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01 Oct 2017

Engineering Cyber Physical Systems: Preface

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Recommended Citation

C. H. Dagli, "Engineering Cyber Physical Systems: Preface," *Procedia Computer Science*, vol. 114, pp. 1-2, Elsevier, Oct 2017.

The definitive version is available at <https://doi.org/10.1016/j.procs.2017.09.055>



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ScienceDirect

Procedia Computer Science 114 (2017) 1–2

Procedia
Computer Science

www.elsevier.com/locate/procedia

Complex Adaptive Systems Conference with Theme: Engineering Cyber Physical Systems, CAS
October 30 – November 1, 2017, Chicago, Illinois, USA

Engineering Cyber Physical Systems

Preface

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Multi-faceted systems of the future will entail complex logic and reasoning with many levels of reasoning in intricate arrangement. The organization of these systems involves a web of connections and demonstrates self-driven adaptability. They are designed for autonomy and may exhibit emergent behavior that can be visualized. They will impact manufacturing industry, defense, healthcare, energy, transportation, emergency response, agriculture and society overall. The success will come how the current challenges related to cybersecurity, interoperability, privacy, safety and socio-technical aspects mainly interaction of human behavior and complex adaptive systems are handled

Complex Adaptive Systems have dynamically changing meta-architectures. Finding an optimal architecture for these systems is a multi-criteria decision making problem often involving many objectives in the order of 20 or more. This creates “Pareto Breakdown“ which prevents ordinary multi-objective optimization approaches from effectively searching for an optimal solution; saturating the decision maker with large sets of solutions that may not be representative for a compromise architecture selection from the solution space.

Our quest continues to handle complexities to design and operate these systems. The challenge in Complex Adaptive Systems design is to create an organized complexity that will allow a system to achieve its goals. Researchers from academia, industry and government met in Chicago, Illinois, on October 30 to November 1, 2017, to share their findings and expand the boundaries of research in Complex Adaptive Systems. This year we are centered on the current state of practice in Engineering Cyber Physical Systems.

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This publication of the Complex Adaptive Systems Proceedings series contains the edited versions of the technical presentations of Complex Adaptive Systems held October 30 to November 1, 2017, in Chicago, Illinois, U.S.A. The extended version of each selected paper was reviewed by two referees, then revised, edited and condensed to the format herein. I would like to express my gratitude to the plenary speakers at the conference for their invaluable contributions through their talks. Further, I wish to express my gratitude to all authors for their contributions to this volume of proceedings and for their presentations at the conference, as well as, to all referees for their comments and suggestions for revising the papers. I would like to mention our appreciation to the conference sponsors for bringing real life dimension, issues and engineering problems to the meeting. I would also like to thank Sue Turner and Latesha Zach for all their help and efforts that enabled me to sail smoothly in the organization of this conference and production of this volume.

Cihan H. Dagli
St. Louis, Missouri, U.S.A.
August, 2017