

Foreword

Question: What is more difficult than writing a book on the multi-disciplinary subject spanning from multi-agent systems, algebraic models, simulations, cognitive and developmental robotics to cognitive and social psychology, theory of motivation, and evolution of language? Answer: writing the foreword for such a book! Dr. Trajkovski and his collaborators, in an intellectual *tour de force* of about 300 pages have managed to brush upon a majority of the hot topics in the aforementioned areas, opionate, and give their own contribution.

The unifying theme of the book is the notion of *agent*. In a bottom-up approach, in the first section of the book, the author lays down the basics of the Interactivist-Expectative Theory of Agency and Learning (IETAL). In accordance with their construal of the notion of the agent, it is impossible to define an agent without its environment. The theory of agency is first given as a narrative, and then, an algebraic formalization is given. The book can be read on many levels and if you are, say, mathematically challenged, it is okay if you skip the major part of Chapters IV-VI. You will still have a good idea of what IETAL is about. As agent is also a social construct, the author offers a theory of multi-agent systems embodied in Multi-Agent Systems Simulation (MASim). They do not shy away from deep psychological questions and include discussion on developmental issues (with special accent on Piaget's theory) such as motivation, emotions, drives, inborn knowledge, and the like. The subtleties of the notion of *emergence* in human and artificial agent societies are given a special chapter (written by Samuel G. Collins) where he succeeds to comment on most of current theorist of *emergence* and put forward his own critical contribution to the debate and to the book.

The second section of the book is by far the most technically oriented, and you will learn about all the intricacies of writing a simulator for IETAL or MASim experiments, as well as experiments with human subjects which inhabit similar

virtual environments. The latter, POPSICLE experiment (POPSICLE: Patterns in Orientations: Pattern-Aided Simulated Interaction Context Learning Experiment) is hinted in the first section. In this section of the book, we also learn about e-POPSICLE, a version of the program for conducting online experiments with distant subjects as well as several hardware robotic platforms used as proof-of-concept tools.

The third and final section of the book is devoted to the discussion of current and future work of the author. Also, a major part of it is about types of interactions (linguistic, non-linguistic, among agents of same and of different types, human-machine interactions, etc.) and the emergence of language in multi-agent systems. Special place is given to the use of spatial metaphors in descriptions of the online interactions. Is it possible to avoid it? What happens if we start using some application without prior knowledge of the interface or of its use? What will emerge from this type of human-machine (or human-machine-human) interactions? These are the questions that the author embarks on with their newest experimental setup Izbushka! As every decent book, this one closes with more questions than answers! Understandably, such a book does not make an easy read, but it certainly makes a gratifying experience!

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