Aresty Assistant: Collaborative Visual Learning by Autonomous Robots

The goal of this project is to understand how groups of robots accomplish tasks by working as a team. Our first task is to design algorithms that will enable a team of robots to visually inspect and understand an object, such as a car or a tree. Equipped with cameras and other sensors, the robots will, just like a team of students, exchange information with each other and in this process form a coherent model of the observed object. With this model, the robots can then move on to explore the environment and model new or recognize already seen objects.

In the process of modeling the information exchange, we will study how the data flows between individual robots and how it should be optimally exchanged to lead to a consensus. We will also examine situations where the consensus cannot be formed and try to understand why this happens. The core of the computational modeling will be based on our recent work on distributed learning and probabilistic inference. We will also study how this collaborative learning among robots can be used to model learning and information exchange in human social networks.

We will use teams of Rover robots (small tank-like robots) equipped with cameras, microphones, and IR illuminators. Adventurous students will also get a chance to play with our quad copters.

Position type: Five research hours per week; two peer group meetings per month; various assignments; presentation Pay: $1000
Period: Sept 2012 - May 2013
Application deadline: April 6, 2012

Eligibility: Rutgers undergraduate students. To find out more and apply see http://aresty.rutgers.edu/our-programs/research-assistant-program