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Yuhua Luo (Ed.)

# Cooperative Design, Visualization, and Engineering

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# Preface

This year, the 17th International Conference on Cooperative Design, Visualization and Engineering (CDVE 2020), which was planned to take place in Bangkok, Thailand, during October 25–28, was held virtually and online due to the unprecedented COVID-19 pandemic. It was a fresh experience for the conference organizers and the participants. The papers presented in this proceedings book is a collection of the accepted papers for CDVE 2020.

From the papers of this volume, we can see new concepts, new applications, new angles of view in the development of cooperative design, visualization, and engineering technology. The papers cover a very broad range of application areas. The areas involved are health care, industrial design, banking IT systems, cultural activities support, operational maritime cybersecurity assurance, emotion communication, and social network data analytics, etc.

Among applying the CDVE technology to the new applications, a paper describes the ongoing work of a Finnish national project to increase the maritime cybersecurity. Small and medium sized ports for cargo traffic are in a highly real-time cooperative environment. Security awareness and visualizing operational cybersecurity situations for them involve a great variety of devices in completely different networks. The system being developed can help the users to identify perceived threats and risks to port assets and provide collaborative responses to emerging cybersecurity attacks.

Another active area is health care. A paper reports the development of a collaborative home-based patient-therapist system for stroke patient rehabilitation. The prototype system is designed for home-based rehabilitation exercises matched with the status of the patient. Direct communication is provided to allow the physicians to be better informed for timely clinical decisions based on the progress of the patient.

From the papers about cooperative applications, we can see that the researchers are raising the cooperative design to a higher level. Not only manual cooperative design is supported, but the automation of the cooperative design is under development. An automated toolkit for aerospace power controllers is being developed to generate correct-by-design flight hardware from high-level requirements with a minimum of manual engineering effort.

In the area of cooperative support system for enterprises, such as banking IT applications, big data processing and analytics can play an important role in boosting the business. The work reported in a paper shows that clustering the bank customers and predicting their behavior can help marketing decision making, forecasting the customer deposits in the near future, etc.

We notice that there are a couple of new concepts being studied in this volume. For example, the concept of a “service internet system” is described in a paper as a complex, networked, and comprehensive service system, formed by a large number of service units in different networks through a highly cooperative relationship. The paper tries to form an overall evolution model for these kinds of systems based on their

similarity to the natural ecosystem. They perform some theoretical analysis of its life cycle and evolution path, similar to a new species entering the ecosystem. The authors use real-world electronic technology industry cluster data to verify the proposed model, which seems to better reflect and predict the evolution trend of the service internet system.

To view and solve traditional problems with new angle of view is an inspiration for new technology development. In the cloud storage optimization, particularly for big data storage optimization, a paper treats the topic using a fuzzy logic view for tiering the storage to be different categories. From the view angle of fuzzy logic and automatic machine learning, the paper shows a new appearance of the cloud data storage problem which seems to be easier to deal with.

In this special and difficult time of a pandemic in the human history, our authors showed their persistent effort in research and development in our field. I am honored to have the opportunity to express my sincere thanks to all the authors for submitting their papers to the CDVE 2020 conference. I would also like to thank all our volunteer reviewers, Program Committee members, and Organization Committee members for their contribution. The success of this year's conference would not have been possible without their support.

October 2020

Yuhua Luo



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