Autonomous Decision Making in the Real World, ABE 598, Spring 2018
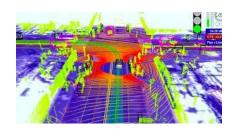
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Want to learn how to make UAVs and Robots that solve complex tasks on their own? Then Autonomous Decision Making is the course for you. We will survey state-of-the-art techniques in autonomy, machine learning, and decision making, including:

- Introduction to automatic reasoning
- Applied Machine learning:
  - **Supervised Learning:** (Deep/Convolutional) Neural Networks for classification, Gaussian processes
  - **Unsupervised Learning:** Clustering using K-means, Dirichlet Processes, DNNs
  - **Mixture modeling:** Hierarchic Bayesian models, Hidden Markov Models
  - **Dynamic ML**: (deep) Recurrent Neural Networks, Evolving Gaussian Processes
- Applied Sequential decision making:
  - **Markov Decision Processes**: Value/Policy iteration, trajectory based methods
  - **Reinforcement Learning**: SARSA, Q-learning, Model based methods
  - Multi-agent and partially observed MDPs
- Software implementation of autonomy algorithms on resource-constrained hardware

This is a project based course. Students can choose final-projects from:
- UAS applications to agriculture and asset monitoring
- Ground robotics and autonomous vehicle systems
- Other autonomy projects related to your research

Prerequisites: Graduate Standing or Consent of Instructor