

**GUEST EDITORIAL:
SPECIAL ISSUE ON INFORMATION SYSTEMS
AND SOFTWARE SYSTEMS ENGINEERING**

Albertas ČAPLINSKAS

Institute of Mathematics and Informatics
2600 Vilnius, Akademijos St. 4, Lithuania

During the last years, advanced (next-generation) information systems have become an increasingly important research area. An advanced information system should be designed as an integral part of the enterprise. It should be based on enterprise model, operate in the network environment, support the Client–Server computing model, provide graphical user interface, maintain digital maps and multimedia data bases. Besides, it should be distributed, or spread, across many computers.

The interest in advanced information systems engineering continues to increase in all post-soviet countries including Lithuania. In 1991 Lithuania decided to begin the development of a modern information infrastructure serving all levels of the government as well as other institutions. This programme is known as “Lithuania 2000” and stimulates the interest in information system engineering both of theoreticians and practitioners. The information system engineering blends naturally with software system engineering, from system architecture design to user interface design.

This special issue on information systems and software systems engineering contains six papers, covering significant aspects of this research field, including enterprise modelling, user interface design, requirement engineering, software engineering tools and architecture of software packages.

Two papers on enterprise modelling by Remigijus Gustas and Bronius Paradauskas are of interest to both researchers and professionals working in the area of information systems.

Bronius Paradauskas considers the information system as a part of the enterprise which should be analysed from three different viewpoints: goal, action,

and object perspective. The object perspective is usually modelled by a conceptual scheme and the conceptual scheme is usually presented by an entity–relationship diagram. The classical entity–relationship diagrams do not allow to model structural constraints. Bronius Paradauskas suggests using the universal structural type of entities in entity–relationship diagrams. The universal structural type of entities is presented by recursive applications of two operators: a positioned universe subsets constructor and a functional set constructor. The proposed approach allows to describe structural constraints in a declarative manner and convert them later on to the procedural form.

Remigijus Gustas discusses how to bridge the gap between a description of the goal as an early requirement statement and a precise specification of the related to this goal limited area of activity which a stockholder is concerned with. He introduces a unifying framework for modelling enterprise goals in terms of semantic descriptions of information system views. Such a framework provides the basis for a better understanding of contractual customer–supplier relationships within several worlds of enterprise modelling.

The paper of Valery Grechko and Vadim Tulchinsky deals with the problem of user interface design in the enterprise information system. The enterprise model is considered as the hierarchy of data types and the set of tasks to manipulate (view, update, retrieval, transactions, etc.) those types. Valery Grechko and Vadim Tulchinsky propose to describe user interface by a grammar of special kind called *a grammar of object representation of interface*. The data types are regarded as terminal symbols and the dialogues used for task execution are regarded as non terminal symbols. This grammar may be used to analyse whether a user interface design is complete (each task may be executed), consistent (useless windows, recursive subordination of windows mismatching dialogue types are not provided) and correct (conforms to its standards).

The paper on the role of analogy in reuse by Audronė Lupeikienė is related to the requirement engineering, presenting a deeper analysis of the role of analogy in this field.

Vytautas Čyras presents two approaches for expressing computations based on recurrence relations and discusses their relative merits. Both approaches rely on the separation between the structural part describing the data dependency pattern of recurrence, a definition of the expressions to be computed as a computational aspect, and the initialisation and definition of outputs. The structural

blanks approach extends the traditional imperative programming language with constructs for defining explicitly the dependency pattern of recurrence. The program of computing the recurrence is defined as a collection of global arrays and several program components: one for each equation of the recurrence, and a scheduler for the entire computation. This approach aims at program reuse and bases a certain architecture of software packages. The other approach, the constructive recursive approach, is based on recursive relations over graphs. The graph may be defined with an assignment of the nodes to the space-time of a parallel computer. The result is then a data parallel program distributed on the processors of the parallel computer. This approach is based on a functional programming language, where the structure of the directed graph, implicitly defined by a recursive expression, is made explicit.

Baiba Apine raises an entirely different set of research issues. This paper presents an experimentally gathered data analysis tool. A data description language and an interpreter for this language are described. The proposed tool may be successfully used in software system engineering to analyse and to present in a user-friendly mode data on the project progress.

I believe that each of these papers makes a contribution to the field of information systems and software systems engineering and will serve as a source for new research works and applications.

Finally, I wish to thank all the people involved in the preparation of the special issue, especially the authors and all the reviewers.

Albertas Čaplinskas