

Robot Motion Planning

Overview

There has been a recent explosion of interest in autonomous robots, ranging from Google and Uber's self-driving cars to Amazon's delivery drones. Planning the motions of these robots so they satisfy physical constraints and do not collide with obstacles is a challenge. This course is an introduction to algorithmic techniques for robot motion planning. Topics will include configuration space representations, roadmap methods, cell decomposition methods, collision detection, sampling-based path planning, nonholonomic motion planning, and multiple robot coordination. We will motivate these techniques by applications of motion planning to mobile robots and robot manipulators, assembly and manipulation planning, computer aided design, and computer games.

Objectives

The primary objectives of the course are to introduce students to fundamental mathematical concepts and algorithmic approaches for robot motion planning. Through written homeworks and programming assignments, students will learn to implement basic motion planners for autonomous robots and will be exposed to open-source motion planning software.

Dates for the Course	31st July, 2017 to 4th August, 2017
Host Institute	IIT Madras
No. of Credits	1
Maximum No. of Participants	70
You Should Attend If...	<ul style="list-style-type: none">▪ You are excited about developing motion planners for robotics and automation.▪ You are a senior undergraduate student, postgraduate student or faculty member in engineering and computer science.▪ You are engineers and researchers from industry, government organizations, and R&D laboratories working on robotics.
Course Registration Fees	<p>The participation fees for taking the course are as follows:</p> <p>Student Participants: Rs.1000 Faculty Participants: Rs.4000 Government Research Organization Participants: Rs.6000 Industry Participants: Rs.8000</p> <p>The above fee is towards participation in the course, the course material, computer use for tutorials and assignments, and laboratory equipment usage charges.</p> <p>Mode of payment: Demand draft in favour of "Registrar, IIT Madras" payable at Chennai</p>
Accommodation	<p>The participants may be provided with hostel accommodation, depending on the availability, on payment basis. Request for hostel accommodation may be submitted through the link: http://hosteldine.iitm.ac.in/iitmhostel</p>

Course Faculty



Prof. Srinivas Akella received his Ph.D. in Robotics from the School of Computer Science at Carnegie Mellon University, and his B.Tech. from the Indian Institute of Technology, Madras. He is a Professor in the Department of Computer Science at the University of North Carolina at Charlotte. He was previously on the faculty of the Computer Science department at Rensselaer Polytechnic Institute, and was a Beckman Fellow at the Beckman Institute, University of Illinois at Urbana-Champaign. In addition to publications in the leading robotics journals and conferences, he has multiple patents. Dr. Akella is a recipient of the National Talent Search Scholarship from the Government of India, and of the NSF CAREER award. His research interests are in developing geometric and optimization algorithms for robotics, automation, and biotechnology applications. <http://webpages.uncc.edu/sakella/>



Dr. Sourav Rakshit is a faculty member in the Department of Mechanical Engineering at IIT Madras. His research interests lie in robotics, biomechanics, and optimization. He received the Ph.D. degree and M.E. degree from the Department of Mechanical Engineering at the Indian Institute of Science, Bangalore. He received his B.E. in Mechanical Engineering from Jadavpur University. He was a Scientific Officer at Bhabha Atomic Research Centre (BARC), India, and a Postdoctoral Researcher at UNC Charlotte.

Course Coordinator

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