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An Overview of Decision Table Literature

1982-1995

by

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Abstract

This report gives an overview of the literature on decision tables over the past 15 years. As much as possible, for each reference, an author supplied abstract, a number of keywords and a classification are provided. In some cases own comments are added. The purpose of these comments is to show where, how and why decision tables are used. The literature is classified according to application area, theoretical versus practical character, year of publication, country of origin (not necessarily country of publication) and the language of the document.

After a description of the scope of the overview, classification results and the classification by topic are presented. The main body of the paper is the ordered list of publications with abstract, classification and comments.

1. Scope of the Overview

A specific remark concerns the size of the literature related to decision tables. The overview consists of 217 references, but this figure is far from exhaustive. One of the reasons for this is that the limited size of bibliographies makes it impossible to get to all documents. Even electronic search facilities (e.g. search engines on the World Wide Web) do not find all documents, because not all of them have been indexed. Thus, the actual number of dcouments that discuss decision tables will be much higher.

To have a better understanding of the evolution of the quantity of literature concerning decision tables, the references are classified per year. The following graph (fig. 1) presents the results.
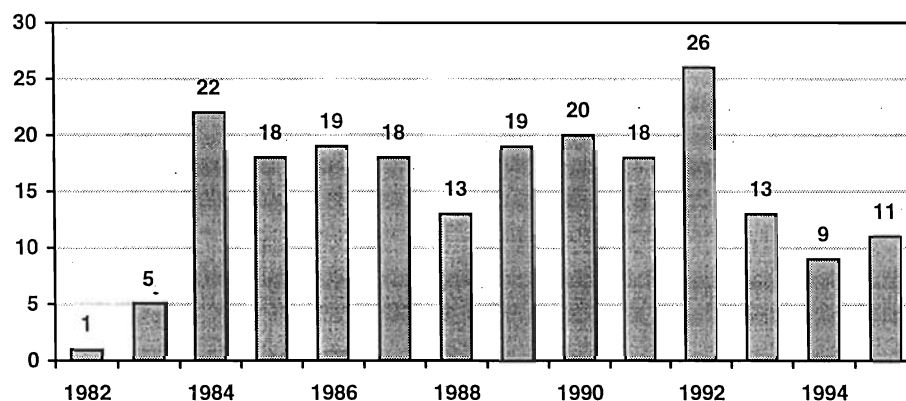

Figure 1: Number of publications per year

The number of publications is more or less constant over the years 1984 to 1992. The only exception is 1988. We are convinced that this deviation is coincidental. The smaller number of publications from 1993 on can be explained by the earlier remark, namely that not all references have been indexed yet, which is especially true for new ones. Similar observations will hold for 1982 and 1983 where publications will not appear in indexing mechanisms because of their age.

2. Classification results

A striking observation from the decision table literature is the diversity of application areas: from expert systems to production systems (possibly automated systems that control the flow of products through the factory), from medicine to legal matters; a wide variety of application areas will be encountered. The area that seems to be discussed most appeared to be expert systems and knowledge representation, which is comprehensible: first of all, expert systems have been discussed a lot, and secondly decision tables are very well suited for use in expert systems. Expert systems and decision support systems are systems that help the user evaluate a situation and take a decision, on the basis of some form of logic representation that must be used in order to reach a conclusion. Decision tables appear to be very well suited for this kind of situations (conditional logic), which is shown extensively in the referenced literature.

The character of the references is distributed equally: 54 documents are theoretical, while 54 others have a more practical nature. 41 references are theoretical as well as practical. The character of the others is unknown.

Another classifcation that is presented is a classification according to country and language. The latter is easy: most of the documents are in English. This is perfectly logical, given the worldwide use of English as a publication language. The number of potential readers of an English paper is far greater than the number of potential readers if that paper was written in e.g. Slovenian. The number of references in languages other than English is marginal, except perhaps for Dutch. The data may however be influenced by the sources of the references. An important source of the overview was in fact the "Excerpta Informatica" database of the Catholic University of Brabant (Tilburg, Holland). Given that this is a Dutch database, it is understandable that Dutch documents will be better represented than e.g. Russian or Chinese texts.

The variety is greater when classifying the documents according to country. First of all the number of referenced countries is larger than the number of referenced languages. This is partly explained by the fact that some countries use the same language (Canada and USA; Holland and Belgium), but also by the fact that some documents are published in a language other than the one normally used in the country of origin, e.g. Finland, India, Israel and Italy. Finally, we see the evident importance of the USA as country of origin.

3. Classification

In order to classify the publications, a, overview is presented of the references according to application area, character, year of publication, country and language. The numbers point to the references in the following section. Some references appear more than once in the classification according to application area, as they concern multiple areas.

3.1. Classification according to application area

- *Expert systems, decision support systems and knowledge representation, artificial intelligence*
  16, 18, 29, 30, 31, 32, 35, 43, 44, 47, 48, 44, 52, 57, 58, 60, 67, 71, 72, 75, 77, 79, 80, 82, 86, 87, 90, 91, 99, 100, 101, 104, 105, 110, 111, 112, 113, 114, 116, 117, 118, 130, 134, 135, 144, 146, 153, 159, 165, 168, 177, 178, 179, 181, 182, 186, 188, 189, 190, 191, 192, 194, 197, 198, 199, 200, 201, 202, 212, 214, 215, 216, 217.

- *Production systems, production planning, process planning, product development*
  5, 23, 37, 53, 58, 82, 83, 89, 134, 173, 179, 182, 183, 211.

- *System development, software development*
  8, 20, 22, 27, 33, 36, 55, 60, 61, 76, 97, 106, 108, 111, 119, 122, 129, 143, 151, 152, 157, 158, 180, 185.

- *Programming, programming languages*
  3, 12, 27, 38, 42, 45, 54, 66, 67, 84, 88, 99, 102, 115, 155, 165, 203.

- *Data communication, telecommunication*
  10, 40, 76, 95, 125, 204.

- *Control systems*
  2, 21, 26, 56, 59, 62, 73, 80, 120, 123, 128, 138, 140, 148, 150, 156, 158, 162, 170, 173, 187, 213.

- *Databases, file management*
  3, 10, 26, 32, 43, 79, 89, 105, 121, 142, 155, 201, 212.

- *Tools, CASE tools, preprocessors*
  1, 4, 5, 46, 81, 83, 171, 172, 188.

- *Algorithms*
  93, 124, 130, 136, 137, 140, 147, 149, 166, 169, 208, 212.

- *Decision formalisms*
  14, 15, 19, 22, 34, 36, 45, 50, 51, 55, 65, 66, 68, 70, 84, 98, 103, 107, 109, 121, 126, 139, 140, 143, 146, 148, 154, 169, 184, 193, 195, 196, 198, 204.

- *Applied mathematics*
  6, 7, 9, 17, 18, 24, 25, 26, 39, 42, 56, 64, 78, 85, 91, 92, 93, 94, 95, 96, 103, 127, 132, 137, 144, 149, 150, 161, 162, 167, 175, 176, 177, 211.

- *Medicine*
  11, 57, 69, 87, 118, 141, 163, 164, 168, 209, 210.

- *Legal matters*
  133, 153, 194, 206.

- *Construction, mining*
  28, 48, 117, 189.

- *Transport*
  13, 39, 78, 144, 145, 160.

- *Nuclear power*
  9, 74, 89.

- *Military applications*
  23, 80, 129.

- *Chemistry*
  62, 170.

- *Robotics*
  63, 131, 160.

3.2. Classification according to character

- *Theoretical*
  2, 4, 11, 12, 14, 18, 24, 25, 42, 43, 45, 50, 51, 56, 78, 92, 94, 95, 98, 99, 103, 106, 108, 110, 119, 121, 123, 124, 125, 127, 130, 131, 132, 138, 139, 140, 143, 148, 158, 162, 169, 173, 174, 175, 180, 187, 193, 196, 197, 198, 200, 203, 214, 216.

- *Practical*
  1, 15, 31, 35, 41, 46, 47, 49, 60, 61, 62, 63, 67, 68, 69, 70, 72, 73, 76, 77, 80, 81, 115, 116, 118, 120, 126, 129, 135, 141, 142, 147, 151, 155, 157, 159, 160, 163, 164, 170, 171, 172, 178, 181, 184, 194, 195, 204, 206, 208, 209, 210, 212, 213.

- *Theoretical / practical*
  3, 6, 8, 9, 10, 16, 17, 19, 20, 26, 29, 32, 39, 57, 64, 71, 74, 84, 86, 87, 91, 93, 96, 100, 114, 136, 137, 144, 149, 150, 153, 161, 168, 176, 185, 189, 199, 201, 202, 215, 217.

3.3. Classification according to year

- *1982*
  109.

- *1983*
  27, 43, 111, 187, 191.

- *1984*
  6, 12, 14, 21, 23, 28, 33, 34, 51, 52, 58, 75, 79, 79, 82, 98, 102, 179, 185, 186, 203, 217.

- *1985*
  15, 47, 49, 53, 59, 83, 84, 89, 92, 100, 101, 106, 108, 139, 165, 166, 180, 183.

- *1986*
  3, 5, 40, 50, 62, 65, 68, 69, 85, 88, 107, 123, 125, 128, 135, 138, 140, 156, 169, 174, 182, 192, 204, 211.

- *1987*
  7, 13, 25, 35, 37, 48, 55, 112, 117, 132, 134, 145, 146, 148, 150, 167, 209, 214.

- *1988*
  10, 18, 19, 22, 38, 60, 66, 110, 114, 137, 153, 196, 207.

- *1989*
  4, 11, 36, 67, 73, 80, 86, 93, 99, 104, 119, 121, 136, 147, 158, 168, 175, 205, 212.

- *1990*
  16, 30, 31, 32, 45, 74, 77, 91, 94, 115, 120, 129, 142, 154, 157, 176, 181, 189, 190, 213.

- *1991*
  61, 64, 71, 76, 90, 95, 103, 113, 116, 124, 126, 130, 133, 155, 160, 178, 193, 208.

- *1992*
  2, 8, 9, 20, 24, 29, 42, 54, 56, 63, 87, 96, 118, 127, 131, 143, 151, 152, 159, 161, 162, 170, 173, 184, 215, 216.

- *1993*
  26, 39, 41, 72, 78, 97, 122, 144, 149, 164, 177, 188, 194.

- *1994*
  44, 57, 105, 141, 163, 195, 197, 199, 200.

- *1995*
  1, 46, 70, 81, 171, 172, 198, 201, 202, 206, 210.

3.4. Classification according to country

- *Australia*
  29, 30, 31, 32, 46, 69, 203, 204.

- *Belgium*
  15, 77, 116, 141, 194, 195, 196, 197, 198, 199, 200, 201, 202.

- *Canada*
  25, 55, 78, 144, 209, 215.

- *China*
  56, 212, 216.

- *Germany*
  27, 62, 67, 80, 83, 91, 167, 168, 180.

- *Finland*
  74, 145.

- *France*
  21, 63, 149, 150, 190.

- *Hong Kong*
  126.

- *India*
  17, 118, 119, 147, 148.

- *Israel*
  64, 127.

- *Italy*
  41, 43, 50.

- *Japan*
  73, 79, 120, 121, 131, 156, 161, 185.

- *Yugoslavia*
  18.

- *Holland*
  38, 40, 65, 66, 104, 105, 107, 108, 109, 110, 113, 122.

- *Poland*
  136, 138, 139, 140, 175, 176, 177, 187.

- *Roumenia*
  45.

- *Russia*
  9, 96, 106, 160, 214.

- *Spain*
  11.

- *Taiwan*
  26.

- *UK*
  4, 57, 76, 90, 99, 115, 141, 157, 181.

- *USA*
  1, 2, 3, 5, 7, 8, 10, 13, 16, 20, 23, 24, 33, 34, 36, 39, 42, 47, 48, 49, 52, 53, 54, 58, 59, 60, 68, 71, 72, 75, 81, 82, 84, 85, 86, 87, 89, 92, 93, 94, 95, 100, 101, 102, 103, 111, 112, 114, 117, 124, 128, 129, 132, 134, 137, 151, 152, 154, 155, 159, 162, 163, 164, 165, 166, 169, 170, 171, 172, 173, 174, 178, 179, 182, 183, 184, 186, 189, 191, 208, 210, 211, 213, 217.

- *South Korea*
  158.

3.5. Classification according to language

- *Chinese*
  56, 215.

- *German*
  27, 62, 167, 180.

- *English*
  1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 16, 17, 20, 21, 23, 24, 25, 26, 29, 30, 31, 32, 33, 34, 35, 36, 37, 39, 41, 42, 43, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 57, 58, 59, 60, 61, 64, 67, 68, 69, 71, 72, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 89, 90, 91, 92, 93, 94, 95, 98, 99, 100, 101, 102, 103, 105, 106, 108, 110, 111, 112, 114, 115, 116, 117, 118, 119, 121, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 134, 135, 136, 137, 138, 139, 140, 141, 144, 145, 147, 148, 149, 150, 151, 152, 154, 155, 156, 157, 158, 159, 162, 163, 164, 165, 166, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 181, 182, 183, 184, 185, 186, 187, 188, 189, 191, 195, 197, 198, 199, 200, 201, 202, 203, 204, 205, 207, 208, 209, 210, 211, 212, 213, 214, 215, 217.

- *French*
  63, 190.

- *Japanese*
  73, 120, 161.

- *Dutch*
  15, 38, 40, 65, 97, 104, 107, 113, 122, 133, 141, 143, 153, 192, 193, 194, 196, 206.

- *Russian*
  9, 96, 160.

- *Slovenian*
  18.

4. Overview of the literature

[1]   ---, *"SILK, the simple Cobol case tool"*, http://vianetinc.clever.net/SILK/

No abstract available.

No keywords available.

Classification: ♦ Application area: Case tools, preprocessors
                  ♦ Character: Practical
                  ♦ Year, Country, Language: 1995, USA, English

Comments: Silk (Simple In-line Logic Kompiler) is a tool that helps the programmer converting decision tables to Cobol code and vice versa. The input is a table from which Silk generates Cobol code. The code contains a number of 'cases' that are labeled and numbered for easy reference. The code also contains the original tables. The conversion of code to tables is possible as well, through the use of the Klis reengineering feature, even if the code is very complex or poorly structured ('spaghetti-code'), according to the author. Other Silk functionalities are an editor for creating and editing tables and a report facility for statistical data. Silk can be downloaded from: "vianetic.com/pub/silk.exe".

[2]   Abdelnour G., Cheung J., *"Transient response analysis of a fuzzy logic controller"*, IEEE Int
        Conf Fuzzy Syst, IEEE Service Center, Piscataway, NY, USA (1992) p. 503-510.

Abstract: The exponential-input describing function technique is utilized to investigate the transient response of a fuzzy controller. The symmetric features that fuzzy addition introduces in the decision table of a fuzzy control algorithm made possible the decoupling of the effects of the output error time sequences and, consequently, the representation of the algorithm by multilevel relays. Computer simulations were carried out on a second-order system to assess the performance of the controller, and determine the accuracy of the approximate solution.

Keywords: control system analysis, describing functions, fuzzy control, transient response, performance assessment, approximate solution accuracy, fuzzy logic controller, exponential-input describing function, symmetric features, fuzzy addition, decision table, fuzzy control algorithm, decoupling, output error time sequences, second-order system.

Classification: ♦ Application area: Control systems
                  ♦ Character: Theoretical
                  ♦ Year, Country, Language: 1992, USA, English

[3]   Akram S., *"An integration of decision tables and a relational database system into a Prolog environment"*, (University Microfilms International Ann Arbor (Michig.), Fasc. Ed.,
        Birmingham (1986).

No abstract available.

No keywords available.

Classification: ♦ Application area: Databases, programming languages
                  ♦ Character: Theoretical / practical
                  ♦ Year, Country, Language: 1986, USA, English

Comments: In this ork, the integration of Prolog, decision tables and a relational database system is examined. In a first step Prolog is integrated in a relational database system. Next the functionalities of the system are upgraded to be able to process decision tables with non-variable entries. In a third and last step the system is further adapted to process variable entries. The relational database system offers storing and manipulation facilities for the decision tables. Prolog takes care of the query functionalities, provides the system with a programming language for application programs and offers the decision tables (thet describe the problem) the possibility to execute the decision rules. Finally, by means of decision tables, data items can be made variable and the relations between them can be modeled. To make the manipulation of decision tables possible 2 extra components are added to the system: a meta data component and a rule base. The meta data component provides information about the entries of the decision rules and is implemented as 4 relationship types in the database. The second component, the rule base, stores the decision rules, considering the information in the meta data component. The rules that are entered in the system are automatically checked. In his conclusion, the author claims that the integrated approach as described above has a number of advantages in comparison with expert systems: modeling power and mathematical foundation.

[4]   Al-Koraishi F., *"Decision table preprocessor for PASCAL"*, Dissertation Univ. Wales, Swansea, UK, (1989).

Abstract: The report describes the development of a decision table preprocessor for the PASCAL programming language. The various factors influencing the design of such a system are also discussed. Decision table characteristics, types and defects are described with particular reference to the limited entry decision table approach. There are three main methods for converting decision tables to computer programs: the mask method, the test-and-branch method and the switch method. The characteristics of these methods are described. A variation on the switch method has been implemented using the PASCAL language. The resultant preprocessor, PASPREP, was then tested on a variety of programming tasks. PASPREP works only on decision tables of the limited entry type. Extension to other types could be implemented, although, most types of decision table can be reduced to a limited entry format by a fairly simple syntactic procedure. PASPREP, like all decision table preprocessors, requires its input to be in a special format. This has been designed to emulate the format commonly met in manual processing. Decision tables can implement the three basic control structures (sequence, selection, and iteration) necessary in procedural programming languages. PASPREP was tested on some standard algorithms (e.g. binary search) to illustrate this feature.

Keywords: decision tables, program processors, decision table preprocessor, PASCAL programming language, limited entry decision table approach, computer programs, mask method, test-and-branch method, switch method, PASPREP, syntactic procedure, control structures, procedural programming languages.

Classification: ◆ Application area: Case tools, preprocessors
                  ◆ Character: Practical
                  ◆ Year, Country, Language: 1989, UK, English

[5]   Allen K., *"Computer-aided process planning: software tools"*, American Society of Mechanical Engineers, Production Engineering Division (Publication) PED, vol. 21, ASME, New York, NY, USA (1986) p. 391-400.

Abstract: In an effort to improve process selection and process planning consistency, many large, medium-sized, and small manufacturing companies are developing their own approaches to computer-aided process planning. The reasons for this are lower initial cost, need for customizing, and long-term system maintenance. This paper reviews five classes of software tools that are being used by vendors and in-house industrial terms for developing computer-aided process planning systems.

Keywords: computer aided manufacturing, production engineering, computer software, artificial intelligence, database systems - management, computer systems programming - decision tables, computer aided process planning, software tools, long term system maintenance.

Classification: ◆ Application area: Case tools, process planning
                  ◆ Character: Unknown
                  ◆ Year, Country, Language: 1986, USA, English

[6]   Arndt K., *"Approximation of three-phase multichannel mass service systems with blocking"*, Tekhnicheskaya Kibernetika, vol. 22, nr. 1 (1984) p. 28-34.

Abstract: A new method is suggested for calculating certain characteristics of a stationary three-phase multichannel mass service system with blocking of devices for an incoming Poisson flow and with exponentially distributed service times. Topics include three-phase mass service system with blocking and the approximation method.

Keywords: systems science and cybernetics - theory, maintainability, mathematical statistics - theory, computer systems programming - decision tables, mathematical techniques - approximation theory, probability, poisson flow, scalar methods, phase blocking, flow of serviced calls, multiphase mass service system.

Classification: ◆ Application area: Applied mathematics
                  ◆ Character: Theoretical / practical
                  ◆ Year, Country, Language: 1984, Unknown, English

[7]   Arora J., *"Interactive design optimization"*, Proceedings of the Sessions at Structures Congress '87, ASCE, New York, NY, USA (1987) p. 256-269.

Abstract: The present paper describes general algorithms suitable for interactive design optimization. Several queries that can aid the design optimization process are described and algorithms to implement them are given. Using these queries the designer can actually guide the design process toward improved designs and, finally, the best design. Several other capabilities, such as graphics that can aid the interactive design decision making process are described and demonstrated with example problems.

Classification: ◆ Application area: Applied mathematics
                  ◆ Character: Unknown
                  ◆ Year, Country, Language: 1987, USA, English

[8]   Ashar P., Ghosh A., Devadas S., *"Boolean satisfiability and equivalence checking using general Binary Decision Diagrams"*, Integration, the VLSI Journal, vol. 13, nr. 1 (1992) p. 1-16.

Abstract: We show how general Binary Decision Diagrams (BDDs), i.e. BDDs where input variables are allowed to appear multiple times along any path in the BDD, can be used to check for Boolean satisfiability. Our satisfiability checking strategy is based on an input smoothing operation on general BDDs. We develop various input smoothing strategies for general BDDs. In order to verify the equivalence of two functions f1 and f2, we check f1 direct sum f2 for satisfiability. General BDDs are not a canonical form and are a much more powerful representation than reduced, ordered BDDs (OBDDs). For example, it has been shown that a general BDD of $O(n^3)$ size can be constructed for an n multiplied by n multiplier. Using general BDDs we were able to verify different implementations of a 16 multiplied by 16 multiplier, a modified Achilles-heel function and a complex add-shift function. It was not possible to construct OBDDs for any of the three functions. The verification was carried out without requiring any additional information, other than the given logic-level descriptions. The use of general BDDs, as opposed to OBDDs, also dramatically reduces the memory requirements to verify other classes of circuits.

Classification: ◆ Application area: Software development
                  ◆ Character: Theoretical / practical
                  ◆ Year, Country, Language: 1992, USA, English

[9]   Baldin B., Volkov A., al., *"Device of fast selection on the basis of parallel decision tables for operating in conditions of increased multiplicity of registered events"*, Pribory i Tekhnika Eksperimenta, nr. 1 (1992) p. 91-109.

Abstract: Device of rapid event selection on the basis of decision tables was described. Device performance calculated by Montte-Carlo method and experimental results obtained on particles beam in case of device operation being part of physical device were presented. The device was developed for usage in combination with 3 track detectors (hodoscopes), each containing 32 elements and was designed for analysis of up to 3 coordinates in each hodoscope during time period not exceeding 160 ns. K500KU415 integral microcircuits were used as memory element. Electronic equipment, hodoscope design, programmes for calculating decision tables and equipment service were described.

Classification: ◆ Application area: Applied mathematics, nuclear power
                  ◆ Character: Theoretical / practical
                  ◆ Year, Country, Language: 1992, Russia, Russian

[10] Bannon D., *"On distributed database requirements for the intelligent network"*, IEEE Global Telecommun Conf and Exhib Commun for the Inf Age Conf Rec, IEEE Service Center, Piscataway, NY, USA (1988) p. 325-329.

Abstract: Ways to manage the distributed database requirements for the intelligent networks (INs) of the future are considered. The nature of the program decision-making tables and data which will be allocated between the switching nodes and the IN database platforms is discussed. The implications of matching current centralized switching system translation lookups and program decision speeds with lookups performed at distant IN database platforms by means of intermediate data links with limited (56 kb/s) transfer speeds are examined. It is suggested that these aspects must be considered before standard distributed-database management techniques can ensure overall performance integrity.

Classification: ◆ Application area: Databases, data- and telecommunication
                 ◆ Character: Theoretical / practical
                 ◆ Year, Country, Language: 1988, USA, English

[11]   Barro S., Ruiz R., al., *"Algorithmic sequential decision-making in the frequency domain for life threatening ventricular arhythmias and imitative artefacts: a diagnostic system"*, Journal of Biomedical Engineering, vol. 11, nr. 4 (1989) p. 320-328.

Abstract: A preliminary study to approach the problem of reliably detecting life threatening ventricular arrhythmias in real time is described. An algorithm (DIAGNOSIS) has been developed in order to classify ECG signal records on the basis of the computation of four simple parameters calculated from a representation in the frequency domain. This algorithm uses a set of rules constituting an operative classification scheme based on the comparison of the parameters with a set of pre-established thresholds. This allows us to differentiate four general categories: ventricular fibrillation-flutter, ventricular rhythms, imitative artefacts and predominant sinus rhythm.

Keywords: biomedical engineering - electrocardiography, computer aided analysis, computer programming - algorithms, computer systems programming - decision tables, algorithmic sequential decision making, frequency domain, ventricular arrhytmias, spectral analysis, clustering, electrocardiographic diagnosis.

Classification: ◆ Application area: Medicine
                 ◆ Character: Theoretical
                 ◆ Year, Country, Language: 1989, Spain, English

[12]   Batorevich N., Bilkun S., *"Comparison of some nonprocedural systems"*, Programmirovanie, vol. 10, nr. 6 (1984) p. 299-304.

Abstract: We attempt to systematize and carry out a comparative analysis of several nonprocedural languages. An informal description of a nonprocedural language system is given. The description is illustrated by a number of examples.

Keywords: computer programming languages, computer systems programming - decision tables, nonprocedural languages, table-driven languages, functional languages.

Classification: ◆ Application area: Programming languages
                 ◆ Character: Theoretical
                 ◆ Year, Country, Language: 1984, Unknown, English

[13]   Beagan D., Bromage E., *"Trip table estimation from observed traffic volumes"*, Proceedings of the North American Conference on Microcomputers in Transportation, ASCE, New York, NY, USA (1987) p. 275-283.

Abstract: This estimation technique identifies the most likely trip table to produce a specified set of traffic counts when assigned to a representative highway network. The resultant table is derived from an entropy maximizing procedure which seeks to define a trip table with the highest degree of disorder or randomness among zone exchanges. Observed traffic counts, network characteristics, and a 'seed' trip table serve to constrain the derivation of this highest disorder table. Trips among all zone pairs are modified in an effort to match observed volumes. Adjustments are made to as many trip table cells as necessary. A package of programs has been written which operate on IBM and IBM compatible microcomputers with a minimum of 512K RAM. Satisfactory results have been achieved in calibrating gravity model derived seed tables and uniform value tables where sufficient count data were available.

Keywords: transportation - route analysis, computer systems programming - decision tables, traffic surveys - computer aided analysis, computers, microcomputer, trip table estimation, observed traffic volumes.

Classification: ◆ Application area: Transport
                 ◆ Character: Unknown
                 ◆ Year, Country, Language: 1987, USA, English

[14]   Belanger R., *"Can't decide?"*, Microcomputing, vol. 8, nr. 5 (1984) p. 94-100.

Abstract: A decision-making utility, the Decision Aid Program, is introduced that is designed as a help in evaluating options and alternatives using a simple mathematical technique. Whether one is making a personal choice or considering a business decision, this program helps by providing a methodical, orderly process for weighing the options. The mathematics is elementary and follows the general scheme you use at an intuitive level. First, you define your options. Then you enumerate the criteria to be used in judging these options. Next, you specify the weight you wish to assign to each of the criteria. The last step is to rate each of the options on each of the criteria. The weighted score for each option is then computed by

multiplying each rating by its corresponding weight and summing the products across all of the criteria. The weighted total scores are then listed in descending order to show the relative attractiveness of each option at a glance.

Keywords: decision theory and analysis - computer applications, computer programs, computer systems programming - decision tables, decision aid program, weighted scores, total scores listing, option weighting.

Classification:
- Application area: Decision formalisms
- Character: Theoretical
- Year, Country, Language: 1984, Unknown, English

[15] Bertels R., *"Onderzoek naar het Gebruik van Beslissingstabellen in de Praktijk"*, Eindverhandeling, K.U.Leuven, Dept. Toegepaste Economische Wetenschappen (1985).

No abstract. available.

No keywords available.

Classification:
- Application area: Decision formalisms
- Character: Practical
- Year, Country, Language: 1985, Belgium, Dutch

[16] Bezek J., *"Decision table language and its parallel execution architecture with applications in expert systems"*, (University Microfilms International Ann Arbor (Michig.), Diss. Doct. Ph. Adv. Techn., Binghamton (1990) 235p.

No abstract available.

No keywords available.

Classification:
- Application area: Expert systems
- Character: Theoretical / practical
- Year, Country, Language: 1990, USA, English

Comments: In this book a programming language is discussed that allows algorithms to be expressed as decision tables: DTL, decision table language. It is not an extension of an existing language, but it adopts a number of functionalities of existing languages, e.g. parallel processing. The decision tables are separate, executable entities, for which a child process is created when calling it (recursion is made possible this way). This child process can be executed in parallel with other processes. Once DTL is situated, the author examines how the language can be applied to production systems (which in this text means a set of rules and facts) in an associative memory environment and applied in a case study. The importance of associative meory is clear: the different columns of a table can be examined concurrently and therefore, significant efficiency improvements can be gained when consulting the table. The author introduces a simple associative memory architecture that is gradually upgraded to a more complex architecture with more functionalities (e.g. processing more and larger tables). The results of the case studies show that the efficiency of rule oriented systems can be improved by using associative memory , especially when parallel processing is possible.

[17] Biswas S., Rajaraman V., *"Algorithm to decide feasibility of linear integer constraints occurring in decision tables"*, IEEE Transactions on Software Engineering, vol. SE-13, nr. 12, p. 1340-1347.

Abstract: To detect errors in decision tables it is necessary to decide whether a given set of constraints is feasible or not. The authors describe an algorithm to do so when the constraints are linear in variables that take only larger values. Decision tables with such constraints occur frequently in business data processing and in nonnumeric applications. The aim of the algorithm is to make use of the abundance of very simple constraints that occur in typical decision-table contexts. Essentially, the algorithm is a backtrack procedure when the solution space is pruned by using the set of simple constraints. After some simplifications, the simple constraints are captured in an acyclic directed graph with weighted edges. Further, only those partial vectors are considered from extension which can be extended to assignments that will at least satisfy the simple constraints. The algorithm also incorporates an idea by which it can be checked whether or not an (m-2)-array vector can be extended to a solution vector of m components, thereby reducing backtracking by one component.

Keywords: linear mathematical programming, decision theory and analysis, business data processing, integer programming, decision tables, linear integer constraints, backtrack algorithm.

Classification:
- Application area: Applied mathematics
- Character: Theoretical / practical
- Year, Country, Language: Unknown, India, English

[18] Bohanec M., Gyergyek L. Rajkovic V., *"Multiattribute decision making based on an expert system shell"*, Elektrotehniski Vestnik, vol. 55, nr. 3-4 (1988) p. 189-198.

Abstract: A multiattribute decision making, based on a new approach to utility measurement is treated. The approach assumes the decision knowledge acquisition by examples of utilities of some alternatives of their parts. The proposed decision making process differs from the existing ones in offering the possibility of identification and verification of utility functions in a learning loop between the man and a computer. The proposed decision making approach is supported by the corresponding computer programs and it has been successfully used in ten of practical decision making situations.

Keywords: artificial intelligence - expert systems, systems science and cybernetics -multivariable systems, computer systems programming - decision tables, mathematical techniques - fuzzy sets, decision making, utility theory, learning loop.

Classification: ◆ Application area: Expert systems, applied mathematics
                   ◆ Character: Theoretical
                   ◆ Year, Country, Language: 1988, Yugoslavia, Slovenian

[19] Boryczka M., *"Application of the rough sets theory to the analysis of multicriteria decision problems"*, Archiwum Automatyki i Telemechanika, vol. 33, nr. 3 (1988) p. 355-366.

Abstract: The paper is concerned with an application of the rough sets theory (proposed by Pawlak, 1982) to the analysis of multicriteria decision problems. The analysis refers to dependency among criteria and to the possibility of reducing superfluous ones. The reduction of superfluous criteria results in simplification of a decision problem. Taking into account the differences between a multicriteria decision problem and information system used to represent a classification or decision table, some modifications of the theory discussed are proposed. Computer implementations of the algorithms designed to determine dependent criteria and to reduce superfluous ones are outlined.

Keywords: management science, operations research, rough sets theory, multicriteria decision problems, information.

Classification: ◆ Application area: Decision formalisms
                   ◆ Character: Theoretical / practical
                   ◆ Year, Country, Language: 1988, Unknown, Unknown

[20] Bryant R., *"Symbolic Boolean manipulation with ordered binary-decision diagrams"*, ACM Computing Surveys, vol. 24, nr. 3 (1992) p. 293-318.

Abstract: Ordered Binary-Decision Diagrams (OBDDs) represent Boolean functions as directed acyclic graphs. They form a canonical representation, making testing of functional properties such as satisfiability and equivalence straightforward. A number of operations on Boolean functions can be implemented as graph algorithms on OBDD data structures. Using OBDDs, a wide variety of problems can be solved through symbolic analysis. First, the possible variations in system parameters and operating conditions are encoded with Boolean variables. Then the system is evaluated for all variations by a sequence of OBDD operations. Researchers have thus solved a number of problems in digital-system design, finite-state system analysis, artificial intelligence, and mathematical logic. This paper describes the OBDD data structure and surveys a number of applications that have been solved by OBDD-based symbolic analysis.

Keywords: Boolean functions, binary sequences, decision tables, data structures, algorithms, artificial intelligence, formal logic, ordered binary decision diagrams -OBDDs), symbolic analysis, digital system design, finite state system analysis, branching programs.

Classification: ◆ Application area: Software development
                   ◆ Character: Theoretical / practical
                   ◆ Year, Country, Language: 1992, USA, English

[21] Canonne R., Damret J., al., *"Computerized inventory control with tables of decision"*, Proceedings of the IFIP WG 5.7 Working Conference on Advances in Production Management Systems, Elsevier Science, Amsterdam, Neth and New York, NY, USA (1984) p. 173-181.

Abstract: This research work consists of the elaboration of an automatized method for the determination of variables of systems concerning the Stock Control, adapted to the problem of spares of industrial equipments. The main originality of this study lies in the choice of a sampling method elaborated on more than 12000 references and in the elaboration of a computerized model including this method and allowing the calculation of tables of decision directly utilizable by the end users of Stock Control.

Keywords: automobile engine manufacture - inventory control, data processing - manufacturing applications, computer systems programming - decision tables, decision theory and analysis, safety stocks, statistical quality control.

Classification: ◆ Application area: Control systems
                     ◆ Character: Unknown
                     ◆ Year, Country, Language: 1984, France, English

[22]   Carey J., McLeod R., *"Use of system development methodology and tools"*, Journal of Systems Management, vol. 39, nr. 3 (1988) p. 30-35.

No abstract available.

Keywords: systems development, user study, design methodology, structured design, data flow diagram, flowcharting, decision table, Nassi-Shneiderman diagram, Warnier-Orr diagram, HIPO.

Classification: ◆ Application area: Software development, decision formalisms
                     ◆ Character: Unknown
                     ◆ Year, Country, Language: 1988, Unknown, Unknown

[23]   Carringer R., *"On the implementation of group technology support software for process planning"*, AUTOFACT, Conference Proceedings 6th., SME, Dearborn, MI, USA (1984) p. 14.10-14.30.

Abstract: This paper discusses the Air Force Group Technology Support Software (GTSS) and its implementation for the repair process planning of undersea torpedoes. GTSS is described as a decision table processor with flexible capabilities. GTSS has been tailored and installed to classify and retrieve standard process plans. Using GTSS, process planners will experience an elimination of manual preparation of plans, an increase in productivity and an increase in process plan standardization.

Keywords: computer systems programming - decision table, codes, symbolic - standards, military equipment - computer aided manufacturing, information retrieval systems, group technology, repair process planning, CAM.

Classification: ◆ Application area: Military applications, process planning
                     ◆ Character: Unknown
                     ◆ Year, Country, Language: 1984, USA, English

[24]   Chang C. H., Azzam H. K., Dediu H. H., *"Bit decision table for hypercube decomposition"*, Electronics Letters, vol. 28, nr. 8 (1992) p. 736-738.

Abstract: A new algorithm for subcube assignment and decomposition is introduced to solve the fragmentation problem in hypercube (n-cube) processor allocation. The sharing density vector introduced in the prime cube graph strategy is used as a vehicle to develop the new algorithm. A bit decision table is devised to provide the key parameters for determining the decomposition. It is proven that the result of the algorithm is at least 22% better than the sharing density vector approach.

Keywords: hypercube networks, search problems, hypercube decomposition, subcube assignment, fragmentation problem, processor allocation, sharing density vector, prime cube graph strategy, bit decision table.

Classification: ◆ Application area: Applied mathematics
                     ◆ Character: Theoretical
                     ◆ Year, Country, Language: 1992, USA, English

[25]   Chaudhry M., Hasham A., *"Software package for the queueing system $M:x/G/1$"*, Operations Research Letters, vol. 6, nr. 4 (1987) p. 195-196.

Abstract: A user-friendly software package, which should be found useful be researchers, practitioners and students alike, for the bulk-arrival single-server queueing system $M:x/G/1$ is discussed. It finds numerically the steady-state probabilities and moments for the number in the system at each of the three time epochs (pre-arrival, post-departure and random). It also finds the moments for waiting time in queue and busy and idle periods.

Keywords: probability theory - queueing theory, mathematical programming, computer software, computer systems programming - decision tables, bulk arrival, single server systems.

Classification: ◆ Application area: Applied mathematics
                     ◆ Character: Theoretical
                     ◆ Year, Country, Language: 1987, Canada, English

[26] Cheng Y.-L., Wei H.-C., Yuan J., *"On establishment of I/O tables in automation of a fault tree synthesis"*, Reliability Engineering & System Safety, vol. 40, nr. 3 (1993) p. 311-318.

Abstract: A method is presented to model the functional or operational behavior of each unit by (1) executing a failure mode and effect analysis and then determining states of the unit, (2) classifying the deviation of each variable of the unit into finite levels and (3) determining the marginal contribution of each in-variable to each out-variable of the unit for each state. Such results are summarized in a form called the I/O table. After testing and standardization, units and their corresponding I/O tables will be saved in a database to avoid redundant work on this modeling. The fault tree is essentially synthesized in terms of a set of mini-trees, each of which can be obtained from one of the I/O tables. The logic consistency of a fault tree synthesis depends largely on that of the I/O tables, and its efficiency largely depends on such a database of I/O tables being efficiently used. The I/O table originates from an idea by earlier workers, but is both mathematically rigorous and more illustrative from an engineering viewpoint. A comprehensive example is given to show how a mini-tree can be derived in terms of an I/O table.

Keywords: failure analysis, input output programs, mathematical models, automation, trees (mathematics), decision tables, database systems, logic programming, fault tree synthesis, input output tables.

Classification: • Application area: Databases, applied math., control systems
              • Character: Theoretical / practical
              • Year, Country, Language: 1993, Taiwan, English

[27] Chvalovsky V., *"Decision tables"*, Software: Practice and Experience, vol. 13, nr. 5 (1983) p. 423-429.

No abstract available.

Keywords: systems design, implementation, structured programming, COBOL, systematics, decision table.

Classification: • Application area: System development, programming
              • Character: Unknown
              • Year, Country, Language: 1983, Unknown, English

[28] Ciesielski R., Rabe H., Richter S., *"Entscheidungshilfen für Leitstandmaschinisten in Grubenbetrieben mit Bandförderung"*, Neue Bergbautechnik, vol. 14, nr. 4 (1984) p. 124-127.

Abstract: The article presents an algorithm for the control of coal quality mined at different faces and for indicating to the supervisor the ratios of maintaining standard quality of coal at the entrance of the preparation plant.

Keywords: coal mines and mining - conveying, computer systems programming - decision tables, coal preparation - blending, mines and mining - underground transportation, conveyors - control, supervisory control, coal mine quality control.

Classification: • Application area: Mining
              • Character: Unknown
              • Year, Country, Language: 1984, Germany, German

[29] Colomb R., *"Computational stability of expert systems"*, Expert Systems with Applications, vol. 5, nr. 3-4 (1992) p. 411-419.

Abstract: It has been shown that propositional expert systems are equivalent to decision tables, and therefore equivalent to classification systems. In many cases, the elementary facts for the classification may not be accurately known. Even if they are, frequently the expert system reasons on the basis of qualitative descriptors of quantitative measurements, which may be subject to borderline effects. The author considers the computational stability of the classification in the presence of errors in the data, using concepts derived from error-correcting codes, in particular Hamming distance. He suggests a number of methods of analysis of the decision table to identify potential instabilities, and suggests methods of correcting or avoiding these problems.

Keywords: computational complexity, expert systems, formal logic, stability, propositional expert systems, decision tables, classification systems, qualitative descriptors, quantitative measurements, computational stability, error-correcting codes, hamming distance.

Classification: • Application area: Expert systems
              • Character: Theoretical / practical
              • Year, Country, Language: 1992, Australia, English

[30]   Colomb R., Chung C., *"Ambiguity and redundancy analysis of a propositional expert system"*, Proceedings of the 4th Australian Joint Conference on Artificial Intelligence, World Scientific, Singapore (1990) p. 409-419.

Abstract: It has recently been shown that propositional expert systems can be automatically transformed into decision tables. In particular, the 661-rule Garvan ES1 system has been transformed into a decision table with 5286 rows. In attempting to further transform the decision table into a decision tree using ID3, it was discovered that there were many pairs of rows which were not mutually exclusive, so the algorithms did not apply. The number of ambiguities, although a tiny percentage of total pairs of rows, was overwhelming to the knowledge engineer. Techniques were developed using the decision table representation and a file of 9805 correct cases to greatly reduce the number of problems, and to present them clearly to the knowledge engineer so that the rules could be amended to remove the ambiguities. In the process, it was discovered that only 14% of the decision table rows were needed in processing the 9805 cases. The origin of this redundancy was discovered, and some suggestions for improvements to knowledge representation techniques made.

Keywords: decision tables, expert systems, knowledge representation, redundancy analysis, propositional expert system, 661-rule Garvan ES1 system, decision tree, ID3, ambiguities, knowledge engineer, decision table representation, knowledge representation.

Classification: ◆ Application area: Expert systems
                    ◆ Character: Unknown
                    ◆ Year, Country, Language: 1990, Australia, English

[31]   Colomb R., Chung C., *"Very fast decision table execution of propositional expert systems"*, Eighth National Conference on Artificial Intelligence, MIT Press, Cambridge, MA, USA (1990) vol.2, p. 671-676.

Abstract: A formal equivalence between propositional expert systems and decision tables is proved, and a practicable procedure given to perform the transformation between propositional expert systems and decision tables. The method gave an order of magnitude speed increase for a well-known expert system in routine use. The method is very general: adaptations are shown for forward and backward chaining inferencing engines, inexact reasoning, and systems where some facts have a high cost and must be determined only if necessary. A particular application for the decision table representation is in real-time expert systems, since a simple hardware implementation is available which gives further orders of magnitude increase in performance. Finally, the decision table representation greatly simplifies the problem of completeness and consistency checking.

Keywords: decision tables, expert systems, inference mechanisms, real-time systems, inference mechanisms, forward chaining, fast decision table execution, propositional expert systems, backward chaining, inexact reasoning, real-time.

Classification: ◆ Application area: Expert systems
                    ◆ Character: Practical
                    ◆ Year, Country, Language: 1990, Australia, English

Comments: In this paper it is shown that propositional expert systems and decision tables are fully equivalent and this generates a number of advantages on different levels:
a) fast execution
   Tables are very simple structures that can be executed very fast (it is not necessary to search them linearly) and that have limited memory requirements. This leads to the fact that expert systems that represent their logic by means of decision tables can be consulted faster. Additionally, consultation time is not only shorter but limited as well. The advantage of speed can be enlarged by using parallel processors.
b) possibilities of verification
   The logic of an expert system has to be verified and errors resolved. Because of their possibilities of verification on the level of correctness, consistency, completeness and redundancy decision tables are very well suited to establish this verification, even more when considering the speed and the simplicity of the verification process.

[32]   Colomb R., Dixon S., *"Database implementation of an artificial intelligence programming paradigm"*, Proceedings of the 4th Australian Joint Conference on Artificial Intelligence, World Scientific, Singapore (1990) p. 462-473.

Abstract: It is shown how the artificial intelligence programming paradigm of endorsements can be expressed in a database-oriented language. The language is tested by expression in it of a working expert system SIRATAC using the endorsements paradigm which was originally coded in the AI language OPS5. The program is analysed into a propositional component and a component using first order predicate calculus over finite relations. The inference engine can be eliminated using a recently proved equivalence between propositional expert systems and decision tables, resulting in the ability to express the problem in

a declarative logic language but to automatically translate it into a decision table with imbedded database commands.

Keywords: decision tables, deductive databases, knowledge representation, logic programming, SIRATAC, artificial intelligence programming paradigm, database-oriented languaged expert system, endorsements paradigm, OPS5, propositional component, first order predicate calculus, equivalence, imbedded database commands.

Classification:	◆ Application area:	Databases, expert systems
	◆ Character:	Theoretical / practical
	◆ Year, Country, Language:	1990, Australia, English

[33] Colter M., "A comparative examination of systems analysis techniques", MIS Quarterly, vol. 8, nr. 1 (1984) p. 51-66.

No abstract available.

Keywords: comparison, structured analysis, systems analysis, flowcharting, data dictionary, decision table.

Classification:	◆ Application area:	System development
	◆ Character:	Unknown
	◆ Year, Country, Language:	1984, USA, English

[34] Coury B., *"Development and evaluation of a methodology for assessing mental models of complec decision tasks"*, Proceedings of the Human Factors Society 28th Annual Meeting, Human Factors Soc, Santa Monica, CA, USA (1984) p. 133-137.

Abstract: Models of decision making behavior in complex systems are hampered by an incomplete understanding of the way in which operators internally represent information about decision tasks. This paper describes the development and evaluation of a methodology for assessing mental models by humans to represent complex decision tasks. The methodology is based on the analysis of proximity measures using multidimensional scaling (MDS). Six subjects were trained to classify a visually presented stimulus into one of four categories. The MDS methodology was used to track the evolution of the subject's internal model and identify the dimensional information used to classify the stimuli. The relation between the dimensional information revealed by the analysis and subject performance is discussed.

Keywords: computer systems programming - decision tables, industrial plants - automation, artificial intelligence, human engineering, multidimensional scaling, decision making models, stress values, process plant diagnosis.

Classification:	◆ Application area:	Decision formalisms
	◆ Character:	Unknown
	◆ Year, Country, Language:	1984, USA, English

[35] Cragun B., Steudel H., *"A decision-table based processor for checking completeness and consistency in rule-based expert systems"*, Int. J. of Man-Machine Studies 26 (1987) p. 633-648.

Classification:	◆ Application area:	Expert systems
	◆ Character:	Practical
	◆ Year, Country, Language:	1987, Unknown, English

[36] Davis A., *"A comparison for the specification of external system behavior"*, Communications of the ACM, vol. 31, nr. 9 (1989) p. 1098-1115.

Abstract: The elimination of ambiguity, inconsistency and incompleteness in a Software Requirements Specification (SRS) document is inherently difficult, due to the use of natural language. Presented is a survey of available techniques and their underlying model to reduce these negatives in the documentation of a software product's external behavior. The techniques include: finite state machines, decision tables and decision trees, program design language, Structured Analysis / Real Time (SA/RT), statecharts, Requirements Engineering Validation (REVS), Requirement Language Processor (RLP), the specification and description language PAISLey, Petri nets. Eight criteria were defined for the evaluation. The techniques are analyzed, compared and contrasted using each of the eight criteria: understandable to computer-naive personnel, basis for design and test, automated checking, external view (not internal view), SRS organizational assistence, automatic prototype and test generation and appropriate applications.

Keywords: real time system, software engineering, formal specification, software specification, specification language, comparison, structured analysis, Petri net, SDL (Specification and Description Language), decision table, PAISLey, finite state machine, statechart, REVS, RLP, SA/RT.

Classification: ◆ Application area: Software development, decision formalisms
                 ◆ Character: Unknown
                 ◆ Year, Country, Language: 1989, USA, English

[37] de Boer S., *"Selection techniques in methodical design"*, Proceedings of the 1987 International Conference on Engineering Design - International Congress on Planning and Design Theory, ASME, New York, NY, USA (1987) p. 303-310.

Abstract: After an introduction to the Methodical Design process the paper discusses the design matrix as a condensed way of presenting design processes on different levels of complexity and on different levels of abstraction. Detailing the first step of the basic three-step pattern (generate-synthesize-select) the paper then discusses selection techniques and a selection matrix is presented as an example. Finally the paper discusses computer support for design processes, selection techniques and visualizations of selection techniques. Current research in these subjects is described briefly.

Keywords: product design, computer aided design, computer systems programming - decision tables, engineering research, methodical design, design matrix, selection techniques.

Classification: ◆ Application area: Product development
                 ◆ Character: Unknown
                 ◆ Year, Country, Language: 1987, Unknown, English

[38] de Lange A., *"De evaluate-opdracht in Cobol"*, Informatie, vol. 30, nr. 4 (1988) p. 260-264.

No abstract available.

Keywords: programming language, Cobol-85, decision table.

Classification: ◆ Application area: Programming languages
                 ◆ Character: Unknown
                 ◆ Year, Country, Language: 1988, Holland, Dutch

[39] De P., Ghosh J., Wells C., *"Delivery time quotation and order processing with forbidden early shipments"*, Computers & Operations Research, vol. 20, nr. 4 (1993) p. 381-390.

Abstract: We examine the problem of quoting a delivery time to a customer and subsequently processing the customer order, which a manager of a make-to-order firm faces quite often. For reasons of competitiveness, it is desirable to promise a short delivery time. However, because of capacity limitations, such a promise also induces the possibility of tardy deliveries for some items in the order. When acceptable, this is usually expensive; otherwise, to prevent the loss of sales, acquisition of additional processing capacity at a premium becomes necessary. The decision problem is further compounded when early shipments are forbidden, i.e. when the processed items in the order are to be held at their greatest value-added state until the promised delivery time. In this paper, we combine the various tradeoffs involved in the problem to first formulate a basic aggregate cost model. We derive the properties essential for the solution of this model, establish its complexity, and present effective solution procedures (both exact and approximate). Finally, we discuss many practical extensions of the basic model, and indicate how these might be solved.

Keywords: operations research, freight transportation, scheduling, optimization, decision tables, mathematical models, computational methods, computational complexity, industrial management, competitive delivery time, order processing, capacity limitations, forbidden early shipments, basic aggregate cost model.

Classification: ◆ Application area: Transport, applied mathematics
                 ◆ Character: Theoretical / practical
                 ◆ Year, Country, Language: 1993, USA, English

[40] Derfler F., *"Link, link, link: de weg van micro naar mainframe"*, PC+, vol. 3, nr. 7-8 (1986) p. 43-45.

No abstract available.

Keywords: micro computer, data transmission, mainframe, IBM SNA (Systems Network Architecture), interconnection, interface, protocol conversion, emulation, decision table.

Classification: ◆ Application area: Data communication
                 ◆ Character: Unknown
                 ◆ Year, Country, Language: 1986, Holland, Dutch

[41] Di Claudio E. D., Orlandi G., Piazza F., *"A systolic redundant residue arithmetic error correction circuit "*, IEEE Transactions on Computers, vol. 42, nr. 4 (1993) p. 427-432.

Abstract: In highly integrated processors, a concurrent fault tolerance capability is particularly important, especially for real-time applications. In fact, in these systems, transient errors are often present, but are difficult to correct online. Error recovery procedures applied for each processing or memory element require large amount of hardware and can reduce throughput. Residue arithmetic has intrinsic fault tolerance capability and requires less complex hardware. A single error correction procedure based on the use of a redundant residue number system (RRNS) and the base extension operation is proposed. The method uses a very small decision table and works in parallel mode; therefore it is suitable for high speed VLSI circuit realization. A parallel systolic architecture which realizes the algorithm is introduced.

Keywords: digital arithmetic, error correction, parallel algorithms, systolic arrays, VLSI, error recovery, processing element, residue arithmetic, systolic redundant residue arithmetic error correction circuit, concurrent fault tolerance capability, real-time applications, transient errors, memory element, redundant residue number system, decision table, high speed VLSI circuit realization, parallel systolic architecture.

Classification: ◆ Application area: Hardware
                      ◆ Character: Practical
                      ◆ Year, Country, Language: 1993, Italy, English

[42]   Dietrich, S. *"Shortest path by approximation in logic programs"*, ACM Letters on Programming Languages and Systems, vol. 1, nr. 2 (1992) p. 119-137.

Abstract: An approximation paradigm is proposed for logic programming as a simple modification to a complete evaluation strategy. The motivational example illustrates how a straightforward transformation of a declarative specification of the distance between two vertices in a directed graph leads to sophisticated algorithms for computing shortest paths. The goal of the work presented in this paper is not to provide a more efficient computation of shortest paths but to investigate how the intermediate tables, known as extension tables, generated by the complete evaluation strategy might be used in approximation algorithms. We present the ETdistance algorithm, which computes single-source and all-pairs shortest paths over a declarative logic program. The ETdistance algorithm takes advantage of the dynamic programming property of shortest paths and the ability of extension tables to store global information to converge to the optimal solution. To put the ETdistance algorithm in perspective, its execution is compared to those of Dijkstra's single-source and Floyd's all-pairs shortest path algorithms.

Keywords: logic programming, critical path analysis, approximation theory, computer software selection and evaluation, algorithms, PROLOG (programming language), dynamic programming, table lookup, decision tables, shortest paths, Dijkstra's single source shortest path algorithms, Floyd's all pairs shortest path algorithms, approximation paradigm.

Classification: ◆ Application area: Applied mathematics, programming languages
                      ◆ Character: Theoretical
                      ◆ Year, Country, Language: 1992, USA, English

[43]   DiLeva A., Giolito P., *"Database facilities for decision support systems"*, Proceedings of the International Conference on Systems, Man and Cybernetics, IEEE Service Center, Piscataway, NY, USA (1983) p. 845-849.

Abstract: A description is given of some database facilities useful for building decision support systems. In particular, problems related to data management and model management are discussed. The overall architecture of the system is then briefly described.

Keywords: database systems, computer systems programming - decision tables, decision support systems, data management, model management.

Classification: ◆ Application area: Databases, expert systems
                      ◆ Character: Theoretical
                      ◆ Year, Country, Language: 1983, Italy, English

[44]   Dubois D., Koning J.-L., *"A decision engine based on relational aggregation of heuristic knowledge"*, Decision Support Systems, vol. 11, nr. 4 (1994) p. 337-361.

Abstract: Constraint propagation is a matter of logical deduction, but this is not usually sufficient to reach a solution to a problem. Heuristic knowledge is usually needed to go on with the solution search when logical deduction becomes inefficient. The way this second type of knowledge is handled has more to do with decision rather than deduction. A mechanism is suggested to handle heuristic knowledge based on social choice theory. An analogy is proposed between the cooperation among heuristics expressed as decision rules and the voting problem. The decision engine DEBORA is presented. This is a general machinery for local decision making that can be used in conjunction with a constraint propagation system.

Classification:		
	◆ Application area:	Expert systems
	◆ Character:	Unknown
	◆ Year, Country, Language:	1994, Unknown, Unknown

[45]   Dumitrascu, Ioachim, *"Generating Fortran programs from decision tables"*, Ed. Academiei Bucuresti (1990) 312p.

No abstract available.

No keywords available.

Classification:		
	◆ Application area:	Decision formalisms, programming languages
	◆ Character:	Theoretical
	◆ Year, Country, Language:	1990, Roumania, English

Comments: The title of this book is misleading: the contents are broader that one would expect. In fact, it gives an overview of all the aspects connected to decision tables. First of all decision tables and a number of similar techniques, like rules and flow charts, are discussed and classified. Second, the use of decision tables in analysis and design of information systems is introduced and different methods of constructing tables are discussed extensively. A third part covers different methods of verification and compression. In the fourth part of his book, the author talks about the conversion of decision tables into trees and flow charts. The linking of decision tables is discussed extensively as well. The fifth part covers automated code generation from tables by means of preprocessors. A comparative analysis of different preprocessors is made: Decisus, Detoc, Tabdec, Detab-65, ... The DLT-Felix preprocessor is described in detail in the last part.

[46]   Dwyer B., *"Experience with the Cope decision table processor"*, http://www.cs.adelaide.edu.au/users/dwyer/cope.html

Abstract: About ten years ago, decision tables enjoyed much the same place in programming folklore as is now enjoyed by structured programming. Some amazing success stories were recorded. But for most people, they failed to deliver the goods. Perhaps this may be attributed to the performance of the early automatic preprocessors. It may also be argued the DP community was not yet ready for the technology. Cope is a recently developed Cobol pre-processor which is fully compatible with structured programming techniques. It combines clarity of expression with efficient object code. The paper describes some interesting applications and experiences.

Keywords: programming methodology, business applications, Cobol, preprocessors, decision tables, structured programming, program maintenance, optimisation, extended-entry.

Classification:		
	◆ Application area:	Case tools, preprocessors
	◆ Character:	Practical
	◆ Year, Country, Language:	1995, Australia, English

Comments: Recently 'Cope' has been developed: a preprocessor that generates Cobol code from a decision table. The input for the preprocessor is a Cobol program that contains one or more tables, as comments in the program. The tables are optimized and converted to Cobol code. During the optimization, the logical structure stays intact. In this document Cope is discussed. The author estimates that Cope generates 10 to 20% less code than would be generated when converting the tables manually. The programming itself would even be reduced by 50%. There are three reasons for these estimates: first, gotos and procedurenames are generated by Cope; second, conditions and actions have to be entered only once and third, Cope makes it possible to enter similar statements in a shorter notation. The time necessary to debug and maintain generated programs should be reduced as well when using decision tables. In fact, errors can be found quickly by adding a row to the table, that keeps tracks of the active column or group of columns. An additional advantage is the fact that the possibility of introducing new bugs when removing old ones is reduced to zero. The use of Cope also eliminates a number of trivial mistakes that are made very often, like gotos that go nowhere, forgotten interpunctions, non matching ifs and elses, which can lead to a variety of cryptic error messages. By automating the conversion process these mistakes are avoided. Another advantage is the automatic optimization of the generated code. Furthermore, Cope is compatible with the techniques of structured programming. The three basic structures (also called structure primitives) can be transformed to tables. In the text, an example is given, consisting of two blocks, of which the last one is an iteration. The text concludes with a number of disadvantages of Cope: first of all, it takes Cope a lot of time to process the tables. Second, maintaining a table is not always that easy, depending on the editior that is used. Finally, it might take a while for one to get fully experienced in using table notations.

[47]   Economides S., Colen M., *"Microcomputer-based decision support systems aid managers in evaluating alternatives"*, Industrial Engineering, vol. 17, nr. 9 (1985) p. 44-48, 50-51.

Abstract: The article describes a manufacturing batch size problem and illustrates the use of a decision support system (DSS) in a production planning decision. The application scenario is related to the formal decision making process. The implementation of DSS, using a microcomputer (PC) software, is discussed.

Keywords: decision theory and analysis - computer aided analysis, computer systems programming - decision tables, cpmouter, microcomputer - applications, system science and cybernetics - man machine studies, decision support systems, pc software, manufacturing batch size problem.

Classification:	◆ Application area:	Expert systems
	◆ Character:	Practical
	◆ Year, Country, Language:	1985, USA, English

[48]   Einstein H., Salazar G., al., *"Computer based decision support systems for underground construction"*, Proceedings - Rapid Excavation and Tunneling Conference 1987, vol. 2., Soc of Mining Engineers of AIME, Littleton, CO, USA (1987) p. 1287-1308.

Abstract: The MIT tunneling group has developed, over the past decade, a number of decision support tools for the geologist and engineer, planner and designer, owner and contractor involved in underground construction. These computer based tools can be used in the planning and exploration stage of a project, in predesign and design, in construction planning and during construction. Tasks as different as optimizing information collection during exploration and during construction, as selecting major design alternatives in predesign and modifying design during construction, as providing cost and time estimation and considering social and physical environmental constraints, can be handled. Output can be in the form desired by the user ranging from geologic profiles (cross sections) to management reports.

Keywords: construction industry - computer applications, structural design - underground, computer systems programming - decision tables, tunnels and tunneling, computer based decision support systems, modules.

Classification:	◆ Application area:	Construction, expert systems
	◆ Character:	Unknown
	◆ Year, Country, Language:	1987, USA, English

[49]   Elson J., *"Policy and procedure program is a support system for executive decision making"*, Industrial Engineering, vol. 17, nr. 9 (1985) p. 36-42.

Abstract: The article presents a type of decision support system (DSS), the policy and procedure program, which consists of a general decision model, information and system integration, and which is also executive. The two factors needed for an effective program, integrity and process, are discussed. A departmental model is suggested as a means to start the program.

Keywords: decision theory and analysis - applications, computer systems programming - decision tables, management - information systems, policy and procedure program, system integration, decision models.

Classification:	◆ Application area:	Expert systems
	◆ Character:	Practical
	◆ Year, Country, Language:	1985, USA, English

[50]   Ercoli P., *"Quantitative evaluation and selection criteria for implementation of decision tables"*, Microprocessing and Microprogramming, vol. 18, nr. 1-5 (1986) Microarchit, Dev, and Appl, Twelfth EUROMICRO Symp on Microprocess and Microprogram, Venice, Italy (1986) p. 617-621.

Abstract: A new method of decision tables implementation, called 'has-like', is evaluated and compared, both analytically and experimentally, with some of the known methods already available, from the points of view of: ease of implementation, reliability, predictability, speed, memory occupation. This gives practical and quantitative criteria for chooing a method of implementation of decision tables.

Keywords: computer systems programming - decision tables, computers, microcomputer, 'hash-like' method, branch method, decision tree, memory requirements.

Classification:	◆ Application area:	Decision formalisms
	◆ Character:	Theoretical
	◆ Year, Country, Language:	1986, Italy, English

[51]   Eremeev A., *"Correctness of decision tables"*, Programmirovanie, vol. 10, nr. 4 (1984) p. 178-182.

Abstract: The author discusses the question of correctness (completeness and consistency) of decision tables. The concepts of syntactic and semantic correctness of decision tables are introduced. He investigates the possibility of automating the process of checking the semantic correctness of a decision table.

Keywords: computer systems programming - decision tables, syntactic correctness, semantic correctness, automation of checking process.

Classification:	◆ Application area:	Decision formalisms
	◆ Character:	Theoretical
	◆ Year, Country, Language:	1984, Unknown, English

[52]   Eriksen D., *"Synopsis of present day practices concerning decision support systems"*, Information & Management, vol. 7, nr. 5 (1984) p. 243-252.

Abstract: To provide guidance in selecting a decision support system (DSS) that fits specific needs, technically and financially, this article examines the definitions and development of DSS. DSS are broken into groups with similar characteristics to examine current software and applications. These groups include Personal Support Systems, DSS and Local Area Networks, DSS and Emulation, Timesharing Systems, Commercial Data Base Systems, and Integrated System. Within each group, current software and practices are reviewed. The potential buyer has the opportunity to compare DSS packages and possible applications. In addition, a list of important questions to ask when choosing DSS Software is included.

Keywords: computer software - selection, computer systems programming - decision tables, database systems -distributed, computer systems, digital - time sharing, decision theory and analysis - applications, management -information systems, semistructured decisions, personal support systems, local area networks, emulation.

Classification:	◆ Application area:	Expert systems
	◆ Character:	Unknown
	◆ Year, Country, Language:	1984, USA, English

[53]   Falkner C., *"Software Aids for the Economic Evaluation of FMS"*, ASEE Annual Conference Proceedings 1985, vol. 1, ASEE, Washington, DC, USA (1985) p. 136-141.

Abstract: In 1983 Draper Labs completed a five volume report for the U. S. Army Tank Command entitled The Flexible Manufacturing System Handbook. Volume III details the steps required to evaluate and implement a Flexible Manufacturing System (FMS). Application of the approach suggested here has numerous details which need further specification and integration into an overall evaluation system. This paper represents a progress report and perhaps a stimulant to induce the reader to work on this problem. FMS are complex systems impacting throughout the entire manufacturing organization and it is a significant task to design a detailed, ready-to-be-applied evaulation system. Continuing research is in progress towards this objective. Of course the end product cannot be anything more than a framework for customizing by the using firm.

Keywords: computer aided manufacturing, computer software - applications, economics - evaluation, flexible manufacturing systems, multidimensional evaluation, decision tables.

Classification:	◆ Application area:	Production systems
	◆ Character:	Unknown
	◆ Year, Country, Language:	1985, USA, English

[54]   Fan C., Dietrich S., *"Extension table built-ins for Prolog"*, Software - Practice and Experience, vol. 22, nr. 7 (1992) p. 573-597.

Abstract: The ET* algorithm is a complete evaluation strategy for Datalog programs, which are logic programs without function symbols. The ET* algorithm uses extension tables and depth-first iterative deepening to provide the evaluation of pure function-free logic programs as declarative specifications. Extension tables are a memo facility that the algorithm uses both to cut infinite derivation paths for complete evaluation and to optimize the evaluation of logic programs. The original implementation of the ET* algorithm incorporated extension tables as part of the Prolog database using the built-in predicates assert and retract. The advantage of implementing the extension table using the Prolog database is the portability of the ET* algorithm. There are several disadvantages, however, with this approach. One disadvantage is the cost associated with the built-in predicates assert and retract, which are known to be expensive operations in most current Prolog systems. Another disadvantage is the differences across implementations in the semantics that these built-ins provide for dynamic predicates. This paper presents an efficient implementation of extension tables as a global data structure in Prolog, which includes a set of built-in primitives for manipulating the extension table. The ET* algorithm is updated to reflect the utilization of the global extension table data structure. The implementations of the ET* algorithm are compared using time and space performance on a variety of benchmark programs.

Classification: ◆ Application area: Programming languages
                 ◆ Character: Unknown
                 ◆ Year, Country, Language: 1992, USA, English

[55] Fancott T., Jaworski W., O'Mara K., *"On the canonical representation of control flow"*, IEEE Service Center, Piscataway, NY, USA (1987) p. 347-354.

Abstract: Some of the issues involved in the analysis and representation of control flow are briefly discussed. These issues are highlighted by considering various tree, graph, and matrix representations of control flow that can be produced automatically in the ABL/W4 environment from a program's strategy matrix. The software engineering facilities provided by the ABL/W4 environment provide an infrastructure for manipulating the clustering criteria underlying the establishment of the decision points found in a program's control flow. In the ABL/W4 environment that flow is segregated from the rest of the program in much the same way the predicate set is segregated in a decision table. It is shown how to investigate and assess the impact of remodularizing a program's control flow.

Classification: ◆ Application area: Decision formalisms, software development
                 ◆ Character: Unknown
                 ◆ Year, Country, Language: 1987, Canada, English

[56] Feng H., Wang S., *"On self-organizing fuzzy control algorithm with regulating the control rules directly"*, Acta Electronica Sinica, vol. 20, nr. 2 (1992) p. 10-16.

Abstract: The authors have studied the problem of electron and fuzzy quantification of the performance measure sets of a fuzzy control system. But the self-assumption of the control rules is still an outstanding question. A new algorithm with direct regulation the control rules from the control decision table. This algorithm can solve the problem of self-modification and self-generation of the fuzzy control rules. It is shown that the algorithm is simple and applicable from software simulation.

Classification: ◆ Application area: Applied mathematics, control systems
                 ◆ Character: Theoretical
                 ◆ Year, Country, Language: 1992, China, Chinese

[57] File P., Dugard P., Houston A., *"Evaluation of the use of induction in the development of a medical expert system"*, Computers and Biomedical research, vol. 27, nr. 5 (1994) p. 383-395.

Abstract: In an earlier study, two medical expert systems for diagnosing thyroid disorders, developed by the application of induction on a sample of previously diagnosed cases and on expert-generated rules, diagnosed a set of test cases better than an expert system developed by the more traditional method of collaboration between a knowledge engineer and an expert. In this paper, an alternative measure of the accuracy of diagnosis of each system is used to evaluate the systems. Diagnoses for every distinct case represented by a combination of indicating factors are compared with diagnoses that the expert made. The induced systems provide diagnoses for many more distinct cases, but a much higher proportion of these diagnoses is incorrect. It is argued that generalizing to unseen cases is an inappropriate use of induction algorithms. The systematic development of a decision table is a more appropriate method for devising a medical expert system.

Classification: ◆ Application area: Medicine, expert systems
                 ◆ Character: Theoretical / practical
                 ◆ Year, Country, Language: 1994, UK, English

Comments: Transferring knowledge from the expert to a knowledge engineer is an important problem. One way to gather knowledge is the induction of knowledge from a set of examples for which the decisions or results are known. In this paper 3 induction based expert systems are evaluated. This can be done by feeding example data to the different expert systems and comparing the results of the expert systems to those that should be obtained. The example data are taken at random from a set of available examples.

The problem of this approach is that rare cases will be less frequently present in the set than normal cases. This means that they will be tested less thoroughly. However, specifically in rare cases, expert systems can be useful. The system can assist users in situations they are less familiar with. For routine decisions they will rely less on expert systems. As a consequence the expert systems will have to be tested in a different way, by means of decision tables. This approach revealed that induction based expert systems performed poorly on rare cases. Therefore it might be useful to use a different technique of knowledge acquisition: letting the expert construct a correct and complete decision table and generating rules from that table. This method requires a greater effort, but gives better results when using the system to make decisions concerning rare cases.

[58]   Fisher E., Nof S., *"Fades: knowledge-based facility design"*, 1984 Annual International Industrial Engineering Conference, Industrial Engineering & Management Press, Norcross, GA, USA (1984) p. 74-82.

Abstract: Conventional methods for facility design are often challenged by the increased complexity and timeliness needs of decision-making in a flexible, automated production environment. Although these methods can still be most useful, a new approach proposed here would have them invoked for appropriate design situations by a higher-level system which combines them with needed data and decision rules, and provides proper control of the decision-making process. In this paper, we describe a knowledge-based, or 'expert' system approach for the facility design problem. Relevance of previous expert system work to it, and the development of prototype software which implements the approach are presented.

Keywords: industrial engineering - computer aided design, computer systems programming - decision tables, management science - applications, facility design expert system, fades, programmable manufacturing operations, expert systems, CAD.

Classification: ◆ Application area: Expert systems, product development
                  ◆ Character: Unknown
                  ◆ Year, Country, Language: 1984, USA, English

[59]   Foster H. R. Jr., *"Block oriented batch control language"*, Proceedings of the Controls West Conference, Tower Conference Management Co, Wheaton, IL, USA (1985) p. 152-160.

Abstract: Each unit in a batch process moves through a series of distinct states, and most of the time is spent in states waiting for something to happen. A batch process control language is described which utilizes this characteristic. In this language a batch recipe consists of control logic and parameters. The control logic is divided into blocks, where each block controls the process unit in a particular state. The batch control logic for a block is expressed as a decision table. The advantage of using decision tables to express batch control logic is discussed.

Keywords: process control - computer applications, computer programming languages, batch control language, batch recipe, control logic, decision table, batch units, control computer.

Classification: ◆ Application area: Control systems
                  ◆ Character: Unknown
                  ◆ Year, Country, Language: 1985, USA, English

[60]   Francioni J., Kandel A., *"Software engineering tool for expert system design"*, IEEE Expert, vol. 3, nr. 1 (1988) p. 35-41.

Abstract: The properties of design tools for expert systems are identified. A design tool is presented for constructing production-type knowledge bases that provides a straightforward methodology and adheres to these properties. The use of decision tables in software design is discussed, and a modified table that can be used for the present application is presented.

Keywords: computer software - software engineering, artificial intelligence - expert systems, decision theory and analysis, design tools, production type knowledge bases, decision tables.

Classification: ◆ Application area: Expert systems, software development
                  ◆ Character: Practical
                  ◆ Year, Country, Language: 1988, USA, English

[61]   Friedberg A. H., *"A graded approach to achieving spreadsheet validity"*, EDP Auditor Journal, vol. 2 (1991) p. 54-65.

Abstract: End-user computing has been identified and ten problems have been described. A solution to the control of end-user computing that is consistent with the trade-off between the control and productivity issue was discussed. This solution, the graded development approach, was traced from its origin and applied to spreadsheet development. To illustrate the solution, a decision table was constructed to classify spreadsheet models into the three levels of the graded development approach: minimal, partial, and full

documentation. Also, the meaning of levels was described in terms of the spreadsheet validation methods: design techniques, standard procedures, testing methods, documentation practices, and audit/review policies. The graded development approach sends a signal to users: the EDP auditor is aware of the users' efforts to work for increased productivity; that effort is applauded and encouraged. The EDP auditor is trying to help the user by providing quality assurance guidelines, which are not designed to unnecessarily hamper productivity.

Keywords: auditing, decision tables, DP management, personal computing, software engineering, spreadsheet programs, system documentation, spreadsheet validity, end-user computing, control, productivity, documentation, design techniques, standard procedures, testing methods, audit/review policies, graded development approach, EDP auditor, quality assurance guidelines.

Classification: ◆ Application area: Software development
◆ Character: Practical
◆ Year, Country, Language: 1991, Unknown, English

[62] Friedrich R., Hoerig H.-J., *"Zum Entwurf von rechtnergestützten Dispatcheraufgaben in einem Chemiebetrieb"*, Chemische Technik (Leipzig), vol. 38, nr. 10 (1986) p. 416-419.

Abstract: The design of computer aided control tasks of large chemicotechnological systems contains a high complexity of problem analysis, which has to describe on one side the technological specificities and on the other hand the economical and organizational necessities of automation. The task of research on the design of computer aided dispatching problems, especially control problems, is discussed. The use of a global-local-methodical conception gives the possibility to minimize the expense of research and to receive realizable demands for the design-project. In this context, some conditions of application of decision algorithms are introduced in the example of so called V-models and local PA-models.

Keywords: chemical plants - control systems, industrial management - computer applications, computer systems programming - decision tables, computer programming - algorithms, computer aided dispatching, decision algorithms, V-models, local PA models.

Classification: ◆ Application area: Control systems, chemistry
◆ Character: Practical
◆ Year, Country, Language: 1986, Germany, German

[63] Fualdes T., Barrouil C., *"Online perception plane for an autonomous vehicle in a little-known region"*, Bulletin de Liaison de la Recherche en Informatique et en Automatique, nr.139 (1992) p. 26-30.

Abstract: The general problem of definition of the plane for a planetary automatic vehicle is formulated and the choice of an optimal (most relevant) plane is discussed in relation to the costs of perception and measurement error. State-space trajectories in open-loop and closed-loop representations are compared; the closed-loop perception plane is a decision table giving the optimal actions at every point, obtainable from dynamic programming. The validity of the results is discussed briefly.

Keywords: closed loop systems, mobile robots, planning [artificial intelligence], space vehicles, autonomous vehicle, planetary automatic vehicle, measurement error, open-loop, perception plane, decision table, dynamic programming.

Classification: ◆ Application area: Robotics
◆ Character: Practical
◆ Year, Country, Language: 1992, France, French

[64] Gal S., Bachelis B., *"Accurate elementary mathematical library for the IEEE floating point standard"*, ACM Transactions on Mathematical Software, vol. 17, nr. 1 (1991) p. 26-45.

Abstract: The algorithms used by the IBM Israel Scientific Center for the elementary mathematical library using the IEEE standard for binary floating point arithmetic are described. The algorithms are based on the accurate tables method.' This methodology achieves high performance and produces very accurate results. It overcomes one of the main problems encountered in elementary mathematical functions computations: achieving last bit accuracy. The results obtained are correctly rounded for almost all argument values. Our main idea in the accurate tables method is to use nonstandard tables,' which are different from the natural tables of equally spaced points in which the rounding error prevents obtaining last bit accuracy. In order to achieve a small error we use the following idea: Perturb the original, equally spaced, points in such a way that the table value (or tables values in case we need several tables) will be very close to numbers which can be exactly represented by the computer (much closer than the usual double precision representation). Thus we were able to control the error introduced by the computer representation of real numbers and extended the accuracy without actually using extended precision arithmetic.

Classification:	◆ Application area:	Applied mathematics
	◆ Character:	Theoretical / practical
	◆ Year, Country, Language:	1991, Israel, English

[65] Geesink L., *"Ontwerp van een systeem voor construeren van beslissingstabellen"*, scriptie, (1986).

No abstract available.

No keywords available.

Classification:	◆ Application area:	Decision formalisms
	◆ Character:	Unknown
	◆ Year, Country, Language:	1986, Holland, Dutch

[66] Geesink L., van Dijk J., *"The construction of decision tables in PROLOG"*, Angewandte Informatik, vol. 30, nr. 7 (1988) p. 294-301.

No abstract available.

Keywords: decision making, modeling, Prolog, decision table, DETAPRO.

Classification:	◆ Application area:	Programming languages, decision formalisms
	◆ Character:	Unknown
	◆ Year, Country, Language:	1988, Holland, Unknown

[67] Geis W., Schumann M., *"Comparison of rule based expert systems with traditional technology selected examples"*, Expert Systems in Economics, Banking and Management, North-Holland, Amsterdam, Netherlands (1989) p. 437-446.

Abstract: Some people argue that knowledge based systems are nothing else than a realization of decision support systems with a new kind of technology. At least some of the simpler expert systems could have been realized with one of the traditional technologies like third generation languages, decision tables, spreadsheet based software, etc. Therefore, the question comes up, whether the use of expert system methods and expert system shells really results in major advantages. The paper presents a comparison based on three selected business examples. The three applications were developed at the Information Systems Dept. The authors implemented all the systems with their own rule based expert system shell. Alternative implementation technologies were simple COBOL programming, a COBOL/decision table generator combination and an integrated dBASE/LOTUS approach.

Keywords: COBOL, decision support systems, spreadsheet programs, rule based expert systems, knowledge based systems, decision support systems, third generation languages, decision tables, spreadsheet based software, DBASE/LOTUS approach.

Classification:	◆ Application area:	Expert systems, programming languages
	◆ Character:	Practical
	◆ Year, Country, Language:	1989, Germany, English

[68] Gettys D., *"If you write documentation, then try a decision table"*, IEEE Transactions on Professional Communications, vol. PC-29, nr. 4 (1986) p. 61-64.

Abstract: A decision table is a powerful documentation tool based on a simple principle: sets of responses for sets of conditions. It is used to present a large quantity of complex information in a simple, straightforward manner. Since the decision table requires no special symbols or shapes, it is understood by nonprogrammers and programmers alike. It can thus serve as a common denominator for a project team, a quick-reference card, and a step-by-step procedural guide. The author argues that if time is invested in explaining how to use a decision table then both the writer and the user will profit from a valuable documentation tool.

Keywords: information dissemination - technical writing, computer systems programming - decision tables, computer systems, digital - interactive operation, information retrieval systems, computer documentation.

Classification:	◆ Application area:	Decision formalisms
	◆ Character:	Practical
	◆ Year, Country, Language:	1986, USA, English

[69] Glasziou P., Hilden J., *"Decision tables and logic in decision analysis"*, Medical Decision Making 6 (1986), p. 154-160.

Abstract: Unmanageably bushy decision trees result when a decision analysis involves several investigations. They can be simplified for riskless tests by deriving the maximum expected utility decision table for the problem as an intermediate step. This table can be logically summarized as a Boolean expression involving the tests. A minimum-cost testing sequence may then be found by manipulation of the Boolean formulas. The relationship between the resulting decision criteria and the receiver operating characteristics is shown.

Keywords: clinical decision analysis, diagnostic tests, screening.

Classification: ◆ Application area: Medicine
 ◆ Character: Practical
 ◆ Year, Country, Language: 1986, Australia, English

Comments: To make a diagnosis, often a number of (sometimes expensive, difficult or painful) tests will have to be performed. It goes without saying that one will try to limit the number of tests as much as possible by searching the optimal combination of tests. In this paper, decision tables are used in establishing this optimal combination. There are two phases to this process. In the first phase a decision table that describes the problem is constructed. There are four steps in this phase:
1. Consider all possible combinations of different test results.
2. Calculate the posterior distribution of the combinations of different test results, based on the prior distribution of different tests. Any method can be used in doing this. The obtained distribution determines whether or not treatment is necessary. A treatment will be necessary when the value is above a treshold value.
3. Per column, determine the best treatment by maximalizing the expected gain.
4. Per treatment find the logical expressions that appear from the table. You will have as many expressions as there are treatments. E.g.: Apply treatment 1 if (test 1 is positive) or (test 1 is negative and test 2 or 3 positive).
In the second phase the expressions found above are analyzed to extract an order (strategy) of the tests that allows to minimize expected test costs, decision period, strategy complexity or any combination of the previous. A number of pragmatical consideration can affect the optimal strategy as well. The different tests have their own specificity and sensitivity. Combining the tests generates another specificity and sensitivity. Therefore, in this paper the treshold values are parametrized. In fact, by this parametrization the deduced rules will change, just as the probability of treatment. In a ROC curve (Receiver Operating Characteristics) it is visualized how the specificity and sensitivity of the tests that lead to treatment changes. From this curve it can very easily be deduced which tests are better and which can be rejected.

[70] Gorla N., Pu H.-C., Rom W., *"Evaluation of process tools in systems analysis"*, Information and Software Technology, vol. 37, nr. 2 (1995) p. 119-126.

Abstract: Process tools are used during systems analysis to describe the process logic of bubbles in Data Flow Diagrams. Two experiments were conducted to determine the relative merits of 3 process tools: Structure English from the textual tool category; Decision Tables from the tabular tool category; Nassi-Shneiderman Charts from the graphical tool category. Three performance types were measured: tool-based comprehension to find understandability of the information in the tool itself; context-based comprehension to find understandability of information in the tool in combination with the information in the rest of the structured specification; the time of comprehension. Results indicate that textual tools are better than both graphical tools and tabular tools, when the problem size is smaller and the users are technically (computer) oriented. The tabular tools are better than graphical tools and textual tools, when the problem is moderately large and the users are non-technically (management) oriented.

Keywords: natural language, comparison, structured analysis, systems analysis, data flow diagram, evaluation, decision table, Nassi-Shneiderman diagram.

Classification: ◆ Application area: Decision formalisms
 ◆ Character: Practical
 ◆ Year, Country, Language: 1995, Unknown, Unknown

[71] Grzymala-Busse J. W., *"On the unknown attribute values in learning from examples"*, Methodologies for Intelligent Systems. 6th International Symposium, ISMIS '91, Proceedings, Springer-Verlag, Berlin, Germany (1991) p. 368-377.

Abstract: In machine learning many real-life applications data are characterized by attributes with unknown values. This paper shows that the existing approaches to learning from such examples are not sufficient. A new method is suggested, which transforms the original decision table with unknown values into a new decision table in which every attribute value is known. Such a new table, in general, is inconsistent. This problem is solved by a technique of learning from inconsistent examples, based on rough

set theory. Thus, two sets of rules: certain and possible are induced. Certain rules are categorical, while possible rules are supported by existing data, although conflicting data may exist as well. The presented approach may be combined with any other approach to uncertainty when processing of possible rules is concerned.

Keywords: artificial intelligence, decision theory, learning systems, unknown attribute, learning from examples, machine learning, decision table, rough set theory, uncertainty.

Classification:	◆ Application area:	Artificial intelligence
	◆ Character:	Theoretical / practical
	◆ Year, Country, Language:	1991, USA, English

[72] Halverson R. Jr., *"An empirical investigation comparing decision tables and if-then rules for programming rule based expert systems"*, Proc. 26th Hawaii International Conference on System Sciences, vol. 3 (1993) p. 316-323.

Abstract: This research examines which method is better for programming rule-based expert systems: IF-THEN rules or decision tables. Thirty undergraduate MIS students served as experimental subjects in an eight week study. After four weeks, subjects wrote decision tables covering cases significantly more consistently than IF-THEN rules (p<.01). After eight weeks, however, subjects wrote IF-THEN rules that were significantly more complete (p<.05) and significantly more correct (p<.01). The eighth week test also revealed that subjects preferred decision tables to IF-THEN rules (p<.05), perceiving them to be easier (p<.01). It is interesting that in spite of a significant preference for decision tables, subjects wrote significantly more accurate IF-THEN rules.

No keywords available.

Classification:	◆ Application area:	Expert systems
	◆ Character:	Practical
	◆ Year, Country, Language:	1993, USA, English

[73] Hamaguchi N., Ooya S., Yoshihara T., *"Logic sequence control in CENTUM"*, Yokogawa Technical Report, vol. 33, nr. 3 (1989) p. 205-210.

Abstract: This paper describes the outline of the logic sequence control which has been developed for CENTUM, and the difference between the logic sequence method and the decision table method.

Keywords: control systems, logic sequence control, CENTUM, decision table method.

Classification:	◆ Application area:	Control systems
	◆ Character:	Practical
	◆ Year, Country, Language:	1989, Japan, Japanese

[74] Hamalainen R., *"Decision aid in the public debate on nuclear power"*, European Journal of Operational Research, vol. 48, nr. 1 (1990) p. 66-76.

Abstract: A wide public debate on the future energy policy of Finland was going on at the time of this decision aiding project. The subject of the debate was the question whether a new nuclear power plant should be built or not. To clarify the differences between anti-nuclear and pro-nuclear opinions for the public we carried out a decision analysis of the issue, the results of which was published in Finland's largest daily newspaper. In this study the participants representing the opposite opinions were the Minister of Finance and an industrial chief executive. This paper describes the project and analyzes the two preference profiles. The sensivity of the results and the question of rank reversal are also studied. The merits of the approach and the implications of the results for the debate are discussed.

Keywords: nuclear engineering - public policy, computer systems programming - decision tables, systems science and cybernetics - hierarchical systems, nuclear power plants - Finland, energy policy decision making, decision hierarchy, multiple criteria.

Classification:	◆ Application area:	Nuclear power
	◆ Character:	Theoretical / practical
	◆ Year, Country, Language:	1990, Finland, English

[75] Hamill B., *"Psychological issues in the design of expert sytems"*, Proceedings of the Human Factors Society 28th Annual Meeting, vol. l, Human Factors Soc, Santa Monica, CA, USA (1984) p. 73-77.

Abstract: An expert system is essentially a way to capture the knowledge and expertise of a subject-matter expert and transfer it to a computer program in hopes of creating an 'intelligent' computer system that will emulate the problem-solving and decision-making performance of the expert. Such systems are being built to serve as intelligent advisors and decision aids in a wide variety of application areas. The paper

discusses conceptual issues and underlying expert system design, with references to current psychological and artificial intelligence literature, and urges consideration of these issues before undertaking development of expert systems.

Keywords: artificial intelligence - expert systems, human engineering - design aids, computer systems programming - decision tables, knowledge engineering, knowledge acquisition, knowledge representation, knowledge utilization.

Classification: ◆ Application area: Expert systems
                   ◆ Character: Unknown
                   ◆ Year, Country, Language: 1984, USA, English

[76]   Haughton H., *"Formal development of communications software-a research project"*, Mathematical Structures for Software Engineering, based on the Proceedings of a Conference, Clarendon Press, Oxford, UK (1991) p. 253-274.

Abstract: There has been an increased awareness of the inadequacy of traditional software engineering techniques for developing software. As the application areas in which software can be applied increases, so does the complexity of the corresponding software. Nowhere is this more true than in the area of data communications. It is clear that ambiguities cannot be tolerated. There needs to be a clear and unambiguous way of describing communications software. The project lends perspective to the various methods currently used to unambiguously describe communications software. Collectively, these methods are known as formal methods. Particular interest is paid to the formal development of an ECMA (European Computer Manufacturers Association) application layer communications protocol, with class O recovery. The ECMA protocol has been designed so that it fits in with the ISO (International Standards Organisation) reference model standards for open systems interconnection and is aimed at the highest level, that is, layer 7 of the model. The ECMA protocol description is given in the form of a state decision table (SDT). Thus a methodology for deriving OBJ specifications from those of SDTs has been developed and discussed. The paper concludes by discussing some of the issues involved in the specification. In particular, it is shown how the specification can aid in addressing verification issues.

Keywords: formal specification, open systems, protocols, telecommunications computing, communications software, software engineering techniques, complexity, formal development, application layer communications protocol, class O recovery, ECMA protocol, ISO, open systems interconnection, state decision table, verification issues.

Classification: ◆ Application area: Data communication, system development
                   ◆ Character: Practical
                   ◆ Year, Country, Language: 1991, UK, English

[77]   Hazevoets F., Vanhoutte B., Vanthienen J., *"An expert system interface for consultation of decision table systems"*, Database and Expert Systems Applications. Proceedings of the International Conference, Springer-Verlag, Vienna, Austria (1990) p. 527-530.

Abstract: A decision table consultation environment is proposed, based on a decision table engineering workbench. It combines the advantages of decision tables (table based verification and modelling) with those of common expert system shells, incorporating rule based knowledge representation, extensive consultation facilities (explanation, specific help, selective restart, case archivation) and interfaces to existing procedures and databases.

Keywords: decision tables, expert systems, user interfaces, table based modelling, expert system interface, decision table systems, decision table consultation environment, decision table engineering workbench, table based verification, expert system shells, rule based knowledge representation, explanation, specific help, selective restart, case archivation, databases.

Classification: ◆ Application area: Expert systems
                   ◆ Character: Practical
                   ◆ Year, Country, Language: 1990, Belgium, English

[78]   Higginson J. K., *"Modeling shipper costs in physical distribution analysis"*, Transportation Research, Part A [Policy and Practice]., vol. 27A, nr. 2 (1993) p. 113-124.

Abstract: A common objective of analytical modeling of a shipper's physical distribution system is the minimization of costs. As a result, there are many cost expressions relating to distribution activities. This paper discusses the modeling of shipper costs through an examination of these expressions and their relevance to actual costs. Some conceptual background to the modeling of logistics costs is presented, and general cost classifications relevant to a shipper's distribution system are outlined. The components of each classification are discussed and summarized by reviewing cost expressions in the literature. A decision table is presented to assist modelers in developing such expressions. Specific and general conclusions are given, and issues regarding these conclusions are discussed.

Keywords: transportation, cost minimization, shipper costs, physical distribution analysis.

Classification: ◆ Application area: Transport, applied mathematics
      ◆ Character: Theoretical
      ◆ Year, Country, Language: 1993, Canada, English

[79] Hirouchi T., Kosaka T., *"Effective database formation for decision support systems"*, Information & Management, vol. 7, nr. 4 (1984) p. 183-195.

Abstract: The management and planning databases from the viewpoint of a decision support system's (DSS) architecture are discussed. Since a manager must monitor business activities and plan the future based upon monitored results, a DSS must have these two kinds of databases appropriate for its needs. A management database, i. e. , one for monitoring activities, is constructed mainly from the existing operational databases. Planning databases, i. e. , those for planning activities, are constructed mostly from the management database. The management and planning databases should be connected through DSS's system architecture. This makes the operational data (indicating business activities) directly and immediately available for management decision making.

Keywords: database systems - design, management - information systems, data processing - data structures, computer systems programming - decision tables, decision theory and analysis - applications, codasyl database, decision support model, relational database, database linkage, model-oriented databases.

Classification: ◆ Application area: Databases, expert systems
      ◆ Character: Unknown
      ◆ Year, Country, Language: 1984, Japan, English

[80] Hofmann H., *"On the employment of expert systems in battle simulations"*, Proceedings of Beijing International Conference on System Simulation and Scientific Computing, Pergamon, Oxford, UK (1989) vol.1, p. 477-481.

Abstract: Following a brief review on the different levels and basic processes of combat modelling, the employment of expert systems for the control of closed combat simulations is discussed by means of a battle simulation system on Corps/Army-level. In order to simulate military combat without human interaction (closed simulation), a command, control and intelligence (C^2 I) module is required that models the military C^2 I -process based on a suitable representation of the knowledge and experience of military commanders. So far, C^2 I -modules usually implied decision table approaches. However, in most instances decision tables turned out to be rather cumbersome for an efficient implementation of changes and extensions. In this regard, new expert system approaches appear to be much better suited for modelling the C^2 I-process. However, expert system modules are not easily integrated with the conventionally programmed processes of a combat simulator and usually acquire significant processing times. For the implementation of the C^2 I -process decision tables and some expert system techniques (implementation in LISP, application of commercial expert shells like KEE or S1) were evaluated. The result of this analysis was the development of a new software tool called ROSWITA. It combines the rule-oriented programming style with the high execution speed of conventional programming languages.

Keywords: command and control systems, digital simulation, expert systems, military computing, battle simulations, combat modelling, closed combat simulations, corps/army-level, military combat, military C^2 I-process, decision table, software tool, ROSWITA, rule-oriented programming style.

Classification: ◆ Application area: Military applic., expert systems, control systems
      ◆ Character: Practical
      ◆ Year, Country, Language: 1989, Germany, English

[81] Holloway M., *"TableWise: Decision Table"*, http://shemesh.larc.nasa.gov/tbell-decision-table.html

No abstract available.

No keywords available.

Classification: ◆ Application area: Case tools, preprocessors
      ◆ Character: Practical
      ◆ Year, Country, Language: 1995, USA, English

[82] Howell E., Yancey D., Armstrong B., *"Decision support systems in computer aided manufacturing"*, Fall Industrial Engineering Conference, American Institute of Industrial Engineers, Inst of Industrial Engineers, Norcross, GA, USA (1984) p. 115-124.

Abstract: An overview of the Integrated Decision Support System (IDSS) Build 1 is given. Features include the IDSS 2. 0 simulation subsystem, decision support language, generalized model building, spreadsheet, analysis technique library, and data integration. Case studies of the use of IDSS in four applications in aerospace manufacturing are presented.

Keywords: computer aided manufacturing - applications, aircraft manufacture - computer aided manufacturing, aircraft plants - automation, productivity, decision theory and analysis, computer programming - decision tables, integrated decision support system, aerospace manufacturing, technology transfer.

Classification: ◆ Application area: Expert systems, production planning
              ◆ Character: Unknown
              ◆ Year, Country, Language: 1984, USA, English

[83]   Huellenkremer M., *"Computer aided process planning with help of a decision table generator"*, Toward the Factory of the Future, Proceedings of the 8th International Conference on Production Research and 5th Working Conference of the Fraunhofer-Institute for Industrial Engineering (FHG-IAO), Springer-Verlag, Berlin, West Ger and New York, NY, USA (1985) p. 43-46.

Abstract: The expense of introduction of computer aided process planning systems is very great, because such systems have a high company-specific part. For this reason, a program package was developed, which enables to enter the planning logic into the computer without the need of a programming command. Based on this logic, process plans can be generated.

Keywords: process control, data processing - manufacturing applications, industrial plants - flexible manufacturing systems, process planning systems, decision table generator.

Classification: ◆ Application area: Production planning, tools
              ◆ Character: Unknown
              ◆ Year, Country, Language: 1985, Germany, English

[84]   Hughes H., *"Programming language engineered for beginners"*, Computer Languages, vol. 10, nr. 1 (1985) p. 23-36.

Abstract: As the complexity and size of programs increase, the programmer is challenged with the task of organizing his program in a manner which will enhance intellectual manageability. Thus, the structure and style are critical in regard to writing programs and verifying their correctness. In recent years, considerable emphasis has been placed on the correctness of programs and techniques for engineering them to be correct. However, more emphasis should be placed on designing languages which facilitate constructing correct programs. In an effort to partially address this problem, a language is described which permits users the convenient development of well-structured programs that are easy to read and understand, easy to correct (debug) and modify, and easy to verify the correctness of the program. The language presented permits the use of decision tables for expressing complex logic.

Keywords: computer programming languages, computer software, structured programming, decision tables, top-down design, flowcharts.

Classification: ◆ Application area: Programming languages, decision formalisms
              ◆ Character: Theoretical / practical
              ◆ Year, Country, Language: 1985, USA, English

[85]   Hull K., Griffin H., *"Real-time multiparameter pulse processing with decision tables"*, X- and Gamma-Ray Sources and Applications, Proceedings of the Sixth Symposium,, vol. 242, nr. 3 (1986) p. 450-454 NIMAER.

Abstract: Decision tables offer several advantages over other real-time multiparameter, data processing techniques. These include very high collection rates, minimum number of computer instructions, rates independent of the number of conditions applied per parameter, ease of adding or removing conditions during a session, and simplicity of implementation. Decisions table processing is important in multiparameter nuclear spectroscopy, coincidence experiments and multiparameter pulse processing (HgI_2 resolution enhancement, pulse discrimination, timing spectroscopy). Other applications can be easily implemented.

Keywords: spectrum analysis, computer systems programming - decision tables, data processing - natural science applications, pulse processing, real time analysis, decision tree.

Classification: ◆ Application area: Applied mathematics
              ◆ Character: Unknown
              ◆ Year, Country, Language: 1986, USA, English

[86]   Jain D., Law K., Krawinkler H., *"On processing standards with predicate calculus"*, Computing in Civil Engineering, ASCE, New York, NY, USA (1989) p. 259-266.

Abstract: Symbolic logic is a representational formalism for expressing knowledge and reasoning about knowledge. In this paper, we show how first-order predicate calculus, a powerful logical language, can be used to represent and process design standards. We contrast this approach with earlier works in which decision tables and production systems have been employed for processing standards. Rules for checking properties (completeness, lack of redundancy, and lack of contradiction) of standards are also given.

Keywords: structural design - standards, computer metatheory - formal logic, computer aided design, processing standards, predicate calculus, decision tables, logical languages, standards properties checking.

Classification: ◆ Application area: Knowledge representation
                   ◆ Character: Theoretical / practical
                   ◆ Year, Country, Language: 1989, USA, English

[87]   Jimison H., Fagan L., al., *"Patient-specific explanation in models of chronic disease"*, Artificial Intelligence in Medicine, vol. 4, nr. 3 (1992) p. 191-205.

Abstract: Clinical models of chronic disease characteristically must represent significant uncertainty in both the data input and inferences. This lack of determinism makes it especially difficult for system users to understand and have confidence in the models. This paper presents a representation for uncertainty and patient preferences that serves as a framework for graphical summary and computer-generated explanation of patient-specific clinical decision models. The implementation described is a computer decision aid designed to enhance the clinician-patient consultation process for patients with suspected angina pectoris. The generic angina model is represented as a Bayesian decision network, where the patient descriptors, probabilities, and preferences are treated as random variables. The initial distributions for these variables represent information on the population of patients with anginal symptoms, and the approach provides a method for efficiently tailoring the distributions to an individual patient. This framework also provides metrics for judging the importance of each variable in the model. The graphical interface uses this information to augment the display of a network representation of the model. Variables that are important for clinician-patient communication are highlighted in the graphical display of the network and included in the text explanation in printed patient-education materials. These techniques serve to keep the explanation of the patient's decision model concise, allowing the communication with the patient to focus on the most important aspects of the treatment decision.

Keywords: decision support systems - medical applications, expert systems - inference engine, expert systems - knowledge bases, computer systems programming - decision tables, decision theory and analysis, bayesian decision network, chronic disease models, patient education.

Classification: ◆ Application area: Medicine, expert systems
                   ◆ Character: Theoretical / practical
                   ◆ Year, Country, Language: 1992, USA, English

[88]   Johnson J., *"Users fine-tune 4GL strategies"*, Computerworld, vol. 20, nr. 13 (1986) p. 65-71.

No abstract available.

Keywords: fourth generation language, systems development, programmer productivity, implementation, management policy, strategic planning, cost benefit analysis, MIS department, decision table.

Classification: ◆ Application area: Programming languages
                   ◆ Character: Unknown
                   ◆ Year, Country, Language: 1986, Unknown, Unknown

[89]   Johnson R., Tashjian B., *"Reliability databases"*, Pressure Vessel and Piping Technol 1985 a Decade of Prog, ASME, New York, NY, USA (1985) p. 895-904.

Abstract: Deterministic methodology is applied to data collected for the nuclear plant reliability data system to illustrate the use of such data in problem solving. The results of this exercise demonstrate the feasibility of obtaining point estimates with large confidence levels. Several areas that deserve attention in a broad outline for continued progress in reliability databases are mentioned and industry and government are encouraged to jointly and periodically review what achievements are desired and how they can best be accomplished.

Keywords: database systems - reliability, nuclear power plants - reliability, computer systems programming - decision tables, deterministic methodology, point estimates.

Classification:	◆ Application area:	Databases, nuclear power, production planning
	◆ Character:	Unknown
	◆ Year, Country, Language:	1985, USA, English

[90] Jones A., *"Logic and knowledge representation: an introduction for system analysts"*, Pitman, London (1991) 324 p.

No abstract available.

Keywords: tree structure, knowledge representation, inference engine, logic, mapping, decision tree, decision theory, decision table, reasoning.

Classification:	◆ Application area:	Knowledge representation
	◆ Character:	Unknown
	◆ Year, Country, Language:	1991, UK, English

[91] Juttner G., Feller H., Becker P., *"Knowledge-based expansion of decision tables for process planning systems"*, Methods of Operations Research, vol. 63 (1990) p. 555-564.

Abstract: Knowledge-based expansion of decision table systems for manufacturing process planning is investigated. The main questions addressed by these investigations are the extent to which decision table systems are able to support process planning, their functional limits, and the extent to which knowledge-based systems can be used to solve such problems. Decision table systems are suitable for the planning of variants and of repetition as well as for the performance of different selection tasks. However, such systems can only partially support generative process planning, adaptive planning and alternative planning and are generally unable to carry out operation sequence planning or operation sequence optimization. The authors show how to solve these problems by extending the decision table methodology using decision support and knowledge-based systems. A prototype system is presented. This system is able to find an optimal operation sequence within a given set of order relations between two operations. The core of the system is the A*-algorithm, a graph search technique often used in artificial intelligence applications.

Keywords: decision support systems, graph theory, knowledge based systems, manufacturing data processing, production control, scheduling, search problems, knowledge-based expansion, variant planning, decision tables, manufacturing process planning, selection tasks, generative process planning, adaptive planning, alternative planning, operation sequence planning, operation sequence optimization, A*-algorithm, graph search technique.

Classification:	◆ Application area:	Expert systems, applied mathematics
	◆ Character:	Theoretical / practical
	◆ Year, Country, Language:	1990, Germany, English

[92] Khan A., Shih C.-T., *"On country risk: some preliminary results"*, Oper Res Lett, vol. 4, nr. 3 (1985) p. 135-138.

Abstract: An extraordinary growth in foreign investment by us firms has generated a need for forecasting country risk. We present a behavioral decision model. Expert information is used to identify salient risk factors, and experts provide judgmental ratings of these variables for a sample of countries. A linear model that is able to simulate the experts' decisions is developed from the data.

Keywords: decision theory and analysis, computer systems programming - decision tables, cost accounting -mathematical models, risk studies - assessment, behavioral decision model, finance, forecasting country risk.

Classification:	◆ Application area:	Applied mathematics
	◆ Character:	Theoretical
	◆ Year, Country, Language:	1985, USA, English

[93] Khuri S., *"Optimal and near-optimal space efficient decision diagram algorithms"*, Seventeenth Annu ACM Comput Sci Conf., ACM, New York, NY, USA (1989) p. 467.

Abstract: A preliminary study to approach the problem of reliably detecting life threatening ventricular arrhythmias in real time is described. An algorithm (DIAGNOSIS) has been developed in order to classify ECG signal records on the basis of the computation of four simple parameters calculated from a representation in the frequency domain. This algorithm uses a set of rules constituting an operative classification scheme based on the comparison of the parameters with a set of pre-established thresholds. This allows us to differentiate four general categories: ventricular fibrillation-flutter, ventricular rhythms, imitative artefacts and predominant sinus rhythm.

Classification: ◆ Application area: Applied mathematics, algorithms
                 ◆ Character: Theoretical / practical
                 ◆ Year, Country, Language: 1989, USA, English

[94]   Khuri S., Batarehk A., *"The harmonium and decision problems"*, International Joint Conference on Neural Networks 90 Int Jt Conf Neural Networks IJCNN 90, IEEE Service Center, Piscataway, NY, USA (1990) p. 179-183.

Abstract: Decision tables are modeled by a harmonium in a manner similar to P. Smolensky's implementation of the two-resistor circuit problem on a harmonium (1984). The lower units consist of the condition combinations, while the knowledge atoms are the actions that are to be carried out in response to the outcome of the conditions. Representational and knowledge vectors are defined. In general, some of the components of these vectors are known and the completion problem consists in filling in the rest of the values that are maximally consistent with the fixed features. The model is described by using harmony theory as the measure of goodness to accomplish the completion task. A comparison with more traditional structures for representing decision tables is made. It is argued that the harmonium is a more flexible and robust model, especially when the environment contains imperfect or incomplete situations.

Keywords: computer systems programming - decision tables, electric networks - analysis, decision theory and analysis, mathematical techniques, harmonium, harmony theory.

Classification: ◆ Application area: Applied mathematics
                 ◆ Character: Theoretical
                 ◆ Year, Country, Language: 1990, USA, English

[95]   Klier P., Fateman R., *"On finding the closest bitwise matches in a fixed set"*, ACM Transactions on Mathematical Software, vol. 17, nr. 1 (1991) p. 88-97.

Abstract: In a given large fixed table of bit-vectors, we would like to find, as rapidly as possible, those bit-vectors which have the least Hamming distances from a newly-presented arbitrary bit-vector.

Keywords: vectors, encoding (symbols), online searching, pattern recognition, decision tables, algorithms, trees (mathematics), bit vectors, Hamming distances, hash table, high dimension search, K-D trees, pattern matching.

Classification: ◆ Application area: Telecommunication, applied mathematics
                 ◆ Character: Theoretical
                 ◆ Year, Country, Language: 1991, USA, English

[96]   Kotlyar V., Khomenko L., *"Classes of 'age' distributions"*, Kibernetika i Vychislitel'naya Tekhnika, nr. 3 (1992) p. 92-113.

Abstract: The paper is of a survey nature and contains the analysing of the main results concerning the 'age' classes distributions appeared in this country and abroad recently. In this case those classes are meant, where limitations connected with the behaviour of distribution functions are caused by gradual and irreversible 'ageing' changes of the physical-chemical properties of actual physical systems. It is underscored that this paper has been written, because, in particular, a large number of various results has been obtained and a system analysis should be made. The authors consider the most important classes for distributions of life time of systems. These classes have been suggested for modelling a variety of ageing aspects.

Keywords: systems analysis, service life, reliability, optimization, operations research, mathematical models, aging of materials, decision tables, flowcharting, mathematical transformations.

Classification: ◆ Application area: Applied mathematics
                 ◆ Character: Theoretical / practical
                 ◆ Year, Country, Language: 1992, Russia, Russian

[97]   Kristen G., *"Kiss-methode voor object oriëntatie: van informatie architectuur naar informatiesysteem"*, Academic Service Informatica, Schoonhoven (1993) 416 p.

An introduction to object oriented systems development is provided, as well as an introduction to the KISS methodoLogy. KISS is a methodology for the object oriented development of information systems, which departs from a description of the information architecture and does not depend on a specific programming environment.The organisation itself is taken as a starting point to design the information architecture. Explained is how the KISS methodology can be applied to design the information architecture. Next,

chapters are devoted to natural language and grammar analysis, the modelling of the object, and an example of a bank is given. The chapter on measuring explains the basics that are needed to understand the encapsulation of objects, which is the subject of the next ·chapter. Then, attention is paid to transformation rules to specify the :implementation of the information architecture in a database management system or a programming language. In the chapter about functions, discussed is how functions can be added to the information architecture. The final chapter focuses on the changes in project management by applying other methods, describes how a method can be implemented in an organization. and discusses how information systems can be better developed and managed with CASE tools. After focusing on the systems analyst, two-valued logics are introduced, paying attention to algebraic, tabular and graphic representations of logic. Some basic rules of logic are presented: elementary manipulation procedures, algebraic simplification of expressions, and the algebra of inference. The following chapters consider logical mapping (K-maps, decision tables, tableaux, tree-structured charts, and networks, graphs and matrices); sets, lists and relations; decision logic (decision table and decision trees); logical reasoning (inference and argument, rules of inference, proofs and methods of proving, and clausal forms); and predicate logic. Finally discussed are knowledge representation by data modeling, frames, rules or semantic networks; and further knowledge representation demands upon logic, including problems with time, uncertainty and truth, are described.

Keywords: systems development, design methodology, relational model, object oriented design, information structure diagram, decision table, object oriented model, object oriented analysis, in format ion architecture, encapsulation, KISS (Kristen Iteratie Selectie & Sequentie) method.

Classification: ◆ Application area: System development
◆ Character: Unknown
◆ Year, Country, Language: 1993, Holland, Dutch

[98] Kulikov M., Chervenchuk V., "Optimization of decision tables", Kibernetika, vol. 20, nr. 2 (1984) p. 204-211.

Abstract: The authors discuss the physical meaning of the optimality criterion for the particular optimization problem considered, prove the equivalence of the transformation of the initial description that guarantees its optimization, which reduces the decision forest of the axiomatic model at the cost of knowingly nonoptimal decision trees, and propose an algorithm for transforming the axiomatic model into a quasioptimal decision tree.

Keywords: decision theory and analysis, optimization, computer programming - algorithms, decision tables, optimality criterion, decision trees.

Classification: ◆ Application area: Decision formalisms
◆ Character: Theoretical
◆ Year, Country, Language: 1984, Unknown English

[99] Kumar B., Topping B., "Prolog-based representation of standards for structural design", CIVIL COMP 89 Fourth Int Conf Civil Struct Eng Comp, Civil-Comp Limited, Edinburgh, Scotl. (1989) p. 165-169.

Abstract: This paper presents a representation scheme for the automated processing of structural engineering codes of practice. The representation is based on the Artificial Intelligence language, Prolog. Previously, the provisions of codes of practice have been represented mostly as rules in computer-aided design programs. This paper proposes representing the code of practice provisions as facts and processing them using standard-independent generic rules. Theoretically, this is the same as any program in Prolog in which the most basic components are facts and rules.

Keywords: structural design - standards, artificial intelligence, computer programming, PROLOG-based representation, standard-independant generic rules, knowledge-based systems, decision tables, information networks.

Classification: ◆ Application area: Programming lang., knowledge representation
◆ Character: Theoretical
◆ Year, Country, Language: 1989, UK, English

[100] Leary E., "Decision support systems aid in management of operations, resources and finances", Industrial Engineering, vol. 17, nr. 9 (1985) p. 26, 30-34.

Abstract: The article examines the concept of decision support systems (DSS) as an aid to management decision-making in operations, resources and finances. Applications of DSS software techniques, automated technologies and academic disciplines (such as management science and operations research) to problems of planning and management are also discussed.

Keywords: decision theory and analysis - applications, computer systems programming - decision tables, management science, operations research, management - information systems, artificial intelligence - expert systems, decision support systems (DSS), application system modelling, operations management, resource management, financial management.

Classification:		
	◆ Application area:	Expert systems
	◆ Character:	Theoretical / practical
	◆ Year, Country, Language:	1985, USA, English

[101] Levy L., Stump T., *"Inverted decision tables and their application: automating the translation of specifications to programs"*, AT&T Tech J, vol. 64, pt. 2, nr. 2 (1985) p. 533-558.

Abstract: Code generation techniques are used to program an application characterized by complexity arising from many special cases, and rapid changes due to advances in the state of the art. A formal notation - an inverted decision table written in a propositional logic form - is developed as a means for allowing expert users to describe the application in a knowledge base that code generators then can use to create production code. The complete system described in the paper automatically transforms a one thousand-page specification into a running program. The development of this system is an example of the formalization of the specification of a complex application. In this case the application is a part of the Job Management Operations System, an operational support system to aid regional Bell Operating Company construction and engineering processes. The techniques described, however, can be generalized.

Keywords: computer systems programming - decision tables, computer systems, digital - on line operation, construction work management, inverted decision tables, code generation techniques, job management operations system, operational support system.

Classification:		
	◆ Application area:	Knowledge representation
	◆ Character:	Unknown
	◆ Year, Country, Language:	1985, USA, English

[102] Lew A., *"Proof of correctness of decision tables programs"*, Computer Journal, vol. 26, nr. 3 (1984) p. 230-232.

No abstract available.

Keywords: algorithm, program structure, program correctness, decision table.

Classification:		
	◆ Application area:	Programming
	◆ Character:	Unknown
	◆ Year, Country, Language:	1984, USA, English

[103] Lew A., *"Reduction of dimensionality of an optimal decision table conversion algorithm"*, Computers & Mathematics with Applications, vol. 21, nr. 11-12 (1991) p. 41-49.

Abstract: A dynamic programming algorithm for converting decision tables to optimal decision trees is analyzed. The complexity of the algorithm may be defined as the dimension of the domain of the minimal-cost functional. Upper bounds for this complexity are derived under various assumptions. Methods of reducing the dimensionality of the problem utilizing lower bounds for decision costs are also discussed.

Keywords: computational complexity, decision tables, dynamic programming, reduction of dimensionality, decision table conversion, converting decision, optimal decision trees, complexity.

Classification:		
	◆ Application area:	Decision formalisms, applied mathematics
	◆ Character:	Theoretical
	◆ Year, Country, Language:	1991, USA, English

[104] Lucardie G., *"Beslissingstabellen & kennissystemen: een conceptuele benadering"*, Instituut voor Ruimtelijke Organisatie TNO, Delft (1989) 78 p.

No abstract available.

No keywords available.

Classification:		
	◆ Application area:	Expert systems
	◆ Character:	Unknown
	◆ Year, Country, Language:	1989, Holland, Dutch

[105] Lucardie G., *"Functional object-types as a foundation of complex knowledge-based systems"*, Verhandeling Technische Universiteit Eindhoven, TNO-Bouw, Rijswijk (1994) 275 p.

Abstract: This thesis deals with the process of modeling knowledge for implementation purposes. The characterisation of modeling knowledge as an activity of reconstructing complex object-types and complex objects, explains the need to integrate artificial intelligence and database technology. Three research issues are identified and investigated in more detail. The first research issue concerns the value of a knowledge level integration of artificial intelligence and database technology relative to a symbol level integration. The second research issue concerns the value of the theory of functional classifications as a pivot for a knowledge level integration of artificial intelligence and database technology. The third research issue concerns the value of the integrated application of decision tables and Prolog as a formal language for functional object-types. In this context reported is on the Advanced Knowledge Transfer System (AKTS) that offers extensive facilities for working with decision tables and Prolog. Concluded is with a case study in the domain of the chemical degradation of brick masonry walls which serves as an example of developing a knowledge-based system according to the theory of functional object-types using AKTS.

Keywords: case study, expert system, knowledge representation, chemistry, Prolog, data base theory, logical design, entity-relationship model, decision table, AKTS (Advanced Knowledge Transfer System).

Classification: • Application area: Expert systems, databases, knowledge repr.
                   • Character: Unknown
                   • Year, Country, Language: 1994, Holland, English

[106]   Lukin N., *"Calculation of attributes in epsilon-schemes"*, Vestnik Moskovskogo Universiteta. Seriya XV:Vychislitel'naya Matematika i Kibernetika, nr. 1 (1985) p. 55-59.

Abstract: The author proposes an attribute scheme that is oriented toward the synthesis of translator object codes. It is shown that the proposed scheme can be efficiently implemented by a rigorously deterministic method of calculating attributes.

Keywords: computer operating systems - program translators, computer programming, translator construction systems, decision tables.

Classification: • Application area: Software development
                   • Character: Theoretical
                   • Year, Country, Language: 1985, Russia, English

[107]   Maes R., *"Beslissingstabellen in een kritisch perspectief"*, Maandblad voor Accountancy en Bedrijfshuishoudkunde (1986) vol. 60, nr. 4, p. 154-173.

No abstract available.

Keywords: systems development, user requirements, program structure, programming technique, program testing, data flow diagram, decision table, Nassi-Shneiderman diagram.

Classification: • Application area: Decision formalisms
                   • Character: Unknown
                   • Year, Country, Language: 1986, Holland, Dutch

[108]   Maes R., *"Composed program complexity measure"*, Angewandte Informatik, vol. 27, nr. 1 (1985) p. 91-116.

Abstract: A new program complexity measure is proposed. It is based upon the translation of programs into decision tables while it tries to adjust the control flow complexity measures by incorporating information on both conditional expressions and instructional sequences. A number of remaining problems and research directions are outlined.

Keywords: computer programming, computer software, program complexity, software metrics, logical complexity, decision tables.

Classification: • Application area: System development
                   • Character: Theoretical
                   • Year, Country, Language: 1985, Holland, English

[109]   Maes R., "Minimizing decision grid charts", Angewandte Informatik, vol. 24, nr. 9 (1982) p. 451-455.

No abstract available.

Keywords: decision table, decision grid chart.

Classification: • Application area: Decision formalisms
                   • Character: Unknown
                   • Year, Country, Language: 1982, Holland, English

[110] Maes R., Van Dijk J., *"On the role of ambiguity and incompleteness in the design of decision tables and rule-based systems"*, Computer Journal, vol. 31, nr. 6 (1988) p. 481-489.

Abstract: Reasoning about the practical meaning of ambiguity and incompleteness in decision tables leads to the notion of 'the life cycle of a decision table'. It is shown how both concepts can be applied in a positive sense during that life cycle. Also, a comparison is made of decision tables and rule-based knowledge systems. A number of problems connected with the occurrence of ambiguities and incompleteness in the design of decision tables and rule base systems are discussed.

Keywords: artificial intelligence - expert systems, decision theory and analysis, decision tables, rule-based systems, knowledge-based systems, decision support systems, ambiguity, incompleteness.

Classification:	◆ Application area:	Expert systems
	◆ Character:	Theoretical
	◆ Year, Country, Language:	1988, Holland, English

[111] Mahmood M., Courtney J., Burns J., "Environmental factors affecting decision support system design", Data Base, vol. 14, nr. 4 (1983) p. 23-27.

No abstract available.

Keywords: systems design, DSS (decision support system), design methodology, selection, organization, performance, decision table.

Classification:	◆ Application area:	Decision support systems, system development
	◆ Character:	Unknown
	◆ Year, Country, Language:	1983, USA, English

[112] Marsden J., Pingry D., *"Decision tables for decision support systems design"*, Proceedings of the Hawaii International Conference on System Science 20th, vol. 1., Western Periodicals Co, North Hollywood, CA, USA (1987) p. 647-654.

Abstract: If DSS is to contribute to the firm, then it must contribute to reaching the firm's objective, profit maximization. The present paper outlines the use of decision tables for initial implementation of a critical search strategy for goal driven DSS design set out in two earlier papers.

Keywords: computer systems programming - decision tables, management - information systems, decision theory and analysis, probability, stochastic processes, decision support systems, profit maximalization.

Classification:	◆ Application area:	Decision support systems
	◆ Character:	Unknown
	◆ Year, Country, Language:	1987, USA, English

[113] Martin J., *"Schematechnieken voor systeemanalysten en programmeurs: een basis voor automatisering"*, Academic Service, Schoonhoven (1991) 354 p.

Abstract: Diagrams can help in the design of complex systems and the development of programs. They are also important instruments for documenting programs. First, an inventory is made of the techniques that an analyst should be able to use. Next, attention is paid to the form of structured diagrams, to three kinds of decomposition, and to a consistent diagram notation. The largest part of the book is concerned with some ten kinds of structured diagrams, including: action diagrams, decomposition diagrams, dependence diagrams, data flow diagIams, data analysis and data structure diagrams, entity-relationship diagrams, data navigation diagrams, diagrams for composite access, decision trees and decision tables, state transition diagrams, and dialogue design diagrams. The use and notation of these various diagrams are described and further literature is listed.

Keywords: program documentation, interface design, flow diagram, program design, data structure, data flow diagram, entity-relationship model, information structure diagram, decision table.

Classification:	◆ Application area:	Knowledge representation
	◆ Character:	Unknown
	◆ Year, Country, Language:	1991, Holland, Dutch

[114] Martinez D., Sobol M., *"Systems analysis techniques for the implementation of expert systems"*, Information and Software Technology, vol. 30, nr. 2 (1988) p. 81-88.

Abstract: In this paper the application of system analysis tools for designing knowledge-based expert systems is presented. The paper illustrates the application of the tools with a simplified example drawn from the oil and gas exploration business. The use of a systematic approach in designing expert systems should help the knowledge engineer clearly identify the facts and rules representative of the acquired human knowledge.

Classification: ♦ Application area: Expert systems
                ♦ Character: Theoretical / practical
                ♦ Year, Country, Language: 1988, USA, English

[115] Medford D., *"Decision time for programs"*, Systems International, vol. 18, nr. 2 (1990) p. 65-66.

Abstract: Decision table based languages enable programs to be written accurately and quickly while at the same time making subsequent maintenance comparatively easy. In many computer programs the areas which contain most errors and are the most difficult to follow are those concerned with the testing of a set of conditions in various combinations. It is here that a decision table is of greatest benefit. The two-dimensional nature of the table makes it possible for the logic to be comprehended at a glance. This contrasts with following the often tortuous threads of a set of 'if', then, else' clauses. The program writer is also forced by the table structure to consider all possible combinations of conditions. Because of this, there is less likelihood of the logic failing to cater for the unusual case, so the program is more likely to be right first time.

Classification: ♦ Application area: Programming languages
                ♦ Character: Practical
                ♦ Year, Country, Language: 1990, UK, English

[116] Merlevede P., Vanthienen J., *"A structured approach to formalization and validation of knowledge"*, Proceedings of the IEEE/ACM International Conference on Developing and Managing Expert System Programs, IEEE Comput. Soc. Press, Los Alamitos, CA, USA (1991) p. 149-158.

Abstract: A guideline for structuring and representing knowledge is introduced. The validation problem and how it can be solved using decision tables are addressed. In most cases, decision table engineering is able to provide extensive validation and verification assistance. Moreover, the knowledge acquisition process is well served through the overview and communication abilities of well-structured decision tables. The automated use of decision tables by means of a decision table engineering workbench, the main element behind the method, is shown.

Classification: ♦ Application area: Knowledge representation, expert systems
                ♦ Character: Practical
                ♦ Year, Country, Language: 1991, Belgium, English

[117] Miller R., Milligan J., *"Decision support system for underground construction - a mining case study"*, Proceedings - Rapid Excavation and Tunneling Conference 1987, vol. 2., Soc of Mining Engineers of AIME, Littleton, CO, USA (1987) p. 1329-1341.

Abstract: A computerized 'Decision Support System' was used to evaluate an 'Underground Platform Approach to Oil Recovery'. Over a billion calculations were required to model the mine layouts; learning curves for shaft, tunnel, and well drilling scenarios; detailed cost, schedule, and resource data; complex oil production and material balance data; varying reservoir parameters; and complex oil pricing curves. Simplified 'optimum' solutions were defined in terms of muck hoisting capacity, barrrels of oil per day, and present worth. Complex 'optimum' solutions were defined in terms of minimal exposure scenarios during development followed by shortest time to full production.

Classification: ♦ Application area: Decision support systems, mining
                ♦ Character: Unknown
                ♦ Year, Country, Language: 1987, USA, English

[118] Mishra R., *"A decision table and rule based interpretation system for epileptic discharges"*, International Journal of Clinical Monitoring and Computing, vol. 9, nr. 3 (1992) p. 165-178.

Abstract: The representation of the various features of waveforms and their correlations, in EEG recording for the diagnosis of different diseases have been carried out by many researchers due to the impact of

knowledge based on expert systems development tools and techniques. The realisation of these systems requires a specific hardware and software tool for its implementation, which may be a costly affair. The design and development of low cost effective system for the diagnosis of epileptic patients are reported in this paper. Two different and linked (at certain stage) approaches of a decision table and a rule based system have been followed to model the reasoning processes of the physician in the diagnosis. In the decision table the features of specific waveforms of EEG are represented in the tabular form. The features are obtained from a 8086 microprocessor based data acquisition system. The rule based system is designed with IF and THEN form of rules using Turbo-Prolog as a programming language tool and is implemented on low cost PC-AT. The performance of the system is evaluated by recording of EEG of some epileptic patients. The results obtained are comparable and to a certain extent appreciable in the opinion of the physician.

Keywords: data acquisition, decision tables, electroencephalography, expert systems, medical diagnostic computing, epileptic discharges, rule based system, reasoning, 8086 microprocessor, data acquisition system, turbo-Prolog.

Classification: ◆ Application area: Medicine, expert systems
                 ◆ Character: Practical
                 ◆ Year, Country, Language: 1992, India, English

Comments: In this paper, the reasoning process of a medical doctor when analyzing EEGs (Electro-EncephaloGram) is modelled by means of a system based on decision tables and rules, to be able to develop a low cost system with few system requirements. There are two steps in the process: in the first one the EEGs are analyzed by means of about five linked decision tables. The results of this analysis serves as input for the rule system in the second step, which makes a diagnosis whether or not the patient suffers from specific forms of epilepsy. As said, in the first step the EEGs are analyzed. This requires few calculations and a high level of logical analysis. That is why, according to the authors, the use of decision tables seems attractive. To limit the size of the tables (large tables cause problems of storage and processing) several smaller tables are constructed and linked to each other. In the text 5 tables are used. The first three convert the line-pattern of the EEGs to a number of parameters that will be used further in the analysis. These parameters are used in the fourth table to make a preliminary diagnosis, which will possibly be confirmed by the fifth table, which makes the final diagnosis. The results of consulting the tables give only a diagnosis based on EEG analysis. In the second step these results will be examined further by means of a number of rules. The system will execute a number of queries on the results of the first step. The rule system will process the results of the queries to reach a diagnosis (characterized by a certain reliability) concerning the presence of some form of epilepsy.

[119] Misra A., Chaudhary B., *"Modified structured decision table and its complexity"*, SIGPLAN Notices (ACM Special Interest Group on Programming Languages), vol. 24, nr. 6 (1989) p. 32-34.

Abstract: A modified structured decision table (MSDT) is introduced which is a modification of structured decision Table (SDT) to document stages of the topdown program development. The level definition of MSDT is kept such as to maintain conformation with the top-down methodology of program construction. Further, the MSDT besides functionally converting any flowchart, exposes the construction of a program by considering one basic program construct at a time.

Keywords: computer programming languages - design, computer programming - flowcharts, computer systems programming - decision tables, structured decicion table (SDT), top-down methodology.

Classification: ◆ Application area: Software development
                 ◆ Character: Theoretical
                 ◆ Year, Country, Language: 1989, India, English

[120] Miwa R., Nishikawa H., Kai T., *"Development of sequence control software for the multipurpose production plant"*, Instrumentation and Control Engineering, vol. 33, nr. 5 (1990) p. 30-35.

Abstract: Distributed control systems (DCS) with sequence control play an important role in the automation of batch processes in fine chemical production. There are various types of sequence control software (program) for carrying out sequence control by DCS, such as decision table type, command type and ladder type software. Development of sequence control systems for increasingly numerous complicated programs is costly and requires much labor on the part of the experts, and the use of different makers' DCSs at one plant further increases the burden on the experts. The authors present a method for the efficient development of a sequence system for practical application.

Keywords: batch processing [industrial], chemical industry, process control, programming, distributed control systems, decision table type software, command type software, sequence control software, multipurpose production plant, batch processes, fine chemical production, ladder type software.

Classification: ◆ Application area: Control systems
                ◆ Character: Practical
                ◆ Year, Country, Language: 1990, Japan, English

[121]   Miyakawa M., *"Criteria for selecting a variable in the construction of efficient decision trees"*, IEEE Transactions on Computers, vol. 38, nr. 1 (1989) p. 130-141.

Abstract: Two variable selection criteria are proposed for converting a decision table to a near-optimum decision tree in the sense of minimal average cost of testing. A criterion, Q, is introduced that is based on the potential of a decision table. The previously known criterion 'loss' and Q are combined into a third criterion O. The performance of the three criteria is examined both theoretically and experimentally. Of most importance is that Q and O do not select a nonessential variable, while 'loss' may do so. The experiment shows that Q and O are actually better than 'loss' for a particular, but large, class of tables. Moreover, it shows that their resulting trees are only 1/4 of the size of the corresponding loss-trees in this case. Near optimizations achieved by the three criteria are compared to true optimum and to another simple criterion. It is also shown that the performance of the three criteria is not worse than that of any other known heuristics, at least for a particular example. The algorithm requires at most $O(L**22**L)$ operations, where L is the arity of an input table.

Keywords: database systems, decision theory and analysis, computer metatheory - many valued logics, pattern recognition, mathematical techniques - heuristic, decision trees, database searching, optimum tree, sequential testing procedure.

Classification: ◆ Application area: Databases, decision formalisms
                ◆ Character: Theoretical
                ◆ Year, Country, Language: 1989, Japan, English

[122]   Mors N., *"Beslissingstabellen"*, Lansa Publishing, Leidschendam (1993) 185p.

Abstract: Although decision tables have been used as a technique applied to information systems development for years and years, not much has been written about them. Many people think it is difficult to make decision tables for complex problems. This book is a practical manual to make decision tables which finishes with the misunderstanding that it is a difficult and limited applicable description technique. Chapters pay attention to the setting up of a decision table; the systematic approach; systematic simplification; special forms of decision tables; the application of decision tables in information analysis, systems design, programming, testing and manuals; and the BT-tool. Included are several exercises.

Keywords: systems design, information analysis, systems documentation, system testing, programming, decision table.

Classification: ◆ Application area: System development
                ◆ Character: Unknown
                ◆ Year, Country, Language: 1993, Holland, Dutch

[123]   Mrozek A., *"Use of rough sets and decision tables for implementing rule-based control of industrial processes"*, Bull Pol Acad Sci Tech Sci, vol. 34, nr. 5-6 (1986) p. 357-371.

Abstract: The article introduces a notion of a human process operator's inference model and makes evident that this model may be a basis for the algorithm which controls a complex technological process. It is proposed to use the rough sets and decision tables formalism as a tool to write, identify and analyse the inference models. A method of formal analysis of the decision table features representing the inference model, as well as of the decision program based on them, are presented. An example based upon data gathered in a cement plant illustrates the identification and the analysis of the inference model of a rotary kiln stoker.

Keywords: process control - computer applications, computer systems programming - decision tables, mathematical techniques - applications, rough sets, rule-based control.

Classification: ◆ Application area: Control systems
                ◆ Character: Theoretical
                ◆ Year, Country, Language: 1986, Unknown, English

[124]   Murphy O. J., McCraw R. L., *"Designing storage efficient decision trees"*, IEEE Transactions on Computers, vol. 40, nr. 3 (1991) p. 315-320.

Abstract: The problem of designing storage-efficient decision trees from decision tables is examined. It is shown that for most cases, the construction of the storage optimal decision tree is an NP-complete problem, and therefore a heuristic approach to the problem is necessary. A systematic procedure analogous to the information-theoretic heuristic is developed. The algorithm has low computational complexity and performs well experimentally.

Classification:
- Application area: Algorithms
- Character: Theoretical
- Year, Country, Language: 1991, USA, English

[125]   Nazarov V., Primakov A. A., Kvasov A. I., *"Shared-use adaptive scheduler for a computer center of AI information and scheduling service in a computer network"*, Avtomatika i Vychislitel'naya Tekhnika, vol. 20, nr. 4 (1986) p. 60-65.

Abstract: The construction of an adaptive shared-use scheduler for computer centers is studied. A method for building a scheduler based on a decision-making table is suggested. The results of a test are reported, where a scheduler for a two-computer complex was built as a system adaptive to the variation of the sets of operators.

Classification:
- Application area: Data- and telecommunication
- Character: Theoretical
- Year, Country, Language: 1986, Unknown, English

[126]   Ng W.-Y., *"Interactive descriptive graphical approach to data analysis for trade-off decisions in multi-objective programming"*, Information and Decision Technologies, vol. 17, nr. 2 (1991) p. 133-149.

Abstract: This paper reports the development of data analysis procedures for the purpose of aiding trade-off decisions in the case of optimizing many objectives. Very often, conflicts exist among objectives and prevent the attainment of optimal levels for all of them. In actual fact, trade-offs constitute the most important activity in such classes of problems, which has been termed multi-objective programming. Candidate solutions are generated and evaluated until one with a satisfactory compromise is found. In our work, we employ multivariate data analysis on the standard data matrix assembled from rows of performance index values of the candidates. The matrix captures the raw information gained and our data analysis aims to discover its underlying structure, as the relationship among the objectives. The emphasis is on enhancing the user's understanding and intuition through an interactive approach, which is both descriptive and graphical. The user understands the problem better by interactively searching for a suitable structure for the matrix, and obtains intuition on the trade-offs required by employing the structure together with the data matrix in an interactive algorithm. An example in computer-aided design serves to illustrate the various techniques developed.

Classification:
- Application area: Decision formalisms
- Character: Practical
- Year, Country, Language: 1991, Hong Kong, English

[127]   Nisan N., Szegedy M., *"On the degree of Boolean functions as real polynomials"*, Conference Proceedings of the Annual ACM Symposium on Theory of Computing, New York, NY, USA (1992) p. 462-467.

Abstract: Every Boolean function may be represented as a real polynomial. In this paper we characterize the degree of this polynomial in terms of certain combinatorial properties of the Boolean function. Our first result is a tight lower bound of Omega (log n) on the degree needed to represent any Boolean function that depends on n variables. Our second result states that for every Boolean function f the following measures are all polynomially related: the decision tree complexity of f; the degree of the polynomial representing f; and the smallest degree of a polynomial approximating f in the Lmax norm.

Classification:
- Application area: Applied mathematics
- Character: Theoretical
- Year, Country, Language: 1992, Israel, English

[128] Nixon S., McMullen W., *"Decision tables in process control: a powerful development tool"*, Instrumentation & Control Systems - 1986, Proceedings of the 1986 Conference and Exhibit, ISA, Research Triangle Park, NC, USA (1986) p. 31-64.

Abstract: An automation and control systems development methodology based on the use of decision tables as its major analysis, design, and documentation technique will be discussed. Decision tables are a powerful facility for expressing complex procedures, programs, and control strategies to be implemented in computer-based systems. Their characteristics and advantages will be discussed, and examples of their use will be compared to other traditional tools. Two industrial plant automation projects employing decision tables will be cited.

Keywords: process control - computer applications, indutrial plants - automation, control systems, logic design, computer programming - structured programming, computer systems programming, development methodologies, documentation techniques.

Classification: ◆ Application area: Control systems
◆ Character: Unknown
◆ Year, Country, Language: 1986, USA, English

[129] Nock T., *"Data flow / decision table modeling of interacting systems with decision makers"*, Vitro Technical Journal, vol. 8, nr. 1 (1990) p. 3-13.

Abstract: Data flow / decision table (DF/DT) modeling is a technique for simulating complex interacting systems. It was used to model the defense of a carrier battle group against submarine attack. It can also be used to set up test beds for rapid prototyping of systems and to organize libraries of reusable code. DF/DT modeling gives the user extensive control over the simulation. The user controls the configurations of the systems being modeled through an extended form of multilevel data flow diagrams, and controls the procedures used by simulated decision makers through data flow diagrams and decision tables. A programmer can readily change the simulation. Nodes used in the diagrams are bound to routines that simulate the activities represented by the nodes. These routines are linked by an internal data base and documented in a catalog. Distributed schedulers and event lists carry the simulation forward in simulated time.

Keywords: decision theory, digital simulation, military computing, software packages, internal databases, interacting systems, decision makers, carrier battle group, submarine attack, rapid prototyping, reusable code, DF/DT modeling, multilevel data flow diagrams, decision tables, event lists, simulated time.

Classification: ◆ Application area: Military applications, system development
◆ Character: Practical
◆ Year, Country, Language: 1990, USA, English

[130] Nunez M., *"Use of background knowledge in decision tree induction"*, Machine Learning, vol. 6, nr. 3 (1991) p. 231-250.

Abstract: At present, algorithms of the ID3 family are not based on background knowledge. For that reason, most of the time they are neither logical nor understandable to experts. These algorithms cannot perform different types of generalization as others can do, nor can they can reduce the cost of classifications. The algorithm presented in this paper tries to generate more logical and understandable decision trees than those generated by ID3-like algorithms; it executes various types of generalization and at the same time reduces the classification cost by means of background knowledge. The background knowledge contains the ISA hierarchy and the measurement cost associated with each attribute. The user can define the degrees of economy and generalization. These data will influence directly the quantity of search that the algorithm must undertake. This algorithm, which is an attribute version of the EG2 method, has been implemented and the results appear in this paper comparing them with other methods.

Keywords: computer systems programming - decision tables, mathematical techniques - trees, learning systems, expert systems - knowledge bases, computer programming - algorithms, decision tree induction, knowledge acquisition, background knowledge.

Classification: ◆ Application area: Expert systems, algorithms
◆ Character: Theoretical
◆ Year, Country, Language: 1991, Unknown, English

[131] Okawa Y., Yokoyama K., *"Control of a mobile robot for the push-a-box operation"*, Proceedings - IEEE International Conference on Robotics and Automation, vol. 1, IEEE Service Center, Piscataway, NY, USA (1992) p. 761-766.

Abstract: Driven by the desire to make a mobile robot do some meaningful jobs other than the path planning and the obstacle avoidance problem, the authors have proposed a method to make a mobile robot push a box from one place to another. They first defined the circumferential conditions and derived the

equations of motion for a robot and pushed object. The validity of the proposed dynamic equations has been proved by experiments. The goal seeking strategy is adopted for the robot's motor control. The objective of control is to direct a pushed object toward the goal. Based on the automatic control theory, a control law for this system was derived. To speed up the computing process, all the variables are divided into intervals, and the control law is converted into the form of a decision table. Many experiments have been done which proved the feasibility of the proposals.

Keywords: computerised materials handling, mobile robots, box pushing, circumferential conditions, equations of motion, goal-seeking strategy, automatic control theory.

Classification:	♦ Application area:	Robotics
	♦ Character:	Theoretical
	♦ Year, Country, Language:	1992, Japan, English

[132] Oksoy D., *"Sequential test for the ratio of two constant failure rates"*, IEEE Transactions on Reliability v R-36 n 5 Dec 1987, 1987 Proc - Reliab & Maint in Comput-Aided Eng Workshop, Leesburg, VA, USA (1987) p. 605-612.

Abstract: An exact sequential test is given for two similar types of equipment in terms of the ratio of their constant failure rates. The plans are useful for incentives in comparative life testing of equipment during its constant-failure-rate period. The theory and equations for the tables are developed and the related references are included. Three test plans are summarized.

Keywords: reliability theory, mathematical statistics, probability, failure analysis, sequential test, failure rate ratio, life estimation, decision tables, statistical inference.

Classification:	♦ Application area:	Applied mathematics
	♦ Character:	Theoretical
	♦ Year, Country, Language:	1987, USA, English

[133] Overhoff R., Molenaar L., *"In de regel beslist: een beschouwing over regelgeving met behulp van beslissingstabellen"*, SDU, 's Gravenhage (1991) 382 p.

No abstract available.

No keywords available.

Classification:	♦ Application area:	Legal matters
	♦ Character:	Unknown
	♦ Year, Country, Language:	1991, Holland, Dutch

[134] Ozdemirel N., Satir A., *"Design of a decision support system for detailed scheduling"*, Information & Management, vol. 12, nr. 5 (1987) p. 247-256.

Abstract: Design of a decision support system (DSS) based on a simulation model of the detailed scheduling activities in a tractor manufacturing company is dealt with. The system analysis phase of the design process is overviewed briefly. The main decision points involved and the problems faced in the production planning and control subsystem are presented. Expectations from a DSS for detailed scheduling are discussed and performance measures are defined. The links between computer programs are shown. Utilization of the DSS designed for production planning and control oriented decision making is discussed using decision tables.

Keywords: management - information systems, computer systems programming - decision tables, production control - scheduling, decision support systems, system design.

Classification:	♦ Application area:	Decision support systems, production planning
	♦ Character:	Unknown
	♦ Year, Country, Language:	1987, USA, English

[135] Panayiotopoulos J.-C., *"Decision support system of the Greek popular lottery"*, Journal of the Operational Research Society, vol. 37, nr. 7 (1986) p. 685-687.

Abstract: The D.S.S. to be considered in this paper is a real case study which is concerned with the raffle of the Greek popular lottery. The applied technique is an original one from the point of view of computational methods in operational research and can be applied in any organization which has a lottery. It is based on the construction of finite semi-groups or semi-Latin squares under stochastic conditions. The proposed technique, implemented on a mini-computer or an inexpensive microcomputer, finds a deterministic decision-table that corresponds to a stochastic problem.

Keywords: decision theory and analysis, computer systems programming - decision tables, data processing - governmental applications, decision support systems, Greek popular lottery, latin squares.

Classification: ◆ Application area: Decision support systems
◆ Character: Practical
◆ Year, Country, Language: 1986, Greece, English

[136] Partyka M., *"Application of structural multiple-valued decisions to the CAD and artificial intelligence basing on example of the Quine-McCluskey algorithm of self-assigning minimization"*, AMSE Review (Association for the Advancement of Modelling and Simulation Techniques in Enterprises), vol. 10, nr. 3 (1989) p. 53-63.

Abstract: The paper includes generalization of the Quine-Mc Cluskey minimization algorithm of two-valued and multiple-valued logical functions to the case of multiple-valued logical functions taking into account various multivalency of variables, and to the case of complex logical expressions of the type 'product sum of product sums ... product sums' up to exhaustion of variables.

Keywords: computer systems programming - decision tables, computer aided design, artificial intelligence, logic design, computer metatheory - Boolean algebra, Quine-McCluskey algorithm.

Classification: ◆ Application area: Algorithms
◆ Character: Theoretical / practical
◆ Year, Country, Language: 1989, Poland, English

[137] Pattipati K., Alexandridis M., *"Application of heuristic search and information theory to sequential fault diagnosis"*, Third Int Symp Intell Control, IEEE Service Center, Piscataway, NY, USA (1988) p. 291-296.

Abstract: The problem of constructing optimal and near-optimal test sequences to diagnose permanent faults in electronic and electromechanical systems is considered. The test sequencing problem is formulated as an optimal binary AND / OR decision tree construction problem, whose solution is known to be NP-complete. The approach is based on integrating concepts from information theory and heuristic AND / OR graph search methods to subdue the computational explosion of the optimal test sequencing problem. Lower bounds on the optimal cost-to-go are derived from the information-theoretic concepts of Huffman coding and entropy, which ensure that an optimal solution is found using the heuristic AND / OR graph search algorithms. This has made it possible to obtain optimal test sequences to problems that are intractable with the traditional dynamic programming techniques. In addition, a class of test sequencing algorithms that provide a tradeoff between optimality and complexity have been derived using the epsilon - optimal and limited search strategies. The effectiveness of the algorithms is demonstrated on several test cases. As a by-product, this approach to test sequencing can be adapted to solve a wide variety of binary identification problems arising in decision table programming, medical diagnosis, database query processing, quality assurance, and pattern recognition.

Keywords: failure analysis, decision theory and analysis, mathematical techniques - trees, mathematical programming, dynamic, computer programming - algorithms, logic circuits.

Classification: ◆ Application area: Applied mathematics, algorithms
◆ Character: Theoretical / practical
◆ Year, Country, Language: 1988, USA, English

[138] Pawlak Z., *"Decision table computer"*, Bull Pol Acad Sci Tech Sci, vol. 34, nr. 9-10 (1986) p. 591-595.

Abstract: We propose in this note a new computer architecture based on the idea of the decision table. This kind of computer can be applied as a process control unit or as an ordinary stored program computer, using the non-Von Neuman architecture organization.

Keywords: computer systems programming - decision tables, process control, computer architecture, deterministic rules.

Classification: ◆ Application area: Control systems
◆ Character: Theoretical
◆ Year, Country, Language: 1986, Poland, English

[139] Pawlak Z., *"Decision tables and decision algorithms"*, Bull Pol Acad Sci Tech Sci, vol. 33, nr. 9-10 (1985) p. 487-494.

Abstract: We show in this note the application of the rough set approach to decision tables analysis yields a simple method whether the decision table is deterministic or not, and we also demonstrate how such an approach can be used to decision tables and decision algorithms simplification.

Keywords: computer systems programming - decision tables, computer programming - algorithms, decision theory and analysis, decision languages.

Classification: ◆ Application area: Decision formalisms
 ◆ Character: Theoretical
 ◆ Year, Country, Language: 1985, Poland, English

[140] Pawlak Z., *"On decision tables"*, Bull Pol Acad Sci Tech Sci, vol. 34, nr. 9-10 (1986) p. 563-571.

Abstract: This paper is an extended and modified version of previous papers in which the rough set approach as a basis for decision tables theory is proposed. We show in this article that the concept of the rough set can be used as a basis for the decision tables theory. The ideas introduced in this paper have been applied to the implementation of cement kiln control algorithm and showed considerable practical advantages as compared to other methods.

Keywords: computer systems programming - decision tables, control systems - theory, computer programming - algorithms, cement plants - kilns, decision languages.

Classification: ◆ Application area: Control syst., algorithms, decision formalisms
 ◆ Character: Theoretical
 ◆ Year, Country, Language: 1986, Poland, English

[141] Penninckx F., *"Beginselen van de heelkunde"*, Cursus K.U.Leuven, Dept. Medicine, Acco (1993) p. 53-54.

No abstract available.

No keywords available.

Classification: ◆ Application area: Medicine
 ◆ Character: Practical
 ◆ Year, Country, Language: 1993, Belgium, Dutch

Comments: Here the use of decision tables in the decision whether or not to perform surgery is demonstrated. The decision tables that are used here have a somewhat different form than usual. In fact, probability data are included in the tables in order to be able to determine the probability of a certain result. In the example that is given there is only one decision variable, namely whether or not to perform surgery, followed by a number of conditions that are checked ex post (during surgery) and one action or result, namely the life expectancy. The probability data allow us to calculate the life expectancy of a patient under different values of the decision variable. This could be the basis for a decision.

[142] Pill M., *"Lex integrate! (word processing and database software package)"*, ICL Today, vol. 5, nr. 8 (1990) p. 41-42.

Abstract: Not every word processing package comes in both MS-Dos and Unix versions, gives you an integral database, and offers immediate support by phone. Lex-WP by Ace Microsystems started as the first integrated word processor and database package for DEC computer systems. It has been developed further to run on a variety of computers and operating systems. The latest version 9C is available on MS-Dos machines such as the DRS M30/60/80, and also under Unix on DRS 300-NX and DRS 400. Lex is written in a decision table language, Filetab-D. The same source code is used to produce executable code for any computer system on which Lex is implemented.

Keywords: database management systems, decision tables, operating systems [computers], software packages, word processing, Lex-WP, word processing package, MS-Dos, Unix, integral database, Ace microsystems, operating systems, decision table language.

Classification: ◆ Application area: Databases, word processing
 ◆ Character: Practical
 ◆ Year, Country, Language: 1990, UK, English

[143] Pottjegort F., *"Inleiding technieken informatiesystemen: 28 technieken voor de ontwikkeling van informatiesystemen"*, Cap Gemini Publishing, Rijswijk (1992) 199 p.

Abstract: This guide describes a number of techniques which can be used when developing information systems. A technique is defined as a collection of elements which enable the realisation of a specification of a part of an information system on the basis of standing arrangements. A distinction is made between qualitative techniques and evaluation techniques. Qualitative techniques treated are: data flaw diagram, information precedence scheme, entity model, structure diagram, bubble charts, structure charts, HIPO, entity life history, Lano matrix, create/use matrix, information structure diagram, Nassi-Shneiderman diagram, flow chart, system flow scheme, state transition diagram, Petri net, decision table, Warnier/Orr diagram, action diagram, structured English, normalisation and formal specification languages. Evaluation techniques described include: risk analysis, score tables, critical success factors, function point analysis, cocomo tables and project management. For each technique treated is: the relationship with the

method, symbols of the technique, an illustrative example of the technique, the working of the technique, the availability in workbenches, and when to apply the technique.

Keywords: systems development, project management, specification language, risk analysis, flow diagram, Petri net, survey, data flow diagram, flowcharting, data normalisation, Critical Success Factors [method], information structure diagram, function point analysis, decision table, Nassi-Shneiderman diagram, COCOMO (Constructive Cost Model), structure chart, Warnier-Orr diagram, HIPO, Entity-Life Modeling.

Classification:	◆ Application area:	System development, decision formalisms
	◆ Character:	Theoretical
	◆ Year, Country, Language:	1992, Holland, Dutch

[144] Potvin J.-Y., Dufour G., Rousseau J.-M., *"Learning vehicle dispatching with linear programming models"*, Computers & Operations Research, vol. 20, nr. 4 (1993) p. 371-380.

Abstract: In this paper, we describe a technique based on linear programming, which is aimed at appropriately weighting the various criteria involved in the decision process of an expert vehicle dispatcher. We introduce in particular an incremental weighting learning scheme that allows a computer system to dynamically adjust to the dispatcher's decision process as new demands come in and new decisions are taken. Results in various dispatching contexts are reported.

Keywords: scheduling, motor transportation, operations research, linear programming, decision tables, expert systems, learning systems, decision support systems, vehicle dispatching, transportation services, incremental weighting learning scheme.

Classification:	◆ Application area:	Transport, expert systems, applied mathematics
	◆ Character:	Theoretical / practical
	◆ Year, Country, Language:	1993, Canada, English

[145] Pulkki R., *"Database helps pick the best route"*, Pulp & Paper International, vol. 29, nr. 12 (1987) p. 44-45.

Abstract: The author describes an easy-to-use computer system which gives practical solutions to problems in transport and handling. It is currently being applied to forest product exports from Finland.

Keywords: data processing, business - distribution applications, transportation - route analysis, wood products - transportation, forestry - Finland, database systems, computer systems programming - decision tables, heuristic programming, forest product exports, spatial database, transport planning, decision making.

Classification:	◆ Application area:	Transport
	◆ Character:	Unknown
	◆ Year, Country, Language:	1987, Finland, English

[146] Puuronen S., *"Direct execution of an extended decision grid chart"*, Angewandte Informatik, vol. 29, nr. 8-9 (1987) 351-357.

No abstract available.

Keywords: algorithm, DSS (decision support system), decision making, optimization, decision table, decision grid chart.

Classification:	◆ Application area:	Decision support systems, decision formalisms
	◆ Character:	Unknown
	◆ Year, Country, Language:	1987, Unknown, Unknown

[147] Rajaraman V., *"Conversion of decision tables to programs in a multiprocessor system"*, Computer Science and Informatics, vol. 19, nr. 1 (1989) p. 30-35.

Abstract: This paper describes the outline of the logic sequence control which has been developed for CENTUM, and the difference between the logic sequence method and the decision table method.

Keywords: control systems, logic sequence control, CENTUM, decision table method.

Classification:	◆ Application area:	Algorithms
	◆ Character:	Practical
	◆ Year, Country, Language:	1989, India, English

[148] Rajaraman V., *"Validation of decision tables used in process control"*, IEEE Transactions on Industrial Electronics, vol. IE-34, nr. 2 (1987) p. 168-171.

Abstract: Process control rules may be specified using decision tables. Such a specification is superior when logical decisions to be taken in control dominate. A method is presented for detecting redundancies, incompleteness, and contradictions in such specifications. Using such a technique ensures the validity of the specifications.

Keywords: computer systems programming - decision tables, process control - computer interfaces, redundancy, computer software - maintenance, process control rules, decision tables validation.

Classification:
- ◆ Application area: Control systems, decision formalisms
- ◆ Character: Theoretical
- ◆ Year, Country, Language: 1987, India, English

[149] Rauzy A., *"New algorithms for fault tree analysis"*, Reliability Engineering & System Safety, vol. 40, nr. 3 (1993) p. 203-211.

Abstract: In this paper, a new method for fault tree management is presented. This method is based on binary decision diagrams and allows the efficient computation of both the minimal cuts of a fault tree and the probability of its root event. We show on a set of benchmarks that our method results in a qualitative and quantitative improvement in safety analysis of industrial systems.

Keywords: failure analysis, algorithms, decision tables, trees (mathematics), probability, graphic methods, systems analysis, accident prevention, Boolean algebra, set theory, industrial systems, fault tree management, binary decision diagrams (BDDs), minimal cuts, Shannon's decomposition.

Classification:
- ◆ Application area: Applied mathematics, algorithms
- ◆ Character: Theoretical / practical
- ◆ Year, Country, Language: 1993, France, English

[150] Reilly K., Salah A., Yang C.-C., *"Logic programming perspective on decision table theory and practice"*, Data & Knowl Eng, vol. 2, nr. 3 (1987) p. 191-212.

Abstract: A theoretical foundation is presented aimed at reconciling the theory and practice of decision table (DT) processing with a family of relatable methodologies represented by logic programming (LP), Prolog, and relational databases. Implementations with predicate data organizations adhere to the relational definition of DT's and illustrate the impact of relational level processing on DT processing; interconnections among these implementations are also stipulated. Use and performance characteristics for the various methods are mentioned and, in order to highlight the contributions to DT theory and methodology, the attractiveness of the perspectives gained from LP is summarized and demonstrated.

Keywords: computer programming - theory, computer programming languages, database systems - relational, term data organizations, predicate data organization, decision table theory, Horn clause, policy maps.

Classification:
- ◆ Application area: Applied mathematics, control systems
- ◆ Character: Theoretical / practical
- ◆ Year, Country, Language: 1987, France, English

[151] Reston M., *"Rapid prototyping and testing coverage based on decision tables"*, Second International Workshop on Rapid System Prototyping. Shortening the Path from Specification to Prototype, IEEE Comput. Soc. Press Los Alamitos, CA, USA (1992) p. 112-145.

Abstract: Encapsulating testing scenarios into complex tests and rapid-testing prototyping are key issues for understanding software testing complexity. The author demonstrates how decision table (DT) techniques can help in visualizing these issues, and so reduce the testing complexity and improve the quality of software products.

Keywords: decision tables, program testing, software prototyping, software quality, testing scenarios, complex tests, rapid-testing prototyping, software testing complexity, quality, software products.

Classification:
- ◆ Application area: Software development
- ◆ Character: Practical
- ◆ Year, Country, Language: 1992, USA, English

[152] Rising L., Calliss F., *"Problems with determining package cohesion and coupling"*, Software - Practice and Experience, vol. 22, nr. 7 (1992) p. 553-571.

Abstract: The cohesion and coupling guidelines described by Yourdon, Constantine and Myers have proved useful aids for the design of modular programs. They have also provided direction for the evaluation of existing modules, pointing to those candidates for restructuring during perfective maintenance. For languages like Ada, where support for a higher-level of abstraction is provided in the form of a package, subprogram heuristics are inadequate. This paper examines existing guidelines and

taxonomies for the Ada package and proposes extensions to these schemes. These package-level schemes are applied in a case study of an existing Ada program.

Keywords: computer programming languages - Modula, computer programming languages - Ada, computer programs - design, systems science and cybernetics - heuristic programming, computer systems programming - decision tables, package cohesion and coupling, modular programs.

Classification:
  ◆ Application area: Software development
  ◆ Character: Unknown
  ◆ Year, Country, Language: 1992, USA, English

[153]   Robben F., *"De inzet van de beslissingstabellentechniek bij de ontwikkeling van juridische computeradviessystemen"*, Computerrecht, jaargang 5, afl. 3 (1988) p. 149-152.

No abstract available.

Keywords: systems development, DSS (decision support system), law, degal decision making, decision table.

Classification:
  ◆ Application area: Legal matters, expert systems
  ◆ Character: Theoretical / practical
  ◆ Year, Country, Language: 1988, Unknown, Dutch

Comments: It is stated here that the decision table technique is an effective method for verifying a number of legal rules for completeness, consistency and correctness. Therefore they can be applied in the knowledge of computer based legal advisory systems, in this particular case the systems of the M.I.J.A. project. A number of linked tables are constructed: main tables, condition subtables and action subtables. Constructing the tables is done with Prologa, that takes care of the optimization and the conversion of rules as well. An advantage of knowledge modelling with decision tables that is cited here is the applicability when constructing legal rules. This is something that expert systems cannot do. In fact, those systems are designed to apply existing knowledge on real life cases. Tables can be used to guarantee the correctness and completeness of the rules and possibly to convert the rules constructed with the tables into legislation and into code for the automated application of it. A disadvantage of the decision table technique is that tables can only be used for design, verification and application of conditional legislation.

[154]   Robertson M., Rahimi M., *"A systems analysis for implementing video display terminals"*, IEEE Transactions on Engineering Management, vol. 37, nr. 1 (1990) p. 55-61.

Abstract: A seven step systems analysis model is demonstrated, which addresses the safefy and ergonomics problems associated with implementing video display terminals. The steps include: defining the problem; setting the objectives and developing an evaluation criteria table; developing alternatives; modeling alternatives; selecting an alternative; and planning for implementation.

Keywords: decision making, video display, ergonomics, display terminal, security, decision table.

Classification:
  ◆ Application area: Decision formalisms
  ◆ Character: Unknown
  ◆ Year, Country, Language: 1990, USA, English

[155]   Rossa R., *"The master file update problem in AWK"*, SIGCSE Bulletin, vol: 23, nr. 4 (1991) p. 58-60.

Abstract: The paper considers how the use of AWK as a programming vehicle may clarify certain aspects of the traditional master file update problem. It views the update problem as having one input stream, rather than two separate streams, of old master records and transaction records. This permits one to see the programming problem as the implementation of decision-table logic.

Keywords: file organisation, high level languages, master file update, AWK, input stream, old master records, transaction records, programming, decision-table logic.

Classification:
  ◆ Application area: Programming, file management
  ◆ Character: Practical
  ◆ Year, Country, Language: 1991, USA, English

[156]   Sakaki Y., Matsunaga K., *"Decision table approach to sequence control of batch processes"*, Advances in Instrumentation, vol. 41 pt 2, ISA, Research Triangle Park, NC, USA (1986) p. 687-702.

Abstract: This paper introduces the decision-table-based sequence control functions used in an advanced distributed batch-process control system. Both sequences and recipes can be downloaded to distributed

controllers from the operator station, to mimimize downtime and maximize throughput in short-cycle, small-volume multi-product multi-stream batch process control applications.

Keywords: chemical operations - process control, computer systems programming - decision tables, batch processes, sequence control.

Classification: ◆ Application area: Control systems
◆ Character: Unknown
◆ Year, Country, Language: 1986, Japan, English

[157] Sammons D., *"Non-procedural programming using matrices and decision tables"*, Computer Bulletin, vol. 2, nr. pt.9 (1990) p. 18-20.

Abstract: A method for using a decision table and matrix techniques together to specify a program in such a way that its code can be generated, is presented. A number of related issues are also touched upon: reasons for the historically rather limited success of the decision table technique as a replacement for sequential programming; general observations on sequential and non-procedural programming; the relevance of the concept of the transaction-driven program to the technique presented; and other significant consequences of the use of the technique presented. The existence of a software tool supporting this technique is also mentioned.

Keywords: decision tables, formal specification, matrix algebra, programming, transaction processing, program specification, matrix techniques, sequential programming, non-procedural programming, transaction-driven program, software tool.

Classification: ◆ Application area: Software development
◆ Character: Practical
◆ Year, Country, Language: 1990, UK, English

[158] Sang H., Tae W., al., *"Development of a computer code AFTC for fault tree construction using decision table method and super component concept"*, Reliability Engineering & System Safety, vol. 25, nr. 1 (1989) p. 15-31.

Abstract: In the AFTC, components are modeled using decision tables and a system is modeled using flow diagrams. A decision table describes relations between inputs, internals and outputs of a component, and a flow diagram describes connections between components of a system. Super component concept is introduced to model a small subsystem as one component. For common cause failure modeling, the Basic Parameter Method or Binomial Failure Rate Method can be used. The final fault tree is generated using modularization techniques.

Keywords: codes, symbolic, computer systems programming - decision tables, reliability, computer code AFTC, fault tree construction, decision table method, super component concept.

Classification: ◆ Application area: Control systems, system development
◆ Character: Theoretical
◆ Year, Country, Language: 1989, South Korea, English

[159] Santos-Gomez L., Darnell M. J., *"Empirical evaluation of decision tables for constructing and comprehending expert system rules"*, Knowledge Acquisition, vol. 4, nr. 4 (1992) p. 427-444.

Abstract: Two studies were designed to evaluate the efficiency of decision table representations for constructing and comprehending expert system rules by nonprogrammers with no experience in either knowledge engineering or expert systems. The first study compared the speed and accuracy of a decision table editor for constructing rules in a tabular representation relative to a standard text editor. Rules were constructed faster and more accurately with the decision table editor than with the text editor. The second study focused on the representational value of decision tables for comprehending expert system rules. In a verification task, subjects responded to questions of different types as accurately and rapidly as possible on the basis of the logical structure of a set of rules represented in either a decision table or textual format. The decision table showed an advantage only in situations where the diagrammatic, integral representation of the decision table expedited the perceptual and symbolic matching processes involved in the search.

Keywords: knowledge acquisition, knowledge representation, rule construction, rule comprehension, decision tables, expert system rules, decision table representations, decision table editor, representational value, verification task.

Classification: ◆ Application area: Knowledge representation
◆ Character: Practical
◆ Year, Country, Language: 1992, USA, English

[160] Sarutsyn A. M., Osipov S. I., *"Delivery - transfer table"*, Tyazheloe Mashinostroenie, nr. 10 (1991) p. 38-39.

Abstract: A delively-transfer table, incorporated into a flexible automated bay of treatment of rotation body-type parts was developed. The table is designated for feed of technological cassettes with oriented installed blanks to the area of action of industrial robot or manipulator with required degree of positioning. The technological process of cassette delivery permits reducing interoperation time of blank feed and increasing equipment loading factor. In the table structure an individual control system is envisaged.

Keywords: equipment testing, decision tables, automation, mass transportation, industrial robots, manipulators, materials handling, cassettes, size.

Classification:	◆ Application area:	Transport, robotics
	◆ Character:	Practical
	◆ Year, Country, Language:	1991, Russia, Russian

[161] Sasao T., *"Optimization of multiple-valued AND-EXOR expressions using multiple-place decision diagrams"*, Proceedings of The International Symposium on Multiple-Valued Logic, IEEE Service Center, Piscataway, NY, USA (1992) p. 451-458.

Abstract: The author presents an optimization method for pseudo-Kronecker expressions of p-valued-input, two-valued-output functions using multiplace decision diagrams for p equals 2 and p equals 4. A conventional method using extended truth tables requires memory of $O(3^n)$ to simplify an n-variable expression, and is only practical for functions of up to n equals 14 variables when p equals 2. The method presented utilizes and can optimize considerably larger problems. Experimental results for up to n equals 39 variables are shown.

Keywords: minimization of switching nets, optimization, many valued logics, decision tables, pseudo-Kronecker expansions.

Classification:	◆ Application area:	Applied mathematics
	◆ Character:	Theoretical / practical
	◆ Year, Country, Language:	1992, Japan, English

[162] Sathyanarayanan G., Lin J., Chen M.-K., *"Neural network modelling and multiobjective optimization of creep feed grinding of superalloys"*, International Journal of Production Research, vol. 30, nr. 10 (1992) p. 2421-2438.

Abstract: The grinding process is a very complex system for which analytical and empirical models have been developed to pursue a control strategy. This paper utilizes a new approach to model the creep feed grinding of superalloys, Ti-6Al-4V and Inconel 718, by using a neural network. A back-propagation learning algorithm is adopted to capture the system behaviour. The neural network learns to associate the inputs (feed rate, depth of cut and wheel bond type) with the outputs (surface finish, force and power) and predicts the systems outputs within the working conditions. Mathematical formulation of a multiobjective optimization problem is then carried out by utilizing the network models. The optimization study results are presented in the form of decision tables and value path diagrams to assist the decision-making process.

Keywords: grinding (machining), superalloys, neural networks, mathematical models, optimization, decision tables, process control, creep feed grinding, titanium aluminium vanadium alloys, superalloy inconel 718.

Classification:	◆ Application area:	Control systems, applied mathematics
	◆ Character:	Theoretical
	◆ Year, Country, Language:	1992, USA, English

[163] Schiffman R., Greenes R., *"Improving clinical guidelines with logic and decision table techniques: application to hepatitis immunization recommendations"*, Medical Decision Making 14 (1994) p. 245-254.

Abstract: Clinical practice guidelines can be clarified, verified and simplified by the use of logical analysis and the application of decision-table techniques. This methodology is applied to a CDC guideline for the prevention of perinatal transmission of hepatitis B by immunization. Relevant clinical variables are identified and possible values for each variable are defined. An exhaustive enumeration of value combinations is generated. Logically impossible combinations are identified and eliminated. The guideline's recommendations are next translated into a set of rules and compared with the remaining value combinations. Variable combinations that are not covered by guideline recommendations represent incomplete guideline specifications. Inconsistency can be identified by finding identical condition sets in two or more rules. The procedure demonstrates that the hepatitis guideline is incomplete. Logical analysis can improve the quality of clinical practice guidelines by assuring comprehensiveness and consistency.

Keywords: clinical guidelines, decision table, logic, verification, hepatitis B, immunization.

Classification: ◆ Application area: Medicine
                  ◆ Character: Practical
                  ◆ Year, Country, Language: 1994, USA, English

Comments: Many clinical guidelines suffer from lack of proper definition, incompleteness and inconsistencies. This causes their quality and usability to decrease. A logical analysis of the guidelines could help eliminate these problems. Representation of the knowledge of the guideline in some logical form reveals incompletenesses and inconsistencies. Again, this is where decision tables come in. These tables can be used to simplify the rules as well. In this paper it is shown how decision tables can be used to verify and simplify clinical guidelines, applied to a recently published guideline concerning the prevention of perinatal transmission of hepatitis B by immunization. There are 8 steps in the approach:
1. Determine the actions and decision variables (conditions) in the guideline.
2. Determine the possible values of the different decision variables and the actions. If needed a subtable can be used.
3. Enter all possible combinations of decision variable values into the table.
4. Determine the logical expressions that can be extracted from the guideline. Essentially the description of the rule is converted into a logical representation.
5. Eliminate all impossible combinations from the results of step 3.
6. Fill the action part of the table by converting the the logical statements from step 4 into table notation.
7. Check the table for ambiguities, omissions, redundancy and contradictions.
8. When possible, simplify the table.
The advantage of the decision table technique is that it forces the designer of the guideline to consider all possible situations and parameters and that it can be applied after as well as during the design phase. In their conclusion the authors say they have constructed a decision table tool (KADET: Knowledge in Augmented DEcision Tables). The term 'augmented decision table' is used to indicate that extra information can be entered into the table, such as testing costs and probabilities of test results.

[164]   Schiffman R., Leape L., Greenes R., al., *"Translation of appropriateness criteria into practice guidelines: application of decision table techniques to the RAND criteria for coronary artery bypass graft"*, Proc. of the Annual Symposium of Computer Applications in Medical Care (1993) p. 248-252.

Abstract: The process of creating clinical practice guidelines from collected evidence has not been well defined. We have developed a technique for translation of a comprehensive set of appropriateness criteria into a usable set of practice guidelines. The criteria are derived from a formal consensus process conducted by RAND and relate to indications for coronary artery bypass graft in acute myocardial infarction. The clinical indications defined by the expert panel are entered as conditions in a decision table. For each combination of relevant clinical findings, the recommended action is defined from the median ranking of the Rand panel. The fully constructed table is next compacted by conventional decision table techniques and sorted to facilitate parsing the knowledge. Ultimately, 8 narrative statements are derived from 51 rules. Augmented decision tables permit display of detailed data in the summary table and its access on as-needed basis.

No keywords available.

Classification: ◆ Application area: Medicine
                  ◆ Character: Practical
                  ◆ Year, Country, Language: 1993, USA, English

Comments: Here the authors discuss how decision tables can be used to convert the RAND criteria for coronary artery bypass graft into guidelines that can be used in practice. The goal is to reduce the size of the criteria as well as to represent them in a compact format. This is the way it has been done: first of all a decision table of the RAND criteria for coronary artery bypass graft was constructed. Next simple rules are contracted into compound rules. To make the next step more easy the rows as well as the columns are rearranged. The rows first: for every row the Weighted Dash Count (WDC) is calculated, which is a measure for the redundancy of that row in the decision process. The rows are sorted by increasing WDC. Next the columns are rearranged so that all columns with the same value for the first condition are together. The same is done for the second condition and so on until all conditions are processed. Then, from the table, descriptive guidelines are generated, which have the form: ... is (in)appropriate for ... except for ..., for others it is ... In practice, a set of 162 rules has been optimized to a set of only 51 rules, which were then converted to 8 guidelines. The price for this complexity reduction is some information loss. Therefore the guidelines have to be used with care.

[165]   Schindler M., *"Expert systems"*, Electronic Design, vol. 33, nr. 1 (1985) p. 112-134.

Abstract: Currently, artificial intelligence programs are being applied in robotics, natural-language interfaces, and expert systems. The first still remains at a level so primitive that few electronics designers

need be concerned about its impact. The second, too, will have little effect because natural languages are inherently so ambiguous that few experts - even within the AI industry - can foresee their usefulness in any serious design work. That leaves expert systems as an important area to be dealt with. However, although the industry is concentrating its efforts here, the current shallow reasoning of expert systems lends itself primarily to such easy applications as banking, insurance, and investment planning - not to engineering. But systems have begun to emerge that can sustain reasoning based on first principles (what artificial intelligence researchers call deep knowledge of the world) expressed by the laws of physics.

Keywords: systems science and cybernetics - artificial intelligence, computer systems programming - decision tables, computer operating systems - program compilers, computer programming languages - LISP, computer architecture -evaluation, knowledge-based systems, expert systems, software automation, inference engines, shells-generic expert systems.

Classification: ◆ Application area: Expert systems, programming
                 ◆ Character: Unknown
                 ◆ Year, Country, Language: 1985, USA, English

[166]   Schmidt R., *"Fast generation of chain-code image descriptions"*, IEEE International Conference on Robotics and Automation, IEEE Service Center, Piscataway, NY, USA (1985) p. 868-872.

Abstract: A method is described for the rapid reduction of intensity matrix image data to chain-coded descriptors. The method also yields some topographic and numerical information about regions in the image. In this method, the chain code is generated and stored in an array which is isomorphic to the image array. Computation other than that associated with the intensity classification (feature) operator is minimized by the use of decision tables for chain-code manipulation. The method is capable of processing a 300 X 200 gray scale image in two seconds using a gradient and threshold operator on a 500K-instruction-per-second processor.

Keywords: image processing - image analysis, computer programming - algorithms, codes, symbolic - applications, computer vision, chain-code generation, decision tables, topography.

Classification: ◆ Application area: Algorithms, image processing
                 ◆ Character: Unknown
                 ◆ Year, Country, Language: 1985, USA, English

[167]   Schmitt P., *"Eine dreiwertige Logik zur Verarbeitung partieller Information"*, Informatik: Forschung und Entwicklung, vol. 2, nr. 4 (1987) p. 182-190.

No abstract available.

Keywords: computer science, semantics, logic, mathematics, theorem proving, decision table, multiple-valued logic.

Classification: ◆ Application area: Applied mathematics
                 ◆ Character: Unknown
                 ◆ Year, Country, Language: 1987, Germany, German

[168]   Schwartz V., Hohenberger P., al., *"Setting up a decision support system with decision tables"*, Methods of Information in Medicine, vol. 28, nr. 3 (1989) p. 126-132.

Abstract: The aim of the study presented was to develop a decision support system using a conventional method which can be used as a shell for different applications. So it was necessary to find a method which allows separation of decision principles and decision algorithms. In addition, documentation of the patient records should be simplified. This could be attained by using the decision table technique and the MUMPS programming language. The general system developed was applied to the therapy decision for patients with liver metastases.

Keywords: DSS (Decision Support System), medicine, systems evaluation, medical information system, MUMPS, decision table, therapy planning.

Classification: ◆ Application area: Medicine, decision support systems
                 ◆ Character: Theoretical / practical
                 ◆ Year, Country, Language: 1989, Germany, English

Comments: Here too, decision tables are recommended as an instrument for knowledge acquisition, because of the clearness of the table notation, so that the communication between the expert and the knowledge engineer is made easier. To make the system easily portable, a separation between the decision algorithms and the knowledge base is needed. This can be accomplished by storing the knowledge in the structure of decision tables and using these in the system. An additional advantage of this architecture is that the decision taken by the system can easily be explained to the user. The constructed expert system is a system that determines the treatment of patients with liver metastases. To this purpose 8 linked decision

tables were constructed with a total of 76 rules. The results were satisfactory: the system was asked a treatment for 33 random cases. For 28 cases the treatment proposed by the system was the same as the treatment that had been used in practice. For the other 5 cases, only during surgery it became clear that the proposed treatment was not possible. Even these cases were conformably to the decision that would have been taken by the expert, because the expert system was consulted before surgery. The authors note that their system can be improved a.o. by making the knowledge available to the user in table notation or some graphical representation so that the user can consult the knowledge in the system and possibly change it. Other improvements that are noted are the automated verification of completeness and consistency and building in precompilers and interpreters.

[169]   Shachter R., *"Evaluating influence diagrams"*, Operations Research, vol. 34, nr. 6 (1986) p. 871-882.

Abstract: We develop an algorithm that can evaluate any well-formed influence diagram and determine the optimal policy for its decisions. Since the diagram can be analyzed directly, there is no need to construct other representations such as a decision tree. As a result, the analysis can be performed using the decision maker's perspective on the problem. Questions of sensitivity and the value of information are natural and easily posed. Modifications to the model suggested by such analyses can be made directly to the problem formulation, and then evaluated directly.

Keywords: decision theory and analysis, computer systems programming - decision tables, probability - random processes, system science and cybernetics - optimal systems, influence diagrams, decision making.

Classification:	◆ Application area:	Algorithms, decision formalisms
	◆ Character:	Theoretical
	◆ Year, Country, Language:	1986, USA, English

[170]   Shah I. M., Rajamani R. K., *"Self organizing control of pH in a stirred tank reactor"*, Expert Systems in Mineral and Metal Processing, Proceedings of the IFAC Workshop, Pergamon, Oxford, UK (1992) p. 131-137.

Abstract: To date, most of the useful work on self-organizing controllers (SOC) has been done on simulated processes. To test it in a real environment, its application to controlling pH in a stirred tank reactor is tried. Due to the extreme nonlinearity of the pH process, the basic design of the SOC did not result in adequate controller response. Therefore, an alternative approach utilizing preselected scaling factors but appropriately choosing performance rules is examined. It is found that the decision table resulting from a nonadaptive fuzzy controller serves as a good choice for the performance table for the SOC. Under both servo and regulator type control situations, the SOC provided impressive pH response. This simple self-learning controller methodology deserves attention. It can be suitable for many difficult to model metallurgical processes.

Keywords: adaptive control, chemical technology, control nonlinearities, fuzzy set theory, learning systems, letallurgical industries, PH control, self-adjusting systems, servo control, computerized control, self-organizing controllers, stirred tank reactor, nonlinearity, preselected scaling factors, performance rules, decision table, nonadaptive fuzzy controller, regulator, self-learning, metallurgical processes.

Classification:	◆ Application area:	Control systems, chemistry
	◆ Character:	Practical
	◆ Year, Country, Language:	1992, USA, English

[171]   Sherry L., Hoover D., *"FM program: Tablewise project"*, http://shemesh.larc.nasa.gov/tbell.html

No abstract available.

No keywords available.

Classification:	◆ Application area:	Case tools
	◆ Character:	Practical
	◆ Year, Country, Language:	1995, USA, English

Comments: Odyssey Research Associates has developed a tool, Tablewise, for Honeywell, to analyze the characteristics of decision tables (see also ref. 172). This tool runs on a UNIX platform and was developed (financially supported by NASA) within the framework of a project on formal methods to develop avionics software of superior quality. The Tablewise fiunctionalities are the following:

- *verification of correctness: automated verification of redundancy, inconsistencies and rules without actions.*
- *generators: automatic generation of Ada-code and table documentation.*

Future research will extend these functionalities with verification of more table characteristics and efficient processing of linked tables. Tablewise can be downloaded from: "air16.larc.nasa.gov/pub/fm/ora/".

[172]   Sherry L., Hoover D., *"Tablewise"*, http://www.oracorp.com:80/tablewise.html

No abstract available.

No keywords available.

	Classification:	◆ Application area:	Case tools
		◆ Character:	Practical
		◆ Year, Country, Language:	1995, USA, English

Comments: see ref. 171.

[173]   Sinriech D., Tanchoco J., *"Economic model for determining AGV fleet size"*, International Journal of Production Research, vol. 30, nr. 6 (1992) p. 1255-1268.

Abstract: One of the important issues in the design of an automated guided vehicles system (AGVS) is the determination of the number of vehicles needed to operate the system in an efficient and economical way. In this paper a multi-criteria optimization model is developed using two goals, cost and throughput performance. By using a trade-off ratio between the goals the number of AGVs needed in the systems is determined. Use of management decision tables to enhance the solution procedure is introduced.

Keywords: materials handling - automation, materials handling - optimization, materials handling - costs, decision theory and analysis, computer systems programming - decision tables, automated guided vehicles, management decision tables, fleet size.

	Classification:	◆ Application area:	Control systems, production planning
		◆ Character:	Theoretical
		◆ Year, Country, Language:	1992, USA, English

[174]   Skipper J., Rieger C., al., *"Evaluation of decision-tree rating scales for mental workload estimation"*, Ergonomics, vol. 29, nr. 4 (1986) p. 585-599.

Abstract: Recent studies suggest that a decision-tree rating scale called the Modified Cooper-Harper (MCH) rating scale is a globally sensitive indicator of change in mental loading. The present study was directed at developing refinements in the scale and at obtaining additional background information. The MCH scale and five design variations of the scale were studied in two independent aircraft-simulator experiments. Aspects studied were the decision-tree structure, the number of categories, the decision sequence and the effects of computer implementation. Results using the rating scales indicate that the MCH scale and its computerized version are generally more consistent than the others. Attendant questionnaire results indicate that pilots base their ratings on the same factors that researchers believe are the important elements of the multidimensional construct of workload.

Keywords: human engineering - manual control, aviators - rating, systems science and cybernetics - man machine systems, computer systems programming - decision tables, mental workload estimation, decision tree rating scales.

	Classification:	◆ Application area:	Psychology
		◆ Character:	Theoretical
		◆ Year, Country, Language:	1986, USA, English

[175]   Skowron A., *"The evidence theory and decision tables"*, Bulletin of the European Association for Theoretical Computer Science, vol. 39 (1989) p. 199-204.

Abstract: For every decision table there exists a Dempster-Shafer space such that the qualities of the lower and upper approximations (with respect to the condition attributes) of sets definable in the decision table by condition and decision attributes coincide with the credibility and plausibility of sets in the Dempster-Shafer space, respectively. The frame of discernment of the constructed Dempster-Shafer space is based on the information about objects rather than objects themselves.

Keywords: artificial intelligence, decision tables, decision theory, set theory, lower approximations, condition attributes, evidence theory, Dempster-Shafer space, upper approximations, sets, decision attributes, credibility, plausibility.

	Classification:	◆ Application area:	Applied mathematics
		◆ Character:	Theoretical
		◆ Year, Country, Language:	1989, Poland, English

[176]   Skowron A., *"The rough sets theory and evidence theory"*, Fundamenta Informaticae, vol. 13, nr. 3 (1990) p. 245-262.

Abstract: The author shows some connections between the rough sets theory and the Dempster-Shafer approach. He proves that for every Pawlak's approximation space there exists a Dempster-Shafer space

with the qualities of the lower and upper approximations of sets in the approximation space equal to the credibility and plausibility of sets in the Dempster-Shafer space, respectively. Analogous connections hold between approximation spaces generated by the decision tables and Dempster-Shafer spaces, namely for every decision table space there exists a Dempster-Shafer space such that the qualities of the lower and upper approximations (with respect to the condition attributes) of sets definable in the decision table by condition and decision attributes coincide with the credibility and plausibility of sets in the Dempster-Shafer space, respectively. A combination rule in approximation spaces analogous to the combination rule used in the Dempster approach is derived.

Keywords: artificial intelligence, set theory, lower approximations, rough sets theory, evidence theory, Dempster-Shafer approach, Pawlak's approximation space, credibility, plausibility, decision tables, upper approximations.

Classification: ◆ Application area: Applied mathematics
                 ◆ Character: Theoretical / practical
                 ◆ Year, Country, Language: 1990, Poland, English

[177] Skowron A., Suraj Z., *"A rough set approach to real-time state identification"*, Bulletin of the European Association for Theoretical Computer Science vol.50 (1993) p. 264-275.

Abstract: Considers decision tables assuming that values (local states) of attributes (conditions) are measured by some sensors. The local states are identified by sensors in a finite by unknown number of time units. The authors present an algorithm for constructing a highly parallel algorithm from a given decision table (represented by a Petri net) allowing to take a proper decision related to an identified global state. They construct a concurrent model of the knowledge represented by a decision table.

Keywords: decision tables, knowledge representation, parallel algorithms, rough set, real-time state identification, Petri net, concurrent model.

Classification: ◆ Application area: Applied mathematics, knowledge representation
                 ◆ Character: Theoretical
                 ◆ Year, Country, Language: 1993, Poland, English

[178] Smith C., Sage A., *"Theory of situation assessment for decision support"*, Information and Decision Technologies, vol. 17, nr. 2 (1991) p. 91-124.

Abstract: Fundamental to any decisionmaking process is the identification or detection of a potentially challenging decision situation. This arises because of the identification of an issue or problem in need of resolution. Timing is important in this identification in that the decisionmaker must either monitor the potentially challenging situation for possible later response, or must respond now. This process is called situation assessment and has several ingredients: imputs, models inquiring systems, perspectives, personal profiles, stress levels, decision strategies, learning, and individual versus group decisionmaking considerations. A proposed theory of situation assessment is further developed here through the description of a concept design of a prototype group decision support system architecture. We also illustrate the situation assessment theory with an application to an example of fire ground commanders in an urban fire fighting situation.

Keywords: decision support systems - applications, decision theory and applications - applications, computer systems programming - decision tables, situation assessment, model inquiring system, support system architecture.

Classification: ◆ Application area: Decision support systems
                 ◆ Character: Practical
                 ◆ Year, Country, Language: 1991, USA, English

[179] Souder R., Leigh W., Damachi N., *"Utilization of a decision support system for work measurement"*, Fall Industrial Engineering Conference, American Institute of Industrial Engineers, Inst of Industrial Engineers, Norcross, GA, USA (1984) p. 437-442.

Abstract: Traditionally work measurement involved considerable manual efforts in data collection, analysis and the generation of operation details. Because of this process being manual, various problems have arisen in work measurement. This paper discusses utilizing a decision support system (DSS) to develop standard times for new work tasks. Decision support systems (DSS) is a term used to describe the form of this new computer accessibility and the term used to denote the study of the design of such systems. The only new thing about DSS is the emphasis on the decision-making and problem-solving process and the man-machine symbiosis.

Keywords: industrial management - computer applications, time and motion study - computer applications, industrial plants - automation, computer aided design - applications, industrial engineering

- computer applications, computer programming - decision tables, work measurement, decision support system, work management task, man-machine symbiosis.

Classification: ♦ Application area: Decision support systems, production planning
                     ♦ Character: Unknown
                     ♦ Year, Country, Language: 1984, USA, English

[180]   Stahn H., Schuemann B., *"Entscheidungstabellentechnik zur Entwicklung und Implementierung von Prozesssteuerungen auf Mikrorechnern"*, MSR MES Steuern Regeln, vol. 28, nr. 4 (1985) p. 162-164.

Abstract: For the microcomputer development system mres 1520 a decision table-oriented software development system was created. It represents a computer-aided means for design, programming, correction, and test of k 1520 computer programs. With this, the software design for the k 1520 computer family is carried out in a way near to the application problem. The use of this software design system is demonstrated by means of the control for a feed system and a car.

Keywords: computer systems programming - decision tables, process control - computer applications, computer software, computers, microcomputer, microcomputer development system, software design.

Classification: ♦ Application area: Software development
                     ♦ Character: Theoretical
                     ♦ Year, Country, Language: 1985, Germany, German

[181]   Stein R. D., *"Intelligent tax model"*, Dissertation Univ. Wales, Swansea, UK, (1990).

Abstract: The Tax Consultation System (TaCS) models both the changes in an individual's financial circumstances, and changes in tax law. TaCS is designed to give expert advice and information on income tax matters and, in particular, the election of separate taxation of wife's earnings, and has been constructed as an extendible system. Operating as a tax adviser the system presents a viewdata user interface. This method enables the system to advise on a person's particular circumstances as well as provide information on income tax. Such an interface makes possible interaction by the user, and in addition the system allows an alternative method of interaction with the user to be easily implemented, and provides facilities to link to other computer systems. By taking the core of the system and a different user interface it is possible to operate the tax calculator with any set of tax rates and allowances. In this mode TaCS provides an income tax model suitable for legislative planning which allows analysis of changes in tax legislation over a period of years and its effects on various categories of taxpayer. By this means the system can provide insight into the consequences of proposed changes in tax law. The programs operate by applying rules to various sets of data, e.g. personal details, income and outgoings, intermediate tax calculations, and tax rates and allowances. The research into the area of knowledge representation required for this system has investigated the similarities between decision table theory and practice, and the construction of rule based knowledge systems. The use of inverted decision tables provides a method of simplifying, debugging, validating and documenting the knowledge base.

Keywords: decision tables, expert systems, financial data processing, knowledge representation, personal computing, Tax Consultation System, financial circumstances, tax law, expert advice, income tax matters, separate taxation, tax adviser, viewdata user interface, tax calculator, TaCS, legislative planning, personal details, income, outgoings, intermediate tax calculations, tax rates, allowances, decision table theory, rule based knowledge systems, inverted decision tables.

Classification: ♦ Application area: Expert systems, knowledge representation
                     ♦ Character: Practical
                     ♦ Year, Country, Language: 1990, UK, English

[182]   Steudel H., Firchow L., *"Expert system for evaluating and selecting computer aided process planning systems"*, American Society of Mechanical Engineers, Production Engineering Division (Publication) PED vol. 24, ASME, New York, NY, USA (1986) p. 287-297.

Abstract: This paper presents an expert system which can assist engineering management in the decision making process of determining which, if any, computer-aided process planning (CAPP) system would best suit the needs and constraints of the company. The expert system provides prospective CAPP users a 'smart tool' to aid them in identifying and evaluating the various interrelated factors associated with CAPP systems, and recommends commercially available software for further investigation. The expert system contains a knowledge base of over one hundred rules which define relationships among numerous factors relating to the general environment, overall objectives, organizational structure, and technical expertise of the company.

Keywords: industrial plants - process control, artificial intelligence - expert systems, process planning systems, engineering management, decision tables.

Classification: ◆ Application area: Expert systems, production planning
◆ Character: Unknown
◆ Year, Country, Language: 1986, USA, English

[183] Steudel H., Tollers G., "*Decision table based guide for evaluating computer aided process planning systems*", American Society of Mechanical Engineers, Production Engineering Division (Publication) PED vol. 19, ASME, New York, NY, USA (1985) p. 109-119.

Abstract: This paper focuses on the engineering management decision variables that surround the evaluation of computer-aided process planning (CAPP) systems. Its objective is to provide perspective CAPP users with a guide that aids them in identifying, weighing, and comparing the various interrelated factors associated with this evaluation. This paper's distinctive feature is the use of decision tables to accomplish this goal. Decision tables provide for the evaluation of the interrelated decision variables in a complete and non-redundant manner. They also provide inherent 'IF-THEN' type relationships which link the numerous decision factors with recommendations. Through the use of decision tables, this paper is much more than a 'checklist' evaluation of CAPP systems. It is a systematic presentation of the interrelated management decision variables under consideration during the investigation and evaluation of computer-aided process planning systems.

Keywords: process control - planning, computer aided engineering - applications, computer systems programming - decision tables, computer aided process planning (CAPP), engineering management decision variables, checklist evaluation.

Classification: ◆ Application area: Production planning
◆ Character: Unknown
◆ Year, Country, Language: 1985, USA, English

[184] Subramanian G. H., Nosek J., al., "*A comparison of the decision table and tree*", Communications of the ACM, vol. 35, nr. 1 (1992) p. 89-94.

Abstract: The decision table and decision tree are essential tools for systems analysts. These decision aids are used by systems analysts in depicting conditional logic for programmers and in validating this logic with the user. The effectiveness of the decision aids is determined by their ability to help in the understanding of conditional logic. Their relative effectiveness in facilitating such understanding however, has previously not been subject to proper empirical testing. This research concerns the effectiveness of the decision table and tree in the user interface. The authors discuss their relative effectiveness as communication tools in user validation of conditional logic and as decision aids in problem solving. Since these aids are normally applied in a specific context involving the users, the authors use a computer investment game that requires their use for decision making. A key feature of this research is the use of this computer game to promote highly motivated and engaged subjects.

Keywords: computer games, decision tables, investment, trees [mathematics], user interfaces, systems analysis, decision tree, conditional logic, decision aids, user validation, problem solving, investment.

Classification: ◆ Application area: Decision formalisms
◆ Character: Practical
◆ Year, Country, Language: 1992, USA, English

[185] Sugimoto M., Fukushima H., "*Software diagram description*", Japan Annual Reviews in Electronics, Computers & Telecommunications, vol. 12 (1984) p. 72-82.

Abstract: The purpose of Software Diagram Description is to improve software productivity, software maintainability and software reliability. The basic idea of Software Diagram Description and FESDD: Fujitsu Essential Software Diagram Description is discussed. After FESDD software development and maintenance is considered, FESDD box formats and a basic idea of Hypermacro are presented. Several FESDD diagrams and discussions of FESDD Support System are provided. FESDD diagram application shows the effectiveness of Software Diagram Description compared with conventional systems.

Keywords: computer software - design, computer systems programming - decision tables, logic design, software diagram description, SDD box formats, nesting levels.

Classification: ◆ Application area: Software development
◆ Character: Theoretical / practical
◆ Year, Country, Language: 1984, Japan, English

[186] Swaim J., Sink S., "*Decision support system development for the multi-factor productivity measurement model*", Fall Industrial Engineering Conference, American Institute of Industrial Engineers, Inst of Industrial Engineers, Norcross, GA, USA (1984) p. 310-317.

Abstract: Recently, Decision Support Systems (DSS) have received a great deal of attention; similarly, productivity measurement has been the focus of numerous books, articles, seminars, etc. However, very little has been written about the potential contribution that productivity measurement models could make as Decision Support Systems. A study was recently completed in which the Multi-Factor Productivity Measurement Model (MFPMM) was modified and enhanced in hopes that it would become a useful DSS for managers concerned with productivity management. This paper will briefly describe the MFPMM, then summarize the study by covering the methodology, the results, and recommendations for further study and development.

Keywords: productivity - computer applications, computer aided manufacturing - applications, industrial management - computer applications, industrial plants - automation, computer graphics - applications, computer programming - decision tables, management decision making, productivity management, output information, input information, decision support systems.

Classification: ◆ Application area: Decision support systems
                  ◆ Character: Unknown
                  ◆ Year, Country, Language: 1984, USA, English

[187]   Swiniarski R., *"Decision table technique application to real-time microprocessor-based controllers"*, Systems Science, vol. 9, nr. 4 (1983) p. 51-64.

Abstract: The paper presents an idea of the decision table technique application to real-time microprocessor-based controllers. The accuracy, memory and processor time requirements of classical microcomputer-based controllers with software arithmetic package have been presented. Analytical inequalities, which can be used for the evaluation of a minimal wordlength of microprocessor arithmetic software for the required controller accuracy have been given. As a counter proposal to software arithmetic-based controllers, the decision table-based controller is suggested. The paper shows that for low accuracy, decision table-based controllers can guarantee better computational parameters than those obtained by classical software arithmetic-based controllers.

Keywords: control systems - computer applications, computers, microprocessor, computer systems programming -decision tables, microprocessor-based controllers.

Classification: ◆ Application area: Control systems
                  ◆ Character: Theoretical
                  ◆ Year, Country, Language: 1983, Poland, English

[188]   Tanaka M., Aoyama N., al., *"Integration of multiple knowledge representation classification problems"*, Proc. of the 1993 IEEE, p. 448-449.

Abstract: This paper describes an approach to integrating various knowledge representations for classification problems. Knowledge representation forms have been analyzed. The analysis shows that suitability of representation depends on a given situation. Therefore, the multiple representation form capability and the form conversion capability are necessary to support developing knowledge bases for wide areas of applications. A classification problem tool called DECISIONBOX has been developed with the aim of providing experts with the integrated knowledge representation capability. A knowledge base can be represented in a tabular form, a rule form and a tree form, and form conversion can be done at all times. With this integrated representation, an expert is able to build a knowledge base using the most appropriate form.

No keywords available.

Classification: ◆ Application area: Knowledge representation, tools
                  ◆ Character: Unknown
                  ◆ Year, Country, Language: 1993, Japan, English

[189]   Thewalt C., Moskowitz D., *"Automated text generation for building standards"*, Journal of Computing in Civil Engineering, vol. 4, nr. 1 (1990) p. 20-36.

Abstract: A methodology for generating English text from a computer-processible representation of a design standard is proposed. The machine representation of the standard uses a network of decision tables. A computer program illustrating the generation process is described. The program uses a template-based, or fill-in-the-blank, approach to text generation. An advantage of such an approach is that meaningful sentences can be consructed from the computer representation using little additional distinctly linguistic information. The use of semantic models to describe the meaning of individual provisions is also discussed. Several new models that were found to better describe the provisions occurring in design standards are subsequently proposed. Future research directions are proposed in light of the current findings.

Keywords: buildings - standards, civil engineering - computer applications, building codes, engineering writing - computer applications, computer programming - algorithms, computer systems programming - decision tables, automated text generation, Lisp program, Icarus, standards analysis, synthesis and expression (SASE), design standard computer representation.

Classification:	◆ Application area:	Knowledge representation, construction
	◆ Character:	Theoretical / practical
	◆ Year, Country, Language:	1990, USA, English

[190] Thomas J. B., *"Les systèmes experts et la mécanique"*, Revue Francaise de Mécanique, nr. 2 (1990) p. 63-76.

Abstract: Mechanical engineers constantly face the challenge of providing the right answer quickly, while meeting ever more demanding quality criteria, both in design and operating functions. Product design, qualification of models on the basis of experiments, performance of complex calculations, analysis of a system's reliability, writing of operating procedures, system operation, crisis management, robot programming and job planning in a complex working environment are all natural fields of application for such techniques. The objectives in using this new type of tool are to master complexity, to ensure quality and to promote optimization.

Keywords: expert systems - knowledge bases, mechanical engineering - computer aided design, logic design - computer aids, computer systems programming - decision tables, logical paths, conceptual knowledge, decision making, reasoning models.

Classification:	◆ Application area:	Expert systems
	◆ Character:	Unknown
	◆ Year, Country, Language:	1990, France, French

[191] Tien J., *"Decision support model for forecasting census levels in an interactive multi-facility system"*, Proceedings of the International Conference on Systems, Man and Cybernetics, IEEE Service Cent, Piscataway, NY, USA (1983) p. 855-858.

Abstract: A computer-based decision-support model has been developed to forecast facility census levels in a general system of interactive facilities where individuals are referred and/or transferred between facilities. The model builds on a matrix or network queuing equation previously developed by the author. The experience to date with applying the model to the forensic mental health area is also presented.

Keywords: data processing - governmental applications, decision theory and analysis, computer systems programming - decision tables, resource management, decision making, census level forecasting, decision support model, queueing equation.

Classification:	◆ Application area:	Decision support systems
	◆ Character:	Unknown
	◆ Year, Country, Language:	1983, USA, English

[192] van Dijk J., *"Mogelijkheden en beperkingen van expert systems"*, Maandblad voor Accountancy en Bedrijfshuishoudkunde, vol. 60, nr. 7 (1986) p. 279-294.

No abstract available.

Keywords: systems design, user interface, decision making, artificial intelligence, expert system, knowledge engineering, problem solving, decision table, data base.

Classification:	◆ Application area:	Expert systems
	◆ Character:	Unknown
	◆ Year, Country, Language:	1986, Holland, Dutch

[193] van Loo L., *"Op weg naar de toekomst: informatica voor het MEAO; deel 2: schematechnieken"*, Wolters-Noordhoff, Groningen (1991) 177 p.

Abstract: This second part in a series of three books for the Dutch intermediate business education discusses practical computer science skills. Explained is how to make program flow charts, program structure diagrams, system flow diagrams; how to work with files in program flow charts and program structure diagrams; P-structures; decision tables; diagrams of the organisation; and configuration plans.

Keywords: algorithm, flow diagram, organisation theory, flowcharting, decision table, Nassi-Shneiderman diagram, intermediate-level vocational education

Classification:	◆ Application area:	Decision formalisms
	◆ Character:	Theoretical
	◆ Year, Country, Language:	1991, Holland, Dutch

[194] Vanbuggenhout T., Vanthienen J., Schepers J., al., *"The decision table technique as a part of a computer supported procedure of legal drafting"*, Legal Knowledge Based Systems, Koninklijke Vermande BV, Lelystad (1993) p. 71-80.

Abstract: The quality of legislation is determined not only by external elements which define its content, but also by a set of intrinsic criteria that concern the content as well as the particular form and shape of the legal rules, which are fixed during the phase of legal drafting. In order to guarantee or to increase the increase the intrinsic quality of legal rules, a method of legal drafting can be used that is based upon the decision table technique. The purpose of the present paper is to describe and evaluate this specific method. Within this method, the intentions of the Legislator are translated into one or more decision tables, so that the decision process can be validated in a formal way. In a next phase, those decision tables can be transformed into a decision rule and even into a legal rule written in natural language. The use of the decision technique opens many perspectives for computer support of the legal drafting process. That computer support is especially interesting for the evaluation of those features dealing with the content of the shaped legal rules.

No keywords available.

Classification: ◆ Application area: Legal matters, expert systems
◆ Character: Practical
◆ Year, Country, Language: 1993, Belgium, English

[195] Vanthienen J., *"A more general comparison of the decision table and tree"*, Communications of the ACM, vol. 37, nr. 2 (1994) p. 109-113.

Abstract: In Subramanian G. H., Nosek J., al., "A comparison of the decision table and tree", Communications of the ACM, vol. 35, nr. 1 (1992) p. 89-94, the authors report on an experimental study comparing two decision representations for depicting conditional logic: decision tables versus decision trees. The experiments may reflect some important shortcomings.

Keywords: decision tables, decision trees, user interfaces, conditional logic.

Classification: ◆ Application area: Decision formalisms
◆ Character: Practical
◆ Year, Country, Language: 1994, Belgium, English

[196] Vanthienen J., *"Een moderne kijk op beslissingstabellen"*, Informatie, vol. 30, nr. 12 (1988) p. 912-937.

No abstract available.

No keywords available.

Classification: ◆ Application area: Decision formalisms
◆ Character: Theoretical
◆ Year, Country, Language: 1988, Belgium, Dutch

[197] Vanthienen J., Aerts A., Mues C., Wets G., *"A modeling approach to KBS verification"*, EUROVAV (1995) Chambery (France).

Abstract: Although anomaly detection is a well-established method for verifying knowledge based systems (KBS), many rule-based system development environments still do not provide built-in checkers. As a result, verification is often performed by means of a stand-alone tool. Yet, the inclusion of an incremental verification component into the modelling environment itself will be of assistance in improving the process of knowledge acquisition and representation. Therefore, research in verification will, in our opinion, focus more and more on techniques that could support designers in reducing the risk of introducing anomalies into the knowledge base. In this context, we strongly believe that the decision table formalism, when applied as a modelling technique, offers substantial advantages to the simple production rule formalism, since its structured nature will considerably reduce this risk. In this paper, it is shown how, by means of some relatively simple procedures, many anomalies are prevented from occurring, while other anomalies can be incrementally checked for. To this end, the notion of table-based modelling is first briefly described, after which a classification of anomalies in a table-based context is proposed.

Keywords: decision modeling, verification, knowledge based systems, knowledge representation, decision tables.

Classification: ◆ Application area: Decision modeling, expert systems
◆ Character: Theoretical
◆ Year, Country, Language: 1995, Belgium, English

[198] Vanthienen J., Dries E., *"Restructuring and Simplifying Rule Bases"*, Proceedings Seventh Intl Conference on Tools with Artificial Intelligence (ICTAI '95), November 5-8, 1995, Herndon (VA), pp. 484-485.

Abstract: Rule bases are commonly acquired, by expert and/or knowledge engineer, in a form which is well suited for acquisition purposes. When the knowledge base is executed, however, a different structure may be required. Moreover, since human experts normally do not provide the knowledge in compact chunks, rule bases often suffer from redundancy. This may considerably harm efficiency. In this paper a procedure is examined to transform rules that are specified in the knowledge acquisition process into an efficient rule base by way of decision tables. This transformation algorithm allows the generation of a minimal rule representation of the knowledge, and verification and optimization of rule bases and other specifications (e.g. legal texts, procedural descriptions). The proposed procedures are fully supported by the PROLOGA tool.

Keywords: decision tables, expert systems, knowledge acquisition, minimal rules, knowledge representation.

Classification: ◆ Application area: Decision formalisms, expert systems
                  ◆ Character: Theoretical
                  ◆ Year, Country, Language: 1995, Belgium, English

[199] Vanthienen J., Dries E., *"Illustration of a decision table tool for specifying and implementing knowledge based systems"*, International Journal on Artificial Intelligence Tools, vol. 3, nr. 2 (1994) p.267-288.

Abstract: In this paper it is explained how automated decision table construction and interfacing can prevent a great deal of the current problems with knowledge based systems, viz. lack of adequate design methodologies, lack of validation and verification support, maintenance problems. A decision table engineering workbench, that addresses these issues of decision table modeling and interfacing, is presented by means of a small but elaborate example.

Keywords: decision tables, knowledge representation, expert system tools and techniques, knowledge acquisition, verification and validation.

Classification: ◆ Application area: Knowledge representation, expert systems
                  ◆ Character: Theoretical / practical
                  ◆ Year, Country, Language: 1994, Belgium, English

[200] Vanthienen J., Wets G., *"From decision tables to expert system shells"*, Data & Knowledge Engineering, vol. 13, nr. 3 (1994) p. 265-282.

Abstract: Building and maintaining high quality knowledge based systems is not a trivial task. Decision tables have sometimes been recommended in this process, mainly in verification and validation. In this paper, however, it is shown how decision tables can also be used to generate, and not just to validate, knowledge bases and how the transformation process from decision tables to knowledge bases can be organized. Several options to generate rules or other knowledge representations from decision tables are described and evaluated. The proposed generation strategy enables the knowledge engineer to concentrate on the acquisition and modeling issues and allows him to isolate the knowledge body from its implementation. The generation process has been implemented for two commercial tools, AionDS and KBMS and has been applied to real world applications.

Keywords: expert systems, decision tables, decision trees, knowledge acquisition, verification and validation, rule minimization.

Classification: ◆ Application area: Expert systems, knowledge representation
                  ◆ Character: Theoretical
                  ◆ Year, Country, Language: 1994, Belgium, English

[201] Vanthienen J., Wets G., *"Integration of the decision table formalism with a relational database environment"*, Information Systems, vol. 20, nr. 7 (1995) p. 595-616.

Abstract: In this paper it is examined how the relational approach may be used, not only in storing, but also in constructing, filling in, validating and consulting decision tables. This integration of a decision table system and the relational concept is studied in the context of an existing decision engineering workbench, Prologa (PROcedural LOGic Analyzer), an interactive rule-based design tool for decision table construction and manipulation.

Keywords: decision tables, relational databases, knowledge based systems, verification and validation, knowledge acquisition.

Classification: ◆ Application area: Databases, decision support systems
◆ Character: Theoretical / practical
◆ Year, Country, Language: 1995, Belgium, English

[202] Vanthienen J., Wets G., Chen G., *"Recent advances in the development and consultation of knowledge based systems using decision tables"*, Intl Conf on Information and Knowledge Engineering (ICIK), Dalian, China (1995) p. 4-7.

Abstract: This paper proposes a method to develop knowledge based systems using decision tables. The basic idea of the method is to start from decision tables in the knowledge acquisition phase and then to generate a knowledge based application by transforming the decision tables to trees or rules. The main advantage of this method is that verification and validation can take place during the knowledge acquisition phase. In this way it is prevented to store erroneous knowledge instead of correcting errors during the later phases of development. Furthermore, the paper describes a support tool for this method called Prologa. This tool supports the knowledge engineer by automating the process of building, validating and optimizing the decision tables and then generates code which can be consulted in a shell or program.

No keywords available.

Classification: ◆ Application area: Knowledge repr., decision support systems
◆ Character: Theoretical / practical
◆ Year, Country, Language: 1995, Belgium, English

[203] Vessey I., Weber R., *"Conditional statements and program coding: an experimental evaluation"*, International Journal of Man-Machine Studies, vol. 21, nr. 2 (1984) p. 161-190.

Abstract: Prior research supports the superiority of the nested conditional over the branch-to-label conditional. However, when examining programmer performance using these two forms of the conditional, the prior research has confounded several programming tasks. If these tasks are disentangled and programmers are trained to perform the tasks using language-independent paradigms, the relative performance of the nested conditional versus the branch-to-label conditional is no longer clear-cut.

Keywords: computer programming - structured programming, computer programming languages, computer systems programming - decision tables, codes, symbolic - encoding, goto, if then else, conditional statements, programmer performance.

Classification: ◆ Application area: Programming, programming languages
◆ Character: Theoretical
◆ Year, Country, Language: 1984, Australia, English

[204] Vessey I., Weber R., *"Structured tools and conditional logic: an empirical investigation"*, Communications of the ACM, vol. 29, nr. 1 (1986) p. 48-57.

No abstract available.

Keywords: English language, structured design, performance evaluation, tree structure, programmer psychology, structured analysis, logic, decision tree, decision table.

Classification: ◆ Application area: Decision formalisms
◆ Character: Practical
◆ Year, Country, Language: 1986, Australia, English

[205] Vidomenko V., *"Automated design and functional simulation of networks in formatted natural language"*, Avtomatika i Vychislitel'naya Tekhnika, vol. 23, nr. 5 (1989) p. 1-7.

Abstract: The author analyzes current trends in support for design of large networks, and offers a brief description (with an emphasis on practical applications) of a problem-oriented computer-aided design system. The linguistic basis for the proposed system is provided by a natural design language that is formatted by decision tables. Software support is implemented as an application package that performs the functions of archiving, interpreting, and documenting of algorithms (AIDA). The package is implemented on a computer of SM-4 class in the RAFOS and OS RT operating environments.

Keywords: computer networks - computer aided design, computer systems programming - decision tables, computer software, natural languages.

Classification: ◆ Application area: Data communication
◆ Character: Unknown
◆ Year, Country, Language: 1989, Unknown, English

[206] Voermans W., *"Think: 3-2 Jurix report"*, http://itkwww.kub.nl:2080/itk/docs/think/3-2/cfrep2.html

No abstract available.

No keywords available.

Classification: ◆ Application area: Legal matters
◆ Character: Practical
◆ Year, Country, Language: 1995, Holland, Dutch

Comments: This text is a report of the November 1993 Jurix convention. A subject that was discussed on this convention was construction aids for legislation. In one of the speeches a method for constructing legislation was proposed and the advantages and disadvantagesof using decision tables in constructing legal texts were discussed. The proposed method has three steps: In the first step a decision table of the problem domain is constructed. In the second step that table is converted into a number of rules, that are converted in the last step into legal text in natural language. The advantage of decision tables as a formal representation technique is that a complex matter (a complex legal rule, that has to consider a great number of circumstances) can be conveniently arranged such that the logical relationships and the decision structure become clear. Next to this advantage, they can also help the legislator with the verification of the rules. There are a few disadvantages as well. First of all, they can only be used for legislation with a conditional structure. Second, the technique can be time consuming and last, the quality of the legislation becomes dependent on the quality of the table.

[207] Vol'skii V., *"Choice of best alternatives on directed graphs and tournaments"*, Avtomatika i Telemekhanika, Vol. 49, nr. 3 (1988) p. 267-278.

Abstract: The article presents a literature survey of choice procedures using a binary preference relation defined on the set of alternatives (a directed graph). Choice procedures for the case when the binary relation is a tournament (i.e., asymmetric and complete) are considered separately.

Keywords: decision theory and analysis - mathematical models, mathematical techniques - graph theory, computer systems programming - decision tables, statistical methods, probability - game theory, binary preference relations, choice theory, directed graphs, tournaments.

Classification: ◆ Application area: Choice procedures
◆ Character: Unknown
◆ Year, Country, Language: 1988, Unknown, English

[208] Wang P., *"Parsing algorithm for line-drawing pattern recognition"*, Proceedings of SPIE - The International Society for Optical Engineering, vol. 1384, Int Soc for Optical Engineering, Bellingham, WA, USA. (1991) p. 68-74.

Abstract: The concept of 'universal array grammar' for off-line line drawing patterns is proposed and an algorithm for transforming two-dimensional line drawing patterns to parsing sequences based on the 'universal array grammar' is constructed.

Keywords: computer graphics - interactive, computer programming - algorithms, computer systems programming - decision tables, universal line array grammar.

Classification: ◆ Application area: Algorithms
◆ Character: Practical
◆ Year, Country, Language: 1991, USA, English

[209] Wartak J., Fenna D., al., *"Diagnostic evaluation of chest pain using decision tables"*, Computers in Cardiology, IEEE Service Center, Piscataway, NY, USA (1987) p. 235-237.

Abstract: The authors examine algorithmic diagnosis of chest pain. A diagnostic evaluation can be made more accurate and expedient by formalizing clinical reasoning using logical and mathematical methods. Logical methods are aimed at the optimal sequencing of the functional inquiry and laboratory investigation. Mathematical methods are aimed at determining weighting factors and the cost of misdiagnosis. A simple algorithm using the optimal logical sequencing can be used by the physician. A more elaborated algorithm using both the logical and mathematical approaches can be used only by computer.

Keywords: biomedical engineering - computer aided diagnosis, computer programming - algorithms, decision theory and analysis - medical applications, chest pain diagnosis, decision tables, cardiology.

Classification: ◆ Application area: Medicine
◆ Character: Practical
◆ Year, Country, Language: 1987, Canada, English

[210] Wears L., Stenklyft R., *"Using decision tables to verify the logical consistency and completeness of clinical guidelines: fevers without sources in children under age three years"*, http://solaris.ckm.ucsf.edu:8081/originals/SAEMabs/z.abs103.html

No abstract available.

No keywords available.

Classification:	◆ Application area:	Medicine
	◆ Character:	Practical
	◆ Year, Country, Language:	1995, USA, English

Comments: The issue here is the verification of clinical guidelines. The recommended method for this verification is the same as demonstrated in ref. 163, with a few minor modifications. By contracting a number of steps, they are reduced to 6 in total. Steps 7 and 8 from the previous description are switched. Otherwise, the methods are the same. We find the same conclusion as in the previous paper, namely that applying this method in practice brought forth a number of inconsistencies and incompletenesses in certain guidelines. The author recommends to verify the guidelines by means of formal methods, like the one described.

[211] Wong C.-L., Bagchi A., Ahluwalia R., *"Dmap: a computer integrated system for design and manufacturing of axisymmetric parts"*, American Society of Mechanical Engineers, Production Engineering Division (Publication) PED, vol. 24, ASME, New York, NY, USA (1986) p. 327-338.

Abstract: A minicomputer based integrated design and manufacturing system has been developed for axisymmetric components. In this system, there are three groups of software packages to carry out component design, process planning, automatic data down loading and execution of the NC program generated to produce the component. Part design is carried out on a simple graphics retrofitted ASCII terminal and implemented on a minicomputer. The graphics representation of the part geometry is then broken up into predefined geometrical elements. A decision table is used to select the sequence of machining operation and appropriate tools. The resulting NC program is then down loaded through a microprocessor and executed on an NC lathe to produce the component. Results of implementation for simple as well as complex shapes are then presented. This system thus ties in design, process planning and NC part programming using decision tables for an integrated CAD-CAM system.

Keywords: computer integrated manufacturing - mathematical models, data processing - manufacturing applications, computers, minicomputer, control systems, numerical, axisymmetric components, decision table, complex shapes.

Classification:	◆ Application area:	Production planning, applied mathematics
	◆ Character:	Unknown
	◆ Year, Country, Language:	1986, USA, English

[212] Wu H., Zhou S., *"Maintenance processor for KB in CAD expert system"*, Proceedings of International Conference on Computer-Aided Design and Computer Graphics, Int. Acad. Publishers, Beijing, China (1989) p. 338-342.

Abstract: The paper reviews past research on the maintenance of knowledge bases. It presents a decision-table-based algorithm for checking completeness and consistency in a rule-based CAD expert system.

Keywords: CAD, data integrity, deductive databases, expert systems, knowledge engineering, KB, maintenance, knowledge bases, decision-table-based algorithm, completeness, consistency, rule-based CAD expert system.

Classification:	◆ Application area:	Expert systems, algorithms, databases
	◆ Character:	Practical
	◆ Year, Country, Language:	1989, China, English

[213] Yeralan S., Ramcharan D., Bauer T., *"New standard for industrial control languages"*,Computers & Industrial Engineering, vol. 19, nr. 1-4 (1990) p. 190-194.

Abstract: There exists a need and an opportunity to develop industrial control languages that take advantage of the powerful facilities offered by modern microcontrollers. Developing a fundamental systems description is a prerequisite to writing such high-level control languages. Such a fundamental systems description requires building and experimenting with alternative hardware/software architectures, and gathering empirical data in actual manufacturing environments. A 3-year project is initiated in the Industrial Research Laboratory at the University of Florida to investigate the various aspects of controller architectures, operating systems and languages. This report summarizes our approach and outlines the progress to date.

Keywords: control systems, programmed - design, computer programming languages - standards, computer architecture - design, systems engineering - human factors, systems science and cybernetics - cognitive systems, computer systems programming - decision tables, industrial control languages, performance analysis, hardware software architecture.

Classification: ◆ Application area: Control systems
             ◆ Character: Practical
             ◆ Year, Country, Language: 1990, USA, English

[214] Yeremeyev A., *"Production model for representing knowledge based on a decision table"*, Tekhnicheskaya Kibernetika, vol. 25, nr. 6 (1987) p. 124-135.

Abstract: The author describes a production model for representing knowledge, based on a decision table language, designed to be used in automating decision-making processes. The paper examines facilities for testing the model for syntactical and semantic correctness (completeness and consistency), for optimization relative to a minimum criterion for decision search time, and facilities for converting the model into a program. An example of the description of the decision-making process by means of this model is also presented.

Keywords: artificial intelligence - expert systems, decision theory and analysis, production model, decision table language, knowledge representation, syntactic correctness, semantic correctness.

Classification: ◆ Application area: Knowledge representation, expert systems
             ◆ Character: Theoretical
             ◆ Year, Country, Language: 1987, Russia, English

[215] Yu P., Anastassopoulos V., Venetsanopoulos A., *"Pattern classification and recognition based on morphology and neural networks"*, Canadian Journal of Electrical and Computer Engineering, vol. 17, nr. 2 (1992) p. 58-64.

Abstract: Morphological transformations are an efficient method for shape analysis and representation. In this work the pecstrum (pattern spectrum), which is a morphological shape descriptor, is used for object representation. Neural networks are then employed, instead of conventional classification techniques, for object recognition and classification. Various coding schemes and training procedures have been examined in order to achieve a high classification performance. A complete classification and recognition scheme is proposed, which is shown to work satisfactorily even for small objects, where the quantization noise has significantly distorted their shape. The classification results are compared with those obtained using conventional methods, as well as with the results obtained using other shape descriptors.

Keywords: pattern recognition - morphology, pattern recognition systems, computer systems programming - decision tables, neural networks - applications, decision support systems, morphological transformations.

Classification: ◆ Application area: Expert systems, knowledge representation
             ◆ Character: Theoretical / practical
             ◆ Year, Country, Language: 1992, Canada, English

[216] Yutian S., Laxian W., *"Design and implementation of software environment for development of expert decision support system"*, Xibei Gongye Daxue Xuebao/Journal of Northwestern Polytechnical University, vol. 10, nr. 2 (1992) p. 165-172.

Abstract: DSS (Decision Support System) was studied by Sprague et al. ES (Expert System) was studied by Harmon et al and Greenwell. EDSS (Expert Decision Support System) is the result of integration of DSS and ES, EDSS was studied by Holtzman. This paper proposes a skeleton model of software environment that is conducive to the development of EDSS; its conceptual architecture is presented. The paper presents several feasible algorithms. These designed algorithms are: knowledge acquisition algorithm, knowledge base construction and maintanance algorithms, reasoning mechanism algorithm, and the algorithm for representation and integration of the model.

Keywords: decision support systems, computer systems programming - decision tables, expert systems - knowledge bases, computer software, reasoning mechanism, software envirionment, interactive design.

Classification: ◆ Application area: Decision support systems, expert systems
             ◆ Character: Theoretical
             ◆ Year, Country, Language: 1992, China, Chinese

[217] Zadeh L., *"Making Computers think like people"*, IEEE Spectrum, vol. 21, nr. 8 (1984) p. 26-32.

Abstract: Fuzzy sets are a concept that can bring the reasoning used by computers closer to that used by people. Whereas a conventional, or 'crisp', set has sharp boundaries (such as the set of all numbers greater than 2), the transition between membership and nonmembership in a fuzzy set is gradual rather than

sharp. With fuzzy sets, human concepts like 'small', 'big', 'young', 'old', 'high' or 'low' can be translated into a form usable by computers. Fuzzy sets and fuzzy logic are now finding wider and wider application in a broad range of problem solving, from industrial process control and pattern recognition to weather prediction, medical diagnosis, and agricultural planning.

Classification: ◆ Application area: Knowledge representation
                 ◆ Character: Theoretical / practical
                 ◆ Year, Country, Language: 1984, USA, English

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