

PhD Thesis Abstract

” CONTRIBUTIONS TO MULTICRITERIAL OPTIMIZATION OF DISTRIBUTED INFORMATION SYSTEMS”

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This thesis proposes to use evolutionary techniques to address the complex problems of multicriterial optimization of computer systems in completing classical, deterministic ones. Thus, there are presented: studies on the use of genetic algorithms for building sets of configurations that meet imposed constraints, studies on the use of evolutionary search in management and network optimization in general and SDN or Internet of Things in particular.

In addition, the thesis presents the optimization of genetic algorithms by ensuring the adaptive function of genetic operators, both by using the chromosome fitness value and by evaluating their distribution in search and space.

The paper is structured in six chapters, its target being to present new concepts and directions of evolution of distributed information systems. Multicriteria optimization methods are presented, with emphasis on highlighting the ones which will be used in the thesis as well as contributions made by the author in the field of study.

The first chapter contains a brief presentation of the problems specific to distributed information systems and the purpose of the thesis, the organization and the author's contributions in the multi-criteria optimization of the distributed information systems.

The second chapter is a review of the studied field and of the theoretical concepts used in thesis. Taking into account that new technologies are the engine of the evolution of computer systems both as architecture and hardware and software, there are briefly presented the elements related to machine-to-machine communication, Internet of Things, ubiquitous calculus, contextual calculation, networks Wireless sensors, smart-dust, ambient intelligence, virtualization and cloud computing, all of which are mostly distributed systems.

The 3-rd chapter contains the theoretical elements related to multi-criteria optimization, here it is detailed the evolutionary methods of optimization of information systems, in which the genetic algorithms (which will be the basic techniques used in the methods proposed in chapter 4), genetic programming, Evolutionary programming and evolutionary strategies.

The 4-th chapter is dedicated to the presentation of genetic methods for optimizing / generating solutions within distributed systems. It contains two distinct subchapters in which are described the proposed methods and the results obtained by the author. In the first subchapter are presented evolutionary approaches to optimizing the functioning of the communication infrastructure of computer systems, the second subchapter being(is) reserved for the presentation of the studies regarding the optimization of the functioning of the algorithms, with emphasis on showing up the self-adapting of the genetic operators.

Chapter 5 presents the conclusions regarding the issues addressed in the thesis, the limitations of the studies and the perspectives of research in this domain.

Chapter 6 contains the list of author's publications, the implementation details for the data types and the functions developed for testing the proposed optimization solutions, and also the annexes with the numerical data obtained in the experimental simulations.