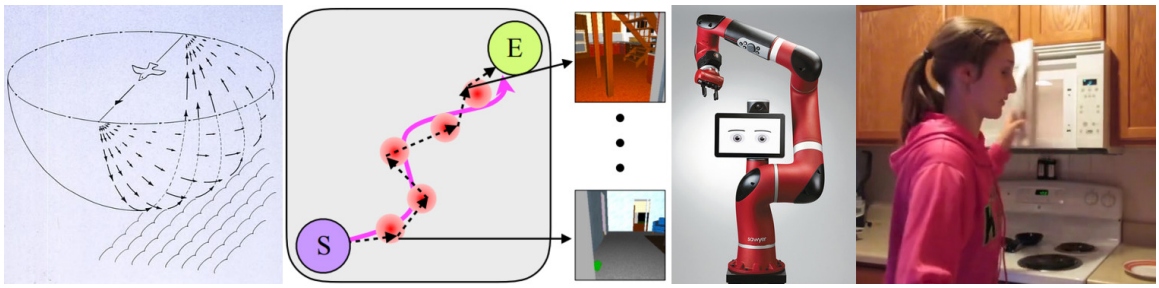
EECS 598 Special Topics:
The Ecological Approach to Visual Perception



Instructor: David Fouhey – `fouhey@umich.edu`

Times: Tuesday/Thursday 3:00-4:30, GGBL 1025

Prerequisites: Graduate standing in EECS or Robotics or Permission of the Instructor

Course Description: The only known examples of actually intelligent agents that perceive their world are biological agents that are born, exist, move, interact with, and survive in the real world. Being a real agent has its challenges – you are not fed the steady diet of human-labeled images and experiences that has fueled recent computer vision growth. However, it does come with the opportunity to explore and change the world as well as experience time-locked signals from a multiple modalities. In vision, this emphasis on the interdependence of a real agent and its environment is often referred to as the *Ecological Approach to Visual Perception*, as coined by JJ Gibson in his 1979 book with the same title. The goal of this course is to concretely explore this general perspective of an agent in its environment.

Specifically, we will explore (in no particular order): the perception of affordances and spatial layout; perception of and for manipulation; agents and how they exist in their environment; visual navigation; learning from demonstration and natural supervision; learning of physical models and dynamics; and learning of agency and intentionality. While the primary focus and assumed background knowledge is learning-based visual perception, readings will come from a wide variety of fields and students should be prepared to read out of their comfort zone.

This is a graduate-level course incorporating two components. The first is weekly group-driven reading and *active* discussion and debating of related work in robotics, computer vision, machine learning, and psychology. This will be a roughly even split between recent work and classics. The second are projects that put ideas from the first component to the test. These are semester-long projects, ideally interdisciplinary, that: find a particular problem; make a concrete hypothesis and experiments to test it; and execute them computationally using *realistic* data.