

APRIL 28 (BERT 012)

9:30 am: Clayton Smith

Settlers of Catan AI: An Analysis of Strategy

Settlers of Catan is a board game where the main objective is to earn victory points by building a society of settlements and cities along a network of connecting roads. We have created an AI simulation of this game for the purpose of evaluating different strategies which are frequently employed by human players.

10:10 am: Nick Blanchet

Neural Network Topology - An Application in Time Series Data

Neural networks are the “black box” of the statistical world but have increasingly been used throughout industry as their predictive power has been proven stronger than any other model. By looking into the black box and examining parameters of a feed-forward network such as the number of nodes within certain layers and the activation function, we hope to get a better understanding of the relationship between the data entering the network, the structure of the network and the final output. We examine these relationships within the context of financial time series data, specifically stock price prediction but the general relationships are pertinent to other applications of neural networks as well.

MAY 3 (BERT 012)

9:30 am: David Sweitzer

Black-Scholes Model

The Black-Scholes option pricing model has been widely used by the majority of option investors. The goal of the here presented work is to measure the dependence of the accuracy of the Black-Scholes model on price volatility. To calculate the accuracy of the model real historical data was used, such as historical stock prices, price volatilities, and interest rates. The model was applied to the historical data for stocks with different price volatilities. The resulting option price time-series were compared with historical option prices and analyzed.

10:10 am: Ryan Ward

Computational Fluid Dynamics Using Marker Particles

We investigate a computational model to numerically simulate fluid flow using marker particles to approximate fluid location. We use a two-dimensional, discrete-space, and discrete-time model that uses finite-difference methods to solve the Navier-Stokes equations. Whereas Harlow and Welch introduced this numerical technique for the study of a broken dam, we present here preliminary results for the investigation of how well the model describes the phenomenon of Faraday waves.