FALL 2014  
Computer Science  
Special Topics  

CS 491-1 / CS 591-1  
Monday, Wednesday, Friday  
1:00 – 1:50 p.m.  
Faner 1222  

Instructor - Dr. Norman Carver  

Learning From Data  

Machine Learning (ML) is one of most exciting areas in computer science today. ML involves methods for computers to use data to “learn” how to perform complex tasks. ML techniques are highly interdisciplinary, and are applied to a wide range of tasks: recommender systems, medical diagnosis, stock market prediction, game playing agents (AIs), robot locomotion, engineering design, speech recognition, spam detection, etc. 

This course will focus on ML theory and techniques that involve learning from data. Topics to be covered include: Computational Learning Theory (VC Theory, PAC Learning), learning linear models (perceptrons, gradient descent, linear regression, logistic regression), practical issues in learning (bias, overfitting, regularization, validation), learning non-linear models (support vector machines, kernel trick, radial basis functions), decision tree learning, Bayesian learning (naive Bayes, ML vs. MAP estimation, optimal Bayes classifier, Bayesian Networks), and reinforcement learning (Markov decision processes, Q learning, temporal difference learning, Monte Carlo methods). 

The course will make significant use of online information and videos. 

Students registered for CS 591 will be expected to carry out a project. 

Prerequisites: Undergraduates must have completed CS 330 with a C or better. 

Students who took CS 491-2/591-1 Machine Learning in Spring 2014 are not eligible to get credit for this course. 

The material in this course is complementary to that in CS 437 (ML and Soft Computing) and CS 533 (Data Mining).