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A SIMPLE NOMINAL CLASSIFICATION ALGORITHM BASED ON QUALITATIVE FEATURES 2

Kornoushenko E.K.

An alternative approach to classifying is proposed based on nominal qualitative features. This approach differs from conventional approaches in that instead of comparing test object features tuple with similar features tuples of training sample objects, the independent pairwise comparison is performed for each pair of values in corresponding tuples of objects features. This allows to form the matrix of features weights for each test object that is more detailed than the test object nearest neighborhood. In this approach the simple classification algorithm is suggested, that has a number of important features in respect of classification results interpretation. The quality of the algorithm is tested on an imbalanced sample taken from the known UCI repository. It is shown that the algorithm provides good objects classification accuracy for «small» classes.

Keywords: classification, nearest neighborhood, class label, vote weighting, feature weighting, feature weight matrix.

SEARCH FOR COURNOT EQUILIBRIUM ON THE HEAT ENERGY MARKET IN THE CONDITIONS OF HEAT SOURCES COMPETITIVE BEHAVIOUR 10

Stennikov V.A., Penkovskii A.V., Khamisov O.V.

The «Single buyer» organizational model is considered on the market of heat energy. The mathematical model is developed, in which the corresponding to Nash equilibrium optimum load distribution among the heat sources is defined on the basis of Cournot approach. It is noted that the mathematical model allows to take into account the heat energy production and transportation costs as well as physical and technical properties of the heat supply systems. The heat supply system with three heat sources is examined using the model developed.

Keywords: heat supply system, market of heat energy, «Single buyer» model, optimization, Cournot — Nash equilibrium.

MODELS OF ENTERPRISE HEADCOUNT MANAGEMENT USING DYNAMIC PROGRAMMING METHOD 19

Belov M.V.

The paper is devoted to the enterprise headcount management problem, taking into account the uncertainty of business and the uncertainty of employee turnover (dismissal and hiring processes). Problem is stated in three ways, each reflecting the specific business management practice: the stationary and non-stationary management assumptions concerning business development, and the case with minimum a priori information that requires robust solutions. The method of dynamic programming with probabilistic and interval uncertainty models is applied to obtain an analytical solution. The absence of additional assumptions about the properties of business uncertainty and traffic of employees (others than the limits of acceptable values ranges) provides the robustness of obtained analytical solution of interval task and significantly enhances its practical value.

Ключевые слова: Dynamic programming; probabilistic uncertainty; interval uncertainty; headcount management; human capital management.

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Asanov A.Z., Myshkina I.Yu.

The problem is considered of applying various types of neural networks to project team members' assessment and selection for project tasks implementation. It is suggested to use cognitive map to obtain concrete estimations of correspondence between performers' competence and individual project tasks and to form the training sample. The method is given of the required expert estimations collecting and processing. It is pointed out that the technique can be applied to determine the cognitive map's parameters and to assess the competence of possible performers. The clustered rankings coordination algorithm is used to coordinate experts' opinions.

Keywords: project, competence, cognitive map, neural networks.

INTANGIBLE ASSETS MANAGEMENT SISTEM EXPERT ANALYSIS WITH RISK ASSESSMENT 40

Gusev V.B., Isaeva N.A.

The procedures are developed, intended for the analyzing the consequences of the interaction of intangible assets and management factors taking into account the risk assessment based on expert data. The analysis

method is considered, being based on reflexive inference procedures for obtaining transitive closure of interaction and risk assessments with the using the multi-valued logic.

Keywords: management factor, intangible asset, assessment, degree of influence, risk, transitive closure, reflexive inference procedure.

THE COMPUTER NETWORK WITH DISTRIBUTED FAST CHANGING OF STRUCTURE, AND WITH DATA PROCESSING DURING TRANSMISSION 47

Stetsyura G.G.

Considered is the computer network with advanced functional features. The network structure is a complete graph, but only the connections demanded at the moment are formed. These connections reorganize quickly, that allows changing their structure repeatedly within the task solving. It is shown that this significantly simplifies and accelerates the massive operations with simultaneous participation of many system devices. The network allows performing several types of distributed calculations immediately during the process of data transmission over the network. The examples of network application and network main components technical construction are given.

Keywords: wireless optical network, dynamic reconfiguration, network calculations, distributed synchronization, barrier synchronization.

DESIGN OF SELF-CHECKING CONCURRENT ERROR DETECTION SYSTEMS BASED ON «2-OUT-OF-4» CONSTANT-WEIGHT CODE 57

Sapozhnikov V.V., Sapozhnikov V.I., Efanov D.V.

The method of Boolean complement is considered for concurrent error detection systems design based on «2-out-of-4» constant-weight code. Formalized are the rules of computing the Boolean complement functions to transform any operating output vector in concurrent error detection system into «2-out-of-4» code word. Necessary and sufficient conditions are formulated for controlled logical device to provide the total self-checkability feature of concurrent error detection system.

Keywords: concurrent error detection system, Boolean complement, 2-out-of-4 code, totally self-checking system, testing.

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Grigoriev L.I., Chernisheva O.N., Kucheryaviy V.V.

Considered are the ergatic systems research problems, the formation features of supervisors functioning reliability evaluation in automatic supervisory control systems of oil and gas transportation technological processes, the necessity of taking into account the supervisory personnel professionally significant psychological characteristics that are required to work in this subject field. Special psychological tests software package is developed to form the estimate of supervisors' reliability and the fuzzy model is suggested.

Keywords: oil-gas industry, automatic supervisory control system, supervisory control, supervisory personnel, ergatic systems, reliability, professionally significant psychological characteristic, engineering psychology, psychological tests, fuzzy models.

DETERMINATION OF SPACECRAFT ELECTRIC JET ENGINES ALTITUDE PERFORMANCE WITH THE METHODS OF EXPERIMENTAL DESIGN . . . 75

Makridenko L.A., Gecha V.J., Sidnyaev N.I., et al.

The testing technique is suggested, based on the theory of experimental design. The analysis is carried out of flight altitude and speed combinations required for optimal spacecraft control. The relevant values of space environment parameters in front of the satellite are presented. The regression model is obtained of electric jet engine flow characteristics — its parameters dependence on the specific thrust. Attention is paid to multifactorial approach to the experiment performed while managing the propulsion device resources. Illustrated is not successive, but simultaneous change of all relevant factors from one design point to another. Optimal designs of multifactorial experiment are obtained.

Keywords: spacecraft, engine, experiment planning, flow characteristics, thrust, test, point, plan, equation, observation.