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Human-Centered and Error-Resilient Systems Development

IFIP WG 13.2/13.5 Joint Working Conference
6th International Conference on Human-Centered Software Engineering, HCSE 2016
and 8th International Conference on Human Error, Safety,
and System Development, HESSD 2016
Stockholm, Sweden, August 29–31, 2016
Proceedings

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Preface

With this IFIP working conference, we premiered joining the International Conference on Human-Centered Software Engineering (HCSE) and the International Conference on Human Error, Safety, and System Development (HESSD). Together they became HCSE+HESSD 2016.

In the tradition of both conference series, HCSE+HESSD 2016 was a single track working conference which aimed at bringing together researchers and practitioners interested in different areas of human-centered software engineering and in the development of systems, in particular safety-critical systems, that are resilient to human error. HCSE's focus is on strengthening the scientific foundations of user interface design, examining the relationship between software engineering and human-computer interaction, and on establishing user-centered design as an essential part of software engineering processes. HESSD emphasizes the design, management, and control of safety-critical systems, the role of human error both in the development and in the operation of complex processes, and leading-edge techniques for mitigating the impact of human error on safety-critical systems, especially techniques that can be easily integrated into existing systems engineering practices.

HCSE 2016 was the sixth in a series of conferences promoted by the International Federation for Information Processing (IFIP) Working Group WG 13.2 on Methodologies for User-Centered Systems Design. Previous events were held in Salamanca, Spain (2007); Pisa, Italy (2008); Reykjavik, Iceland (2010); Toulouse, France (2012); and Paderborn, Germany (2014). While HCSE had initially been organized in conjunction with other conferences, it has grown over the years and was held as a biennial standalone conference in 2012 and 2014. HESSD 2016 was the eighth event in a series of conferences promoted by the IFIP Working Group WG 13.5 on Resilience, Reliability, Safety, and Human Error in System Development. This conference series has been running for more than a decade. Since then its scope has grown with new concerns – especially in autonomous systems and cyber security. Other problems – in task analysis and situation awareness – continue to provide motivation for research today just as they did back in 2004. The generation of new challenges illustrates the vitality of the work being done in this area, the sustained focus on core problems illustrates the generic importance of this area of research. In 2016 we joined HCSE and HESSD together since there is a substantial overlap of topics, interests, and participants.

HCSE+HESSD 2016 took place in Stockholm, Sweden, on August 29–31, 2016. It was hosted and locally organized by the Media Technology and Interaction Design Group of the KTH Royal Institute of Technology, Stockholm. The conference venue was KTH's OpenLab center.

HCSE+HESSD 2016 welcomed eleven full research papers, describing substantial novel contributions and advanced results, and ten short papers, presenting late breaking results, practice and experience reports, and practical evaluations. The program was

complemented by tool demonstrations and research poster presentations. Four of them had their own paper contributions. All these papers are featured in this collection. We received 32 complete submissions for peer review. All qualified submissions were independently reviewed in a joint single-blind process by, in general, three reviewers, who were selected members of the HCSE+HESSD 2016 Program Committee. In addition, the papers and reviews were extensively discussed by the Program, Technical Paper, and Demo and Poster Chairs to make the decisions. The Program Committee made use of the possibility to recommend accepting submissions in other categories than they were originally submitted for in some cases. The final decision on acceptance was based on an additional meta-review after the authors had improved their contributions according to the first-round review results. Our sincere gratitude goes to the members of our Program Committee, who devoted countless hours to providing valuable feedback to authors and ensuring the high quality of the shared HCSE+HESSD 2016 technical program.

We thank Danica Kragic and Ivar Jacobson, our keynote speakers, who accepted to give inspiring and insightful speeches at HCSE+HESSD 2016. Abstracts of their talks are also presented in this proceedings volume. In addition, we express special appreciation to the local organizer team in Stockholm. We are indebted to our sponsors for their generous support in helping to make our conference special and successful. Finally our thanks go to all the authors who actually did the research work and especially to the presenters who sparked inspiring discussions with all the participants at HCSE+HESSD 2016 in Stockholm.

July 2016

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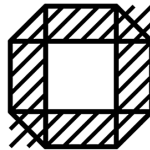
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System Development

Keynote Abstracts

Industrial Scale Agile – From Craft to Engineering

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Abstract. The move towards agility has led to many benefits for the software industry. It has broken the tyranny of the prescriptive waterfall approach to software engineering, an approach that was causing more and more large project failures, and it has allowed software developers to keep up with the ever increasing demand for more and more innovative IT solutions. It has enabled many companies to do great things, but in many cases has led to a culture of entitlement, heroic programming and short-term thinking that threatens the sustainability of the parent companies and the IT solutions that they depend on. Little or no thought is put into maintainability, the heroes become potential single points of failure, and the costs of keeping the lights on just keep growing and growing. What is needed is a way to maintain the values of agility whilst making software development more an engineering discipline than a craft; a human-centered form of agile software engineering fit for the Internet Age.

Robotics and Automation: Challenges and Potential

Danica Kragic Jensfelt

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Abstract. Physical autonomous systems, also known as robots, are a result of a long-term integration of mathematical modeling, software and hardware advances in several fields of technology as well as social sciences. Robots are equipped with various sensors and actuators that enable autonomous interaction with the environment. Similarly to biological systems, the environment provides context for interactions, tools for executing tasks and means for grounding semantics. Central to achieving this is representation and parameterization of multimodal sensory data that enables safe, robust and scalable action generation. But deploying these systems in human-populated environments is still an open problem and there are many scientific challenges that need to be addressed. For humans and robots alike, objects in the environment provide context for interactions, tools for executing tasks and means for grounding semantics. In robotics, an important open problem is to detect, recognize and categorize objects given sensory data, both prior to and during interaction with objects. Central to solving this problem is to represent and parameterize sensory data so to provide fast, robust and scalable solutions. This talk summarizes the current state of the art and provides an insight in why robots are still not an integral part of our daily lives.

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