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Preface

The 15th International Conference on Cooperative Design, Visualization, and Engineering, CDVE 2018, was held in Hangzhou, which is a famous scenic city in China and the base of the booming internet business miracle.

The papers presented in this proceedings book reflect important trends in research and development hot topics such as robotics, artificial intelligence, cloud technology, big data, block chain technology, etc. We are excited to see that cooperative applications are playing an increasingly important role in technological development and social services.

In the field of cloud technology, particularly cloud storage for cooperation, some papers address how to facilitate multiple user information sharing in the cloud, while retaining concurrent access. Some discoveries are reported from applying comprehensive suites of concurrency benchmarking to major cloud storage systems, such as Microsoft OneDrive, Google Drive, and Dropbox, etc. A strategic heuristic-oriented management and organizational strategy is proposed to navigate the complex cloud storage landscape. The strategy is centered around the probabilistic graphical model which, according to the authors, can increase tractability and efficiency in cloud storage management.

Papers about extending the distance and range of cooperation by allowing cross-platform devices and editors to work together are presented.

A web-based tiled display wall capable of supporting collaborative activities among multiple remote sites is reported. The system introduces a key feature, the virtual display area, as a method for handling various display configuration environments with different physical resolutions and aspect ratios. This enables ad hoc participation from multiple sites to facilitate remote collaboration and cooperative work. Similarly, there are papers explaining how to create heterogeneous co-editing systems to potentially solve the long existing war among different editors.

A higher level of automation for cooperative design, such as architecture design, is sought in some papers. Visual language of design elements, graph rewriting, and rule schemes are used for automatic creation of new architecture components or fitting new architectural objects into existing design contexts.

Recently, robotics has become a very hot topic in research and social life. This fact is reflected by some of the papers in the volume. A couple of the papers presented at the conference address robot-robot cooperation and human-robot cooperation. Cloud computing is often involved in robot control, as an important element in such systems.

A very interesting topic is presented in one paper, i.e., that of emotion communication between humans and robots. In a typical scenario, the robot reads the emotional states of the user and relies on the cloud to determine the most appropriate action. Since this process generally involves several interactions before the user's comfort is achieved, timeliness becomes a critical issue. The author uses a Markovian representation for the emotional state sequence.

From the application point of view, some papers presented in this volume convincingly show that cooperative technology is one of the key elements to solving many daily social issues.

One example is about how to solve or minimize the effect of a city traffic jam. One paper presents an urban traffic interactive visual analytic system. The volume of the transportation tracking system is unbelievably large. These data are keys for unveiling human mobility patterns, transportation system utilization, and urban planning. Their system is demonstrated with a real-world taxi GPS and meter data sets from approximately 15,000 taxis running for one whole month in Cheng-du, a huge Chinese city of over 10 million people. The system shows the advantage of being easy to use, efficient, and scalable to visualize and explore transportation data. This will greatly help the traffic-control city-planning administrators in their work. At the same time, it can be used in real time for the drivers to optimize their travel plans by avoiding congestions.

Another suggestion for solving social problems is the proposal in one paper to use block chain technology. As the aging population increases, the care services of many countries are facing a crisis. The authors propose an incentive-based system to promote citizen to citizen collaboration. A method for trading care services using crypto credit is suggested to facilitate such collaboration. Based on block chain technology, citizens can trade crypto credits for care services with each other.

In the field of education, one social problem has attracted the attention a group of researchers. High school students often experience high pressure in relation to their learning and social activities, which can increase their worries and anxiety. Giving students access to relevant information and teaching them how to manage anxiety are important for their school performance and wellbeing. Given the wide use of smart phones, the group helped the local community organizations to develop an anxiety self-regulation and education application for high school students.

In summary, the papers in this volume show the more practical aspects of cooperative design, visualization, and engineering that contribute to the advancement of technology and social services. We believe that the demand for technology is a truly pushing power for research and development in our field.

As the editor of this volume, I would like to express my sincere thanks to all the authors for submitting their papers to the CDVE 2018 conference and for their contribution to technological development and their service to society.

The success of this conference is a result of the cooperation and hard work of all our volunteer reviewers, Program Committee members, and Organization Committee members. My special thanks goes to our Program Committee chair, Prof. Dieter Roller at the University of Stuttgart, Germany, for his longtime work and unconditional support over the past fifteen years. My special thanks also go to the members of our local Organization Committee, as well as, the Organization Committee chair, Prof. Wanliang Wang, and co-chairs, Yan-Wei Zhao, and Li-Nan Zhu, at the Zhejiang University of Technology, China. The success of this year's conference would not have been possible without their generous support.

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