The influence analysis of adopted modelling conception of the medical decision support system on ways of generating clinical pathways

A. AMELJAŃCZYK
aameljańczyk@wat.edu.pl

Instytut Systemów Informatycznych
Wydział Cybernetyki WAT
ul. S. Kaliskiego 2, 00-908 Warszawa

In this paper the influence analysis of the most popular modeling conceptions in constructing medical decision support systems on the ways of generating clinical pathways   in the field of decision-nodes was made. Such modeling conceptions as modeling based on the fuzzy set theory , rough set theory, Bayesian networks and determining patterns were analyzed.

Keywords: Clinical Decision Support System, Clinical Pathways, Fuzzy Sets, Rough Sets, Multicriteria Optimization.

Mathematical aspects of objects' spiderweb modelling

A. AMELJAŃCZYK
aameljanczyk@wat.edu.pl

Instytut Systemów Informatycznych
Wydział Cybernetyki WAT
ul. S. Kaliskiego 2, 00-908 Warszawa

In this paper opportunities to use so called spiderweb modeling method in modeling and qualitative analysis of complex objects in the processes of data exploration   were discussed. Such terms as N-dimension spiderweb space, spiderweb's model of the object, adequacy of the model and some exploration characteristics of the model were defined.

Keywords: data exploration, mathematical model of the object, spiderweb modeling, spiderweb model of the object, M-precision model, precision and adequacy of the model

---

Applicability analysis of selected standards to architecture modelling of information system for health service

T. GÓRSKI
gorski@wat.edu.pl, tomasz.gorski@rightsolution.pl

Instytut Systemów Informatycznych
Wydział Cybernetyki WAT
ul. S. Kaliskiego 2, 00-908 Warszawa

The article presents results of standards' analysis BPMN, GELLO, UML, OCL, XML and HL7 in context of their applicability to software system architecture modelling. Mentioned standards are assessed from software system modelling for health service point of view. Useful features of each standard to software system architecture modelling, was presented. Summary contains recommendation of standards set to software system architecture modelling for health service.

Keywords: architecture of information system

Usability of Gello and RIM for the object-oriented modeling of medical systems

P. KOSIUCZENKO
piotr.kosiuczenko@wat.edu.pl

Instytut Systemów Informatycznych
Wydział Cybernetyki WAT
ul. Kaliskiego 2, 00-908 Warszawa

Modern-day medical systems are complex and heterogeneous. This requires their unification, also with the help of standards. Health Level 7 (HL7) is a widely accepted standard that allows data exchange between various institutions and medical systems. Reference Information Model (RIM) is an associated standard. It concerns the syntax and semantics of messages sent between different medical systems. Like in the case of UML class diagrams, models based on RIM need to be constrained. Gello is a clone of the Object Constraint Language created for this purpose. In this paper above mentioned standards and their relationships are discussed. Their suitability for modeling and design of medical systems is evaluated.

Multi-objective optimization of multidimensional aggregates schema

M. MAZUREK
marcin.mazurek@wat.edu.pl

Instytut Systemów Informatycznych
Wydział Cybernetyki WAT
ul. S. Kaliskiego 2, 00-908 Warszawa

The most popular technology used to increase performance of large data warehouses is multidimensional aggregates computed from high-resolution data. Query-rewriting techniques allows significantly shorter user query response time, when comparing query evaluation on base tables in data warehouse and smaller in size aggregates. There are three key parameters of multidimensional schema - query response time, time needed to refresh data in the schema and disk space required for storage of multidimensional structures. In paper multicriteria optimization problem was formulated, in which data refresh time is a constraint, and the remaining two measures are objectives. As a result of multi-run single-objective task computations, Pareto-optimal set of points is shown. The satisfactory solution might be found based on a distance to ideal point.

The simulator of malwares epidemic spreading in computer networks

A. NAJGEBAUER, R. KASPRZYK
anajgebauer@wat.edu.pl

Instytut Systemów Informatycznych
Wydział Cybernetyki WAT
ul. S. Kaliskiego 2, 00-908 Warszawa

The paper focuses special attention on research of Complex Networks (CN). CN have Scale Free and Small Word features, what make them accurate model of many networks such as telecommunication. These features, which appear to be very efficient for communication, favor at the same time the spreading of computer viruses. Based on defined centrality measures, we show how to discover the critical elements of any networks. The identification of the critical elements of a given network should be the first concern in order to reduce the consequence of viruses spreading.

We define dynamic model for the spreading of viruses on networks and build application to simulate and analyze many epidemic scenarios. Based on available data of some networks, we show how and why epidemics are spreading in real telecommunication networks like Internet and how could be halted.

A method of road traffic analysis based on the behavior of cell phone users

G.SABAK

gsabak@wat.edu.pl

Wydział Cybernetyki WAT
ul. S. Kaliskiego 2, 00-908 Warszawa

In this paper a possibility to use data describing mobile phone users' behavior to derive road traffic information is investigated. The formal models of location data, road (as a simple polygonal chain) and its coverage by a cellular network are proposed and defined. With the use of these models a problem of deriving traffic situation information is formulated.

A method to calculate road traffic information from location data stream is described. In order to verify the proposed method, it was applied to a real-world data (Kraków-Zakopane road) obtained from the network of one of the mobile network operators in Poland. The results of computations are provided and analyzed. The derived traffic information is compared to the one which was obtained during an actually performed test-drive.

Keywords: CellId location, transport, congestions

Qualification of variables' priorities for some decision functions

J. WIŚNIEWSKA

joanna.wisniewska@wat.edu.pl

Instytut Systemów Informatycznych
Wydział Cybernetyki WAT
ul. S. Kaliskiego 2, 00-908 Warszawa

The following thesis describes two methods of finding variables' priorities for some specific logical functions (without any negated variables). The first method is based on Hamming distance and requires a review of examined function's truth table. That makes this method exponentially complex. The second proposed method consists on analyzing function's minimum Boolean formula and it's less precise in variables' qualification than the first mentioned method, but usually it's also less complex.

Keywords: variable's priority, decision function, Hamming distance