

# ***Cryptocurrency Price Prediction***

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# Objective/Methodology

- To build a price prediction model for cryptocurrency (specifically for bitcoin) based on historical prices and other features (market microstructure, economics indicators etc.).
- Multi-factor model (linear regression)
- Statistical Model: ARIMA
- Machine Learning/Deep Learning Models
  - K-Nearest Neighbors
  - Neural Network

# Data Pre-processing for Models

- <https://www.bitcoin.com/>
- <https://public.bitmex.com/?prefix=data/>
- Train: Jan 1, 2010 – June 30, 2018
- Validation: July 1, 2018 - Dec 31, 2018
- Test: Jan 1, 2019 - June 30, 2019
- At each date, I will lookback 28 days and make a prediction for the next 7 days. In this manner, I use a moving window of 34 days and I can generate my lookback features and target in each of the train, validation and test datasets.

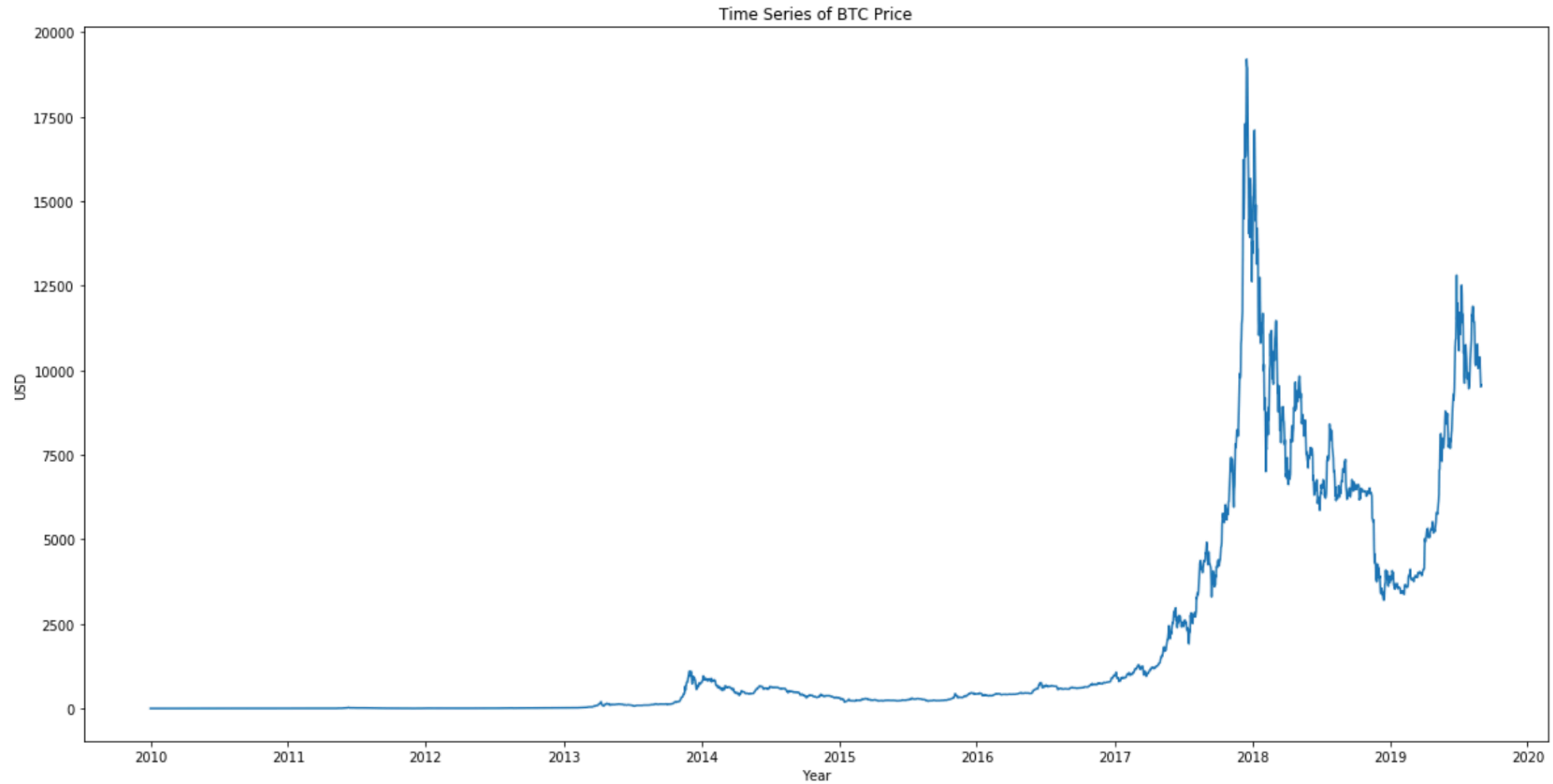
# Build and Train Models

- 1. Build 2 simple benchmark predictions, and calculate MAE and RMSE
  - Benchmark 1: average (prediction is an average of the BTC prices in the lookback period)
  - Benchmark 2: last value (prediction is the most recent price in the lookback period)
- 2. Build and train KNN/Simple Neural Network model
- 3. Build and train RNN model with LSTM/GRU layer
- 4. Ensemble model that combines predictions from an RNN and ARIMA Model.

# Evaluation

- Explore different models and compare with each other
- Evaluate each of the models on the test set and calculate MAE and RMSE
- Identify and explain which model performs best.
- Come up with the best trading strategy.

# Time Series of BTC prices



# Interesting Plots:

HeatMap shows the correlation between each features to reduce the multi-collinearity in the regression model.

