# Commodity Price Predictor

# Definition

## Project Overview

Investment firms, hedge funds and even individuals have been using financial models to better understand market behavior and make profitable investments and trades. A wealth of information is available in the form of historical stock prices and company performance data, suitable for machine learning algorithms to process.

Can we actually predict stock prices with machine learning? Investors make educated guesses by analyzing data. They'll read the news, study the company history, industry trends and other lots of data points that go into making a prediction. The prevailing theories is that stock prices are totally random and unpredictable but that raises the question why top firms like Morgan Stanley and Citigroup hire quantitative analysts to build predictive models. We have this idea of a trading floor being filled with adrenaline infuse men with loose ties running around yelling something into a phone but these days they're more likely to see rows of machine learning experts quietly sitting in front of computer screens. In fact about 70% of all orders on Wall Street are now placed by software, we're now living in the age of the algorithm.

This project seeks to utilize Deep Learning models, Long-Short Term Memory (LSTM) Neural Network algorithm, to predict stock prices. For data with timeframes recurrent neural networks (RNNs) come in handy but recent researches have shown that LSTM, networks are the most popular and useful variants of RNNs.

I will use Keras to build a LSTM to predict stock prices using historical closing price and trading volume and visualize both the predicted price values over time and the optimal parameters for the model.

## Problem Statement

The challenge of this project is to accurately predict the future closing value of a given stock across a given period of time in the future. For this project I will use a ​Long Short Term Memory networks – usually just called “LSTMs” to predict the closing price of the S&P 500 using a dataset of past prices.

GOALS

1. Explore stock prices.
2. Implement basic model using linear regression
3. Implement LSTM using KERAS library
4. Compare the results and submit the report
5. Apply the concepts and techniques learned in the Udacity Machine Learning NanoDegree

## Metrics

For this project measure of performance will be using the Mean Squared Error (MSE) and Root Mean Squared Error (RMSE) calculated as the difference between predicted and actual values of the target stock at adjusted close price and the delta between the performance of the benchmark model (Linear Regression) and our primary model (Deep Learning).

# Analysis

## Data Exploration

## Exploratory Visualization

## Algorithms and Techniques

## Benchmark Model

# Methodology

## Data Preprocessing

## Implementation

## Refinement

# Result

## Model Evaluation and Validation

## Justification

# Conclusion

## Visualization

## Reflection

## Improvement