

Electrical Engineering and Computer Science Technical Seminar Series

Friday, September 27, 2019

12:00 PM in COB 263

Exploration, Mapping, and Navigation of Mobile Indoor Robots Under Motion and Sensing Uncertainties

Jose Luis Susa Rincon

Faculty Host: Wan Du

Abstract

As robots become ubiquitous in our everyday lives, they are more and more often assigned complex tasks involving multiple objectives at once. Moreover, efficiency, here intended as the ability to complete more tasks in a given amount of time, is becoming increasingly important. At the same time, spurred by progress in machine learning, there is a tendency to explore novel designs in which robots rely more on visual sensors and less on traditional sensors like range finders. In addition, robots use imprecise sensors, and are subject to noisy dynamics. In this talk we consider the problem where a team of mobile robots is tasked with collecting information about a set of stationary targets. There is a temporal deadline to complete the task, and the objective is to determine a control policy maximizing the probability of successfully completing the task within the assigned deadline. We also present a solution for the problem of creating and merging together partial spatial models relying on our recently introduced Oriented Topological Semantic Maps (OTSM), which are human-like representations of indoor environments for robot navigation. This problem arises when a group of robots cooperatively explore an environment, and each one independently builds a partial map that must be combined with the others into a full map.

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Biography

Jose Luis Susa Rincón is an Electronics Engineer from the Colombian School of Engineering of Colombia, with MSc in Robotics from the Ecole National d'Ingénieurs de Brest (ENIB) of France. At present, he is a EECS PhD student working with Professor Stefano Carpin at the University of California Merced on Fast Deployment for Swarm of robots under temporal constraints. His most recent contributions were presented at the International Multi-Robot Systems Symposium in August 2019, and on the prestigious scientific journals: the IEEE Robotics and Automation Letters and the IEEE Robotics and Automation Magazine. He has previous experience as a project Manager for two projects on educational robotics and on a translation system of electromyography signals into speech. Also, he has worked a lecturer of some prestigious universities in Colombia and he is author of a book to teach robotics to children. Currently, he is a founder and the President/CEO of 4Venir.org, a nonprofit company for outreach in science and technology in San Joaquin Valley.

