

The 26th Mediterranean Conference on Control and Automation

CONFERENCE REPORT

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The 26th Mediterranean Conference on Control and Automation (MED '18) took place on June 19-22, at the Kolovare Hotel in Zadar, Croatia. The conference covered a broad range of topics, in line with ongoing convergence of control/systems theory with software/communication technologies, as well as new developments in robotics and mechatronics, autonomous systems, unmanned systems, cyber physical systems, and network controlled systems. It also tackled some growing societal and economic challenges, as well as possible solutions brought by the control, automation and robotics technologies and systems. The conference general chairs were Stjepan Bogdan of the University of Zagreb, Croatia, and Sandra Hirche of the Technical University of Munich, Germany; and the honorary chairs were Panos Antsaklis of the University of Notre Dame, USA, as the president of the Mediterranean Control Association (MCA), and Kimon P. Valavanis, one of MCA's vice-presidents.

TECHNICAL PROGRAM OVERVIEW

The technical program was chaired by Nikola Mišković of the University of Zagreb, Croatia, and Roberto Galeazzi of the Technical University of Denmark, Kongens Lyngby, Denmark. A total of 160 papers out of 215 submissions were accepted for presentation at the conference. The authors were from 40 countries with the top three countries being Italy, Croatia, and Greece. The 124 members of the International Program Committee served as associate editors and reviewers. The conference had 153 registered participants. The technical program included 28 regular and 2 invited sessions in five (exceptionally, six) parallel tracks, as well as three plenary sessions, featuring keynote talks by leaders in the field, as well as two round tables, a workshop, a tutorial, a student competition, and social events.

KEYNOTE TALKS

Three keynote talks were presented, one on each day of the main conference. On the first day, Bart De Moor of the KU Leuven, Belgium presented a talk entitled "*Back to the roots: Multivariate polynomial optimization by numerical linear algebra*". The speaker on the second day was Yasamin Mostofi of University of California, Santa Barbara, CA, USA, who spoke on the topic "*Robotics and Wireless Communications: Opportunities and Challenges*". On the third and last day, Maryam Kamgarpour of Swiss Federal Institute of Technology Zurich, Switzerland, gave a talk entitled "*Multiagent decision making: learning from observations*".

ROUND TABLE DISCUSSIONS

After a lengthy hiatus (since MED 2007 in Athens, Greece) MED '18 once again included round table events. At the first one, entitled "*Social Implications of Autonomy and Automation*," chaired and moderated by Panos Antsaklis, University of Notre Dame, the panelists discussed the benefits and challenges of technological innovation in autonomy and automation and future implications on the society. The panelists were: Airlie Chapman of University of Melbourne, Sandra Hirche of Technical University Munich, Maryam Kamgarpour of ETH Zurich, and, Anthony Tzes of New York University – Abu Dhabi. The second round table, also chaired by Panos Antsaklis, was entitled "*Control Systems and Artificial Intelligence (AI) in the Quest for Autonomy*," and it addressed the implications, evolution, and impacts of AI adoption in control systems. The panelists included: Maryam Kamgarpour of ETH Zuerich, Alexandre Maze of Softbank Robotics, Yasamin Mostofi of University of California Santa Barbara, USA, and Zoran Vukić, of University of Zagreb. Both round tables were well-attended and elicited lively discussion.

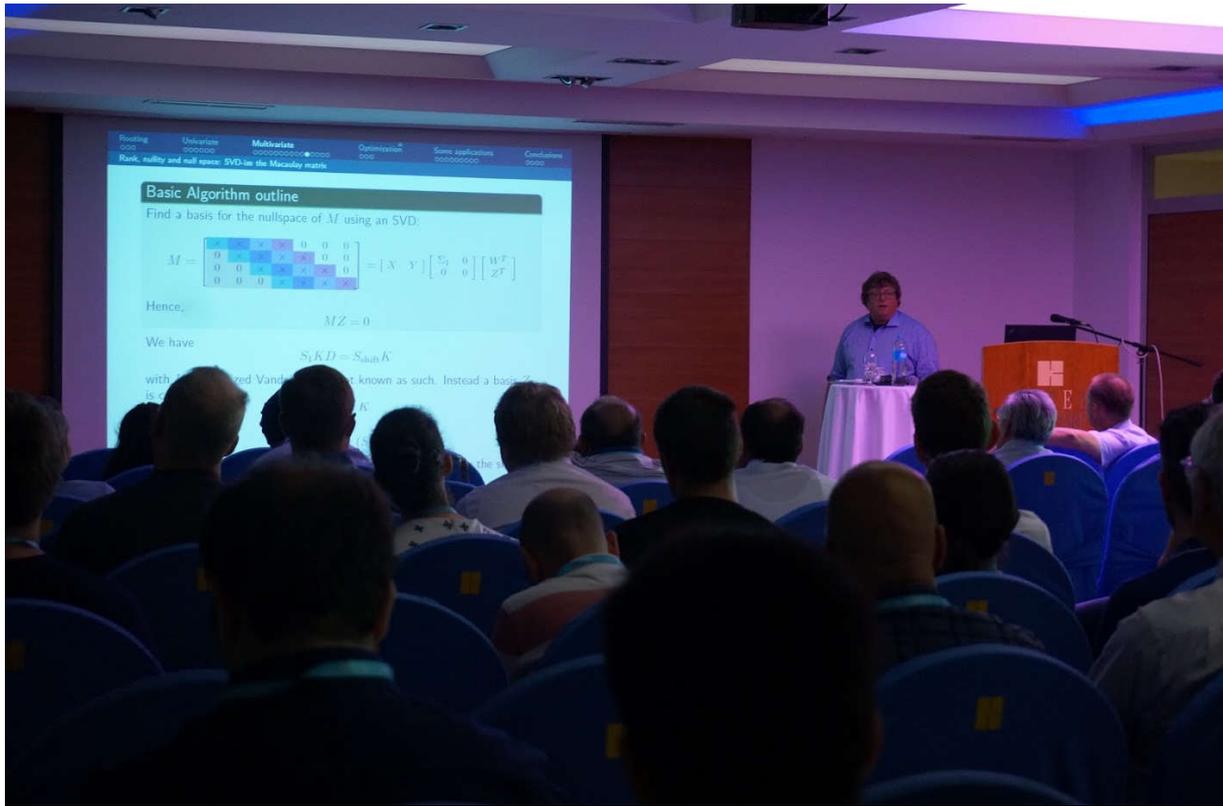


Figure 1 - Bart De Moor explains the basic algorithm outline

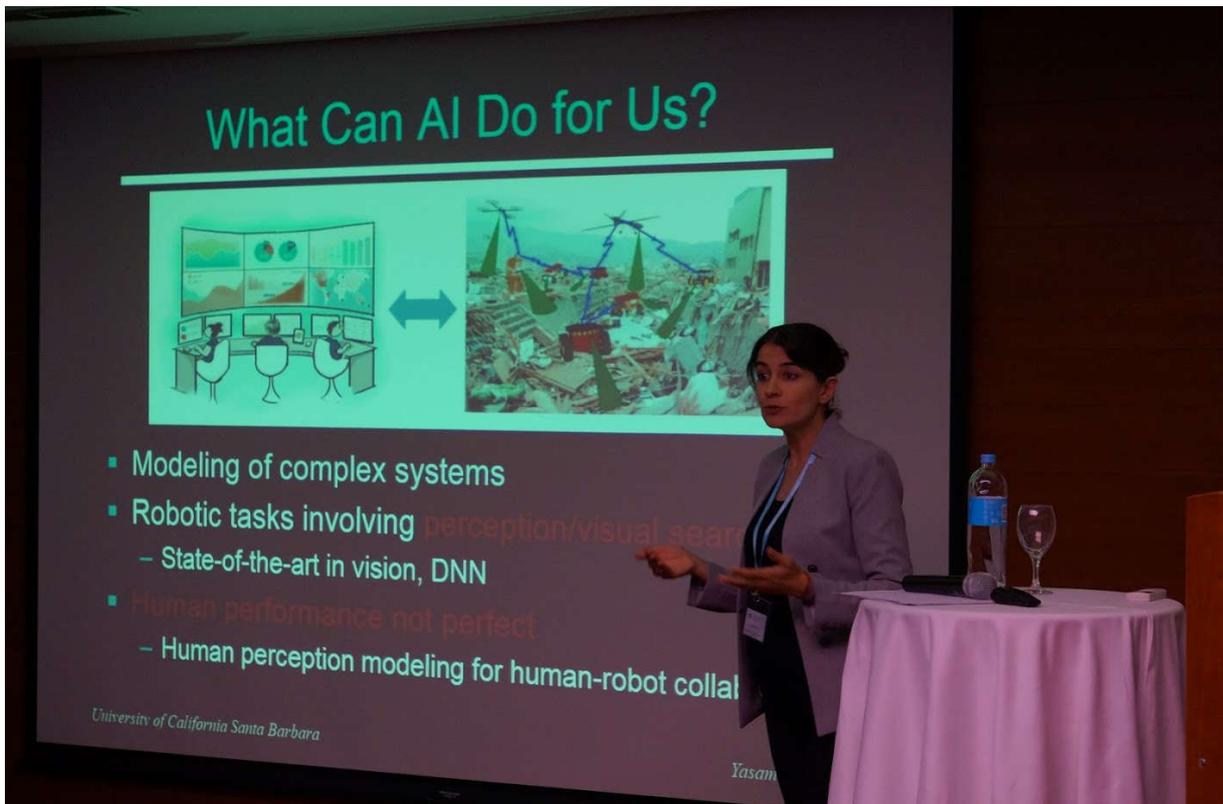


Figure 2 - Yasamin Mostofi at the AI roundtable discussion



Figure 3 - Maryam Kamangaopour discusses learning in control design

WORKSHOP, TUTORIAL AND INDUSTRIAL CHALLENGES

The main technical program was preceded by a day dedicated to workshops, tutorials and *Industrial Challenges* student competition.

A half-day *Workshop on Assistive Technologies for People with Autism Spectrum Disorder (ASD) and other Disabilities*, was organized by Zdenko Kovačić and Maja Cepanec, both from the University of Zagreb. It brought together top experts – trainers from diverse fields, including robotics, information technology, human-robot interaction, rehabilitation and other related areas to share knowledge and discuss the technologies which could facilitate better social inclusion of people suffering from ASD, as well as people with other forms of disability.

A half-day *Tutorial on Graph Theoretic Methods in Networked Dynamic Systems* was presented by Airlie Chapman of University of Melbourne, Australia, and Mehran Mesbahi of University of Washington, USA.

Industrial challenges, dedicated to students, represented one of the innovative aspects of the MED conference series. The main idea was to expose students to interesting project assignments in close relation with the industry. Each challenge was based on a technical specification of the problem, set forth by the conference organizers and the industrial partners supporting the challenge, and comprised two stages: 1) pre-conference qualification round(s), and 2) finals at the conference. The challenges and their respective organizers were: 1) *Aerial robotics control and perception challenge*, organized by *robotics@fer.hr*, organization of robotics laboratories at the University of Zagreb Faculty of Electrical Engineering and Computing; 2) *Automotive challenge*, organized by Rimac Automobili and supported by dSpace and MathWorks; 3) *Process automation challenge*, organized by the 3Smart project and supported by Siemens and MathWorks.

SOCIAL EVENTS AND AWARDS

Social events included the gala dinner, and the welcome and closing receptions. The gala dinner provided the opportunity to announce the winners of the Best Paper Award and the Industrial Challenges.

The Best Paper Award was awarded to the paper entitled “*Rational Approximation of Distributed-Delay Control Laws Via Moment-Matching*,” coauthored by Omer Malka and Zalman J. Palmor, from Technion-IIT. The Best Paper Award was sponsored by *Actuators and Robotics*, by MDPI, Basel, Switzerland.



Figure 4 - Zalman Palmor receives the best paper award from Panos Antsaklis

The winning team for the *Aerial robotics* industrial challenge was team *Crobots*, including the students Filip Zorić, Bojan Spahija, and Lovro Marković, all from the Faculty of Electrical Engineering and Computing, University of Zagreb, Croatia. The winning team for the *Automotive challenge* was team *YDrive*, including the students Miloš Stojanović and Marko Skakun, both from the Faculty of Electrical Engineering, University of Belgrade, Serbia. The winning team for the *Process automation challenge* was team *SapiEngineering*, including Tamás Kardos and Zsolt Hobaj, both from the Sapientia Hungarian University of Transylvania, Romania.



Figure 5 - Aerial robotics control and perception challenge mockup wind farm environment



Figure 6 - Industrial challenges competition participants' group photo

Another social event on the margins of MED '18 was IEEE Young Professionals “Meet Up”, organized by the Young Professionals affinity group of the IEEE Croatia Section, with the aim to provide an

opportunity for scientists and engineers at early stage of their careers to establish new and international contacts and to explore collaboration opportunities. This networking event was open to all MED '18 conference participants and local IEEE members and visitors.

ORGANIZATION AND SUPPORT

The MED '18 was organized by the Mediterranean Control Association (MCA) and KoREMA – Croatian Society for Communications, Computing, Electronics, Measurement and Control; and it had the technical co-sponsorship from the IEEE Control Systems and the IEEE Robotics and Automation societies. It was supported by International Conference on Unmanned Aircraft Systems (ICUAS) Association, Inc. and the project Advanced Methods and Technologies in Data Science and Cooperative Systems (DATACROSS) under the auspices of the Centre of Research Excellence for Data Science and Advanced Cooperative Systems of the Republic of Croatia.

Please refer to the conference web site (<http://www-med-control.org/med2018>) for more details.

NEXT CONFERENCE

The next Mediterranean Conference on Control and Automation (MED '19) will take place in Akko, Israel, on July 1-4, 2019. For more information, visit the MED '19 web site (<https://med19.net.technion.ac.il/>).

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