Jeremiah McReynolds
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For Professor In Suk Jang

Summary of Presentations

LSTMs for Music Composition
By Kyle Hart

The goal of the paper was to use Machine Learning to compose blues music with both a harmony and a melody. The author was successful in their attempt by using an LSTM RNN network, and by limiting their inputs to 25 unique notes. They chose LSTM RNN because music has long-term dependencies that can only be handled by LSTM. The authors first created their own data set by composing their own music, then they trained a model to compose a harmony based on this data set, and finally they trained a model to compose both the harmony and the melody. Note that only the melody was allowed to use information about the harmony - not vice versa. In all, the experiment was successful and the authors were able to create blues music with a melody and harmony.

The presenter noted that there are ways to expand the project, such as predicting an entire batch of notes instead of one at a time, or by de-linking the melody from the harmony. The presenter was also curious about other musical improvisations a neural network may be able to learn if it is given more flexibility, similar to how a neural network was able to find new playing techniques in the game Go.

SVM for Stock Market Predictions
By Justin Bernstein

The goal of the paper is to predict Stock Price Direction using a Support Vector Machine (SVM). Often, researchers regard the stock market as a reflection of all available public information, thus not being very predictable. This hypothesis is known as the Efficient Market Hypothesis, or “random walk.” The model they compose uses 4 parameters: price volatility, stock momentum, index volatility, and index momentum. The model they produce predicts about as well as a coin toss, thus enforcing the researcher’s belief that the stock market price increases or decreases only as public information becomes available. The presenter notes that the author’s work further enforces the “random walk” hypothesis.

Defending Against Neural Fake News
By Shaurya Chandhoke

The paper aims to combat and acknowledge the growing issue of NLP-generated fake news. The presenter states that fake news spreads much quicker than legitimate news, and it often has monetization or propaganda based goals. The presenter notes that fake news has historically been handwritten by a human; but, in recent times, NLP algorithms have been

“exploited” such that they create a new breed of convincing fake news articles. The paper introduces a new model called “Grover” to detect fake news. It uses the GPT2 adversarial architecture to become both a generator and discriminator of fake news. The adversary is used to generate new fake news, and the verifier attempts to detect this fake news. The adversary uses real headlines to generate contextualized tokens, then uses those tokens to create a new headline that is fake yet believable based on the context token. The verifier is then trained on both real news and some fake news generated by the adversary. According to the authors, then, Grover is the best NLP algorithm to detect fake news.