Image Classification with Machine Learning and Neural Networks

The Data Science Initiative (DSI) has developed software that uses a variety of machine learning techniques to provide content based image recognition (CBIR) of an image library and also builds a similarity network of an entire image library. The current system relies on a modified SURF feature point extraction to identify salient features from each image, and then uses clustering algorithms and matrix distance calculations to estimate image similarity for search and retrieval and for building an image similarity network. This project involves the application of a range of machine learning techniques, including SVM and convolutional neural network based classification, to enhance the platform's functionality to provide semantic level searching. For example, a user starting with an image of a tree should be able to find not only pictures of the same or similar trees, but of all trees. Students working on the project will first implement a trained SVM classifier to provide baseline functionality, after which they will test and implement successful deep learning approaches to the classification problem.   Students working on the project will work directly with the Associate Director of the DSI and DSI Graduate Student Researchers and affiliates.