

# Decision Analysis and Decision Support – The Need for Fuzzy Logic and Soft Computing – FUZZ-IEEE 2007 Panel

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The panel discussion concerns one of "meta-problems" in both real life and, as a consequence, in science: how to make good (best?) decisions. This problem is as old as humankind itself, is omnipresent, and important for individuals, groups, organizations, nations, etc. As always in the case of such problems, researchers and scholars have tried to find models and solutions for decades or even centuries, each time in the framework of their current knowledge and understanding of issues.

The purpose of the panel is to present some opinions on what fuzzy logic, and some other tools and techniques which constitute broadly perceived soft computing, can do to develop better, more human consistent approaches to decision making, and to help solve real world decision making problems.

From our perspective, the most interesting are developments in the formal, mathematical direction, notably those more sophisticated that appeared after World War II with the *utility theory, optimization, operations research, control theory, game theory*, etc. Unfortunately, in virtually all these approaches emphasis was on "hard" mathematical tools that could give optimal solutions, and without much account of the "soft" nature of human related issues.

The panel is expected to cover several areas. First, we will try to show a perspective on those developments and some newer trends into modern decision making. Then, knowing limitations of those classic, formal approaches we will discuss how to account for a key role played by humans without clear cut preferences, unclear value systems, etc. We will mention the role of *fuzzy preference structures*, concepts of *fuzzy optima*, and - what seems to be of crucial importance - an increasing role of *tools to handle natural language* that is the only fully natural means of human articulation and communication and hence is clearly used by humans to

describe the problem, constraints, goals, intentions, etc. We will emphasize in this respect a crucial role of new paradigms with roots in fuzzy logic, notably Zadeh's *computing with words and perceptions*.

As a next step, we will consider a *next decision theory* that can be viewed as a further development, and a considerable extension of the classic, somehow idealistic decision making models. Decision theory is meant as an interdisciplinary field that is concerned with how decision makers, real or ideal, make decisions in non-trivial situations, and how good (best?) decisions are attained. We will mention the basic two approaches: *normative* (or prescriptive) and *descriptive*. The first is concerned with how a decision maker should make decision, i.e. how to develop proper decision analytic tools and techniques to obtain a best (optimal?)

## I. PANEL CONTRIBUTORS

The panelists come from a diversity of backgrounds and interests. They include:

- **Moderator:** Janusz Kacprzyk, Polish Academy of Sciences, Warsaw, Poland.
- **Panelists:**
  - Lotfi A. Zadeh, University of California, Berkeley, USA.
  - Valentina Balas, University of Arad, Romania.
  - Christer Carlsson, Abo Akademi University, Abo, Finland.
  - Shyi-Ming Chen, National Taiwan University of Science and Technology, Taiwan).
  - Raija Koivisto, VTT Technical Research Center, Finland).
  - Anca Ralescu, University of Cincinnati, USA).