**IS Project Proposal: Stock prices prediction using RNN and LSTM neural networks**

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The objective of this project is to develop a stock price prediction model using Recurrent Neural Networks (RNN). Specifically, we will explore two different approaches: Classical RNN and RNN with LSTM units. The model will be trained on historical stock price data with the aim of predicting future price movements. The task is to predict the trend of the stock price for August 2023, capturing upward and downward trends rather than exact prices, as future variations are independent of the past according to Brownian Motion.

*Dataset properties*. The dataset will consist of stock price data for Google and Apple stocks, including features such as date, opening price, closing price, highest price, lowest price, trading volume, dividends, and stock splits. The dataset will be gathered using yfinance.

*Data Preprocessing.* To preprocess the data, we will handle missing values, outliers, and any other data inconsistencies. Additionally, we will normalize the numerical features to a common scale using techniques like Min-Max scaling or Standardization.

*ARIMA Model*. To establish a baseline model for univariate analysis, we will use the ARIMA model. This will provide a comparison point for the performance of the RNN-based models.

*Univariate and Multivariate prediction*. For both the classical RNN and LSTM approaches, we will create both univariate and multivariate models. By comparing their performance, we aim to understand whether and why the multivariate model performs better. The multivariate model will incorporate multiple features from the dataset, while the univariate model will focus on a single feature.

By conducting these analyses and comparisons, we aim to develop insights into the effectiveness of RNN-based models for stock price prediction and determine the impact of incorporating additional variables in the multivariate model.