Distributed Mission Planning of Complex Tasks for Heterogeneous Multi-Robot Systems

by Dr. Barbara Arbanas Pascoal Ferreira

Η διάλεξη θα γίνει τη Δευτέρα 10 Ιουλίου 2023, ώρα 10:30
στην Αίθουσα Τηλεδιάσκεψης 2 (Κεντρική Βιβλιοθήκη Ε.Μ.Π.)

Abstract: Cooperative multi-robot systems (MRS) have been widely studied in the last decades. The great interest in these systems stems both from the considerable difficulties in establishing intelligent, coherent control of joint missions and from the many advantages offered by MRS. This talk focuses on the coordination and planning of cooperative missions for heterogeneous MRS. In this area, developing a robust control architecture, communication, and mission planning are the main problems discussed and solved in the literature. In this talk, we will address the problems of mission decomposition selection (the question of what do we do?), task allocation (the question of who does what?), and task scheduling (the question of how to arrange tasks in time?) of missions for MRS, which are often summarized under the common term mission (task) planning. We will cover some interesting applications of UAV-UGV cooperative teams and illustrate the capabilities of the mission planning and coordination system developed in our work.

Biography:
Barbara Arbanas Pascoal Ferreira received her PhD in 2022 from the Faculty of Electrical Engineering and Computing University in Zagreb on "Decentralized mission planning for heterogeneous robotic teams based on hierarchical task representation". Since 2015, she has been working at the Laboratory for Robotics and Intelligent Control Systems (LARICS) under the supervision of Prof. Stjepan Bogdan as a research and teaching assistant. Coming from a computer science background, her interests include multi-robot coordination and planning, distributed artificial intelligence, scheduling and optimization. As a researcher, she has been involved in several international and national research projects, including H2020 project subCULTron, FP7 EuRoC, and the Croatian Science Foundation project SpECULARIA. She also participated in the ERL Emergency Robots 2019 and MBZIRC 2020 robotics competitions as a member of the LARICS team. Currently, she is the team leader of UNIZG-FER team in MBZIRC 2024 competition. To date, she has authored or co-authored 9 conference papers, 5 journal papers, and one book chapter.

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Multi-domain maritime robotics: potentialities and issues raised

by Dr. Fausto Ferreira

Η διάλεξη θα γίνει τη Δευτέρα 10 Ιουλίου 2023, ώρα 11:30
στην Αίθουσα Τηλεδιάσκεψης 2 (Κεντρική Βιβλιοθήκη Ε.Μ.Π.)

Abstract: With advancements in state of the art cooperative control, communications and battery endurance, multi-domain maritime robotics has become more popular in the past few years. Teams of Autonomous Surface Vehicles (ASVs) cooperating with Autonomous Underwater Vehicles (AUVs) or more recently with Unmanned Aerial Vehicles (UAVs) have worked together in a variety of tasks such as archaeology, biology, logistics and security. In this talk, several examples of the potentialities introduced by multi-domain maritime robotics will be presented. Moreover, issues raised by the operation of these teams at sea such as collision avoidance and communication needs will be addressed.

Biography:
Dr. Fausto Ferreira is a Leading Researcher at the University of Zagreb, Faculty of Electrical Engineering and Computing. His research activities are conducted within the Laboratory for Underwater Systems and Technologies (LABUST). He has been involved in 15 EU Projects (FP6, FP7, H2020, Horizon Europe, INTERREG, Erasmus+) and 2 Office of Naval Research Global (ONRG) projects (including a Visiting Scientist Program grant). He is the Coordinator of the Erasmus+ project Marine Robots for better Sea Knowledge awareness (MASK). He has been the Deputy Technical Director of 6 Robotics competitions (SAUC-E 2014, euRathlon 2014, euRathlon Grand Challenge 2015, ERL Emergency 2017-2019) and Technical Director of 1 robotics competition (SAUC-E 2016). He has also been PI and co-PI of two U.S. Office of Naval Research Global funded projects and is currently PI of two EU funded projects. Dr. Ferreira is a senior member of IEEE and the Vice-President for Workshops and Symposia of the IEEE Oceanic Engineering Society (OES). He serves as an Associate Editor and in the Board of Directors of Earthzine, an IEEE OES publication. He has been a member of many conference organizing committees (including Technical Co-chair of OCEANS 2021 San Diego - Porto). He holds over 60 peer-reviewed papers including a patent and a book chapter and has reviewed for over 20 international journals. His research interests include underwater computer vision, sonar processing, marine law for unmanned marine vehicles, robotics competitions, and educational robotics. He holds a PhD in Robotics, an Integrated Master in Electrical and Computer Engineering and a Bachelor in Political Science with a thesis on regulatory aspects of autonomous surface vessels.

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