Real-Time Machine Learning and Decision Making for System's Autonomy

Real time machine learning and decision making are key for autonomous systems to operate in stochastic and dynamic environments. In this talk, we will present novel algorithms for sequential decision making and stochastic control that go beyond classical formulations and show applications to robotics and autonomous systems. The aforementioned algorithms rely on information theoretic interpretations of stochastic control theory, generalizations of the Nonlinear Feynman-Kac lemma, and machine learning methodologies for regression. At the end of this talk, and towards closing the gap between high-level reasoning/decision making and low-level organization/computation, we will highlight the interdependencies between theory, algorithms, and forms of computation and discuss future computational technologies in the area of autonomy and robotics.