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Human Centered Computing

5th International Conference, HCC 2019
Čačak, Serbia, August 5–7, 2019
Revised Selected Papers

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ISSN 0302-9743

ISSN 1611-3349 (electronic)

Lecture Notes in Computer Science

ISBN 978-3-030-37428-0

ISBN 978-3-030-37429-7 (eBook)

<https://doi.org/10.1007/978-3-030-37429-7>

LNCS Sublibrary: SL3 – Information Systems and Applications, incl. Internet/Web, and HCI

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Preface

We are happy to present HCC 2019, a successful event of the Human Centered Computing conference series. HCC 2019 was held during August 5–7, 2019, in Čačak, Serbia, and enjoyed wholehearted support from the local research communities as well as researchers from across the Western Balkan region.

As in previous events, HCC 2019 drew a wide range of thoughts, research, and practical work, aiming not only to support humans in our everyday activities but also to enhance our capacity through automation enabled by advanced learning algorithms, smart infrastructure and transportation, as well as deepened our understanding of sociotechnical problems and impacts by studies on profound issues due to the penetration of web communities into offline societies.

HCC 2019 attracted submissions from a number of countries and regions. Each submission was reviewed by at least two Program Committee members and invited scholars. The committee decided to accept 29 long papers and 42 short papers and posters, including invited papers to the doctoral symposium.

Among the submissions, we were pleased to find an increased number of papers on deep learning and its applications on a variety of real-life problems, ranging from image/video analysis, to human-computer interaction, and to logistics and supply chain management. We also saw new frontiers of machine learning algorithms, broadened by in memory computing and availability of “super” computers. In particular, we are certain that the application of machine learning algorithms into manufacturing and other “conventional” industrial sectors will inspire more innovations and foster fruitful long-term collaborations after the conference.

We are grateful to all members of the Technical Program Committee and conference Organization Committee. The most significant task fell upon their experienced shoulders. During the months leading to the conference, all the committee members worked hard to identify a set of high-quality submissions reflecting the trends and interests of the related research fields. Our special thanks also go to the external reviewers, student volunteers, and local support team, who played a key role in making HCC 2019 a successful event and Čačak a welcoming conference venue. We are also grateful to Springer’s editorial staff for their hard work in publishing these post-conference proceedings in the LNCS series.

August 2019

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Abstracts

HOLOgrams for Personalised Virtual Coaching and Motivation in an Ageing Population with BALANCE Disorders

Nenad Filipovic

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Abstract. We have developed of hologram coaches, as augmented reality models in combination with three-dimensional biomechanical models of a balance physiotherapist for virtual coaching. Holograms are offering new forms of accessible user interaction. First demo represent virtual coach with mocked edge server presenting the sitting exercise. When the session begins, the hologram physio sits in front of the patient, provides the instructions and shows the exercise. Then the hologram sits close to the patient, at his left, and the patient can see it when he looks at the direction where the hologram physio is. At the end, and without interruptions during the exercise, the hologram verbally asks the patient about his symptoms and provides a reward.

First prototype architecture demonstrate capability of proposed approach to establish communication between virtual coach and edge computer responsible to estimate patient condition based on which virtual coach will make interruptions and promote accessible interaction. It was applied to mobile phone with headset equipment. With this augmented reality technology we expect to help patient at their home for physiotherapy session.

Acknowledgment. This study was funded by the grant from the EC HORIZON2020 769574 HOLOBALANCE project.

Short bio

Nenad D. Filipovic is full Professor at Faculty of Engineering and Head of Center for Bioengineering at University of Kragujevac, Serbia. He was Research Associate at Harvard School of Public Health in Boston, US. His research interests are in the area of biomedical engineering, vertigo disease, cardiovascular disease, fluid-structure interaction, biomechanics, multi-scale modeling, data mining, software engineering, parallel computing, computational chemistry and bioprocess modeling. He is author and co-author 11 textbooks and 5 monographies, over 250 publications in peer review journals and over 10 software for modeling with finite element method and discrete methods from fluid mechanics and multiphysics. He also leads a number of national and international projects in EU and US in area of bioengineering and software development.

He is currently Rector of University of Kragujevac and leads joint research projects with Harvard University and University of Texas in area of bio-nano-medicine computer simulation. He also leads a number of national and international projects in area of bioengineering and bioinformatics. He is a Managing Editor for Journal of Serbian Society for Computational Mechanics and member of European Society of Biomechanics (ESB) and European Society for Artificial Organs (ESAO).

INPRESEC - Paradigm Shift in Information Security and Privacy with AI and ML

Dragan Pleskonjić

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Abstract. The team, led by INPRESEC initiator and founder Dragan Pleskonjić ([Personal Website](#), [LinkedIn](#)), works on research and development of the solution that predicts, prevents and detects security threats and attacks before they actually affect the live system, with demonstrable accuracy of approximately 99%.

The solution utilizes Artificial Intelligence (AI), Machine Learning (ML), predictive analytics, and threat intelligence with a specific approach developed by the team with decades of combined experience in scientific research, academia and professional experience in enterprise security, AI and ML (patent applications in progress). Novel approach to cyber security has been developed to predict the most likely cyber-attacks and to plan optimal proactive cyber-security defensive measures.

The solution improves security posture of the client system by minimizing risks and impacts of security threats and attacks. It significantly reduces the work of security teams, while improving accuracy, response time and performances of the security system.

Short bio

Dragan Pleskonjić is Senior Director Application Security at international company IGT (previously GTECH). In his current role, he directs, coordinates and oversees application security efforts on global organization level. Dragan is a well-known expert and influential strategic thinker in the area of information security, privacy, machine learning (ML) and artificial intelligence (AI). He is an experienced leader and has held top positions at international companies, working with clients and partners from various sectors worldwide, including: finance and banking, technology, telecommunications, services, lotteries, gaming, education, government and others. He possesses rich experience in creating and managing start-ups, new businesses development, proven leadership and talent for creation, management and organization of successful teams. Initiated and has held leading positions in a number of industry projects, as well as in research and development projects. Dragan is an adjunct professor for various cyber-security and computer science courses. He is author of ten books so far, including well-known university textbooks on topics such as cybersecurity, operating systems, and software. Dragan is inventor with set of patents granted by USPTO and also CIPO, EPO and WIPO patent offices. He published more than seventy scientific and technical

papers at conferences and journals. His current research and development focus is intelligent predictive security (INPRESEC), exploring the paradigm shift in information security and privacy with artificial intelligence (AI) and machine learning (ML). Dragan is initiator and founder of INPRESEC project and solution. For more information, please visit his personal website at <https://www.dragan-pleskonjic.com/>.

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