Colloquium

Learning to navigate in dynamic environments

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Some animals can complete very difficult navigation tasks in a seemingly effortless way: homing pigeons can fly back home from unfamiliar places that are hundreds of kilometers away from their loft; male moths can reach females from distances of several hundreds of meters; migratory birds can cross the oceans with minimal energy expenditure by relying on ascending air currents. The fundamental aspect that is common to all these behaviors is the highly dynamic and unpredictable nature of the environment given by the turbulent atmospheric conditions. In this talk, I will focus on the example of soaring birds that exploit thermal convection to reach great heights without flapping their wings. How soaring birds find and navigate thermals within the complex landscape of a turbulent convective atmosphere is unknown. Reinforcement learning, a branch of machine intelligence, provides an appropriate framework to identify an effective navigational strategy as a sequence of decisions taken in response to environmental cues. I will discuss how to use it, to suggest possible strategies used by birds and also to train autonomous gliders to navigate atmospheric thermals.

Wednesday, Dec 18th 2019

4:00 PM (Tea/Coffee at 3:30 PM)

Auditorium, TIFR-H