

Arbitrary Multiscale Explainable Decision-Making for Symbiotic Autonomous Systems

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Abstract — In the near future to solve complex, arbitrary multiscale system problems, we need a unified, integrated framework that can offer an effective and convenient, universal mathematical approach, by considering information not only on the statistical manifold of model states, but also on the combinatorial manifold of low-level discrete, directed energy generators and empirical measures of noise sources, related to experimental high-level overall perturbation. To overcome past modeling limitations in dynamic cooperative multi-agent system, we propose the modeling of agent as purposive subject modeled by advanced decision logic approach. In this context, predicative competence and natural language processing can play a fundamental role in developing new generation of user-friendly, more autonomous, but still colloquial systems to offer explainable decision-making to achieved goal. Understanding this deep layer of “machine thought” is vital to develop highly competitive, more reliable and effective symbiotic autonomous systems. A new approach to computational predicative competence will be presented.

Keywords — Collective/personal intelligence, evolutive cognition, evolutive information, evolutive wisdom, transdisciplinarity, ontologic database, cognitive framework, cognitive informatics, abstract sciences, cognitive systems, machine knowledge learning, denotational mathematics, cognitive computing, semantic computing, cognitive knowledge base, applications.

About the Keynote Speaker



Rodolfo A. Fiorini is Professor of Bioengineering at Politecnico di Milano University, Italy. He had joined research projects with Stanford University and University of California at Los Angeles. He has received prestigious awards and honors from Italian National Research Council, University and Research Ministry, U.S.A DOL,

etc. He is the founder and coordinator of the Research Group on Computational Information Conservation Theory (CICT). His research activity has concerned collective/personal intelligence, evolutive cognition, evolutive information, knowledge representation, modeling and simulation, bio-inspired system, intelligent networking, cognitive computing, human-machine interfaces, computational reasoning, business process management systems, energy management systems, wellbeing, and the use of intercultural transdisciplinary approaches for the creation of reality levels where engineering and life sciences can synergistically interact to promote scientific discovery. Prof. R. A. Fiorini is WAAS Fellow, IEEE, EMB, AAAS, and JtiBS Editorial Board Member.