Challenges in Motion Planning in Modern Scenarios

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Research: Motion planning and control, optimal control, in and, differential game theory

Abstract: Traditional methods for path planning of unmanned vehicles rely on underlying geometrical rules such as parallel navigation, pure pursuit, and line-of-sight guidance. These methods work well for one-on-one pursuit-evasion problems when the opponent strategy is known. However, with the evolving automation industry, it is important to propose similar geometrical rules for applications such as coverage, reconnaissance, and for scenarios with unknown opponent's strategy. In this talk, we present a geometrical rule for reconnaissance missions and discuss a peculiar difficulty that arises when following self-intersecting paths. To address the growing sophistication of pursuit-evasion problems—particularly when the strategies of the pursuer and evader are unknown—we discuss a variant where an intelligent evader may exploit information asymmetry, a challenge that appears in certain pursuit-evasion scenarios.

Biography: Bhargav Jha is currently an Assistant Professor in Department of Electrical Engineering, Indian Institute of Technology, Kharagpur. Prior to this he was a postdoc fellow with the Department of Electrical and Computer Engineering at the Michigan State University, USA. He received his B.E. (Honors) degree in Electronics and Instrumentation from Birla Institute of Technology and Science Pilani, India in 2016 and the Masters and Ph.D. degree in Aerospace Engineering from Technion-Israel Institute of Technology in 2019 and 2022, respectively.

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