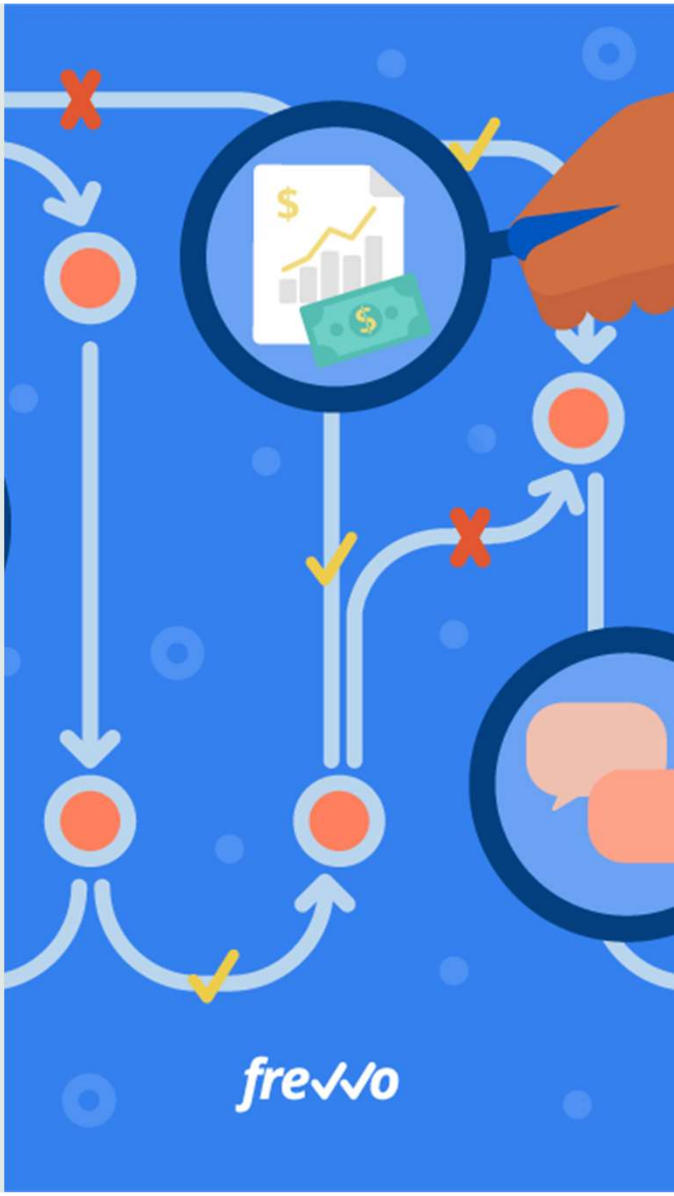
Capstone Presentation

Timeseries Analysis of Bitcoin in the Context of Cryptocurrencies

Project Overview

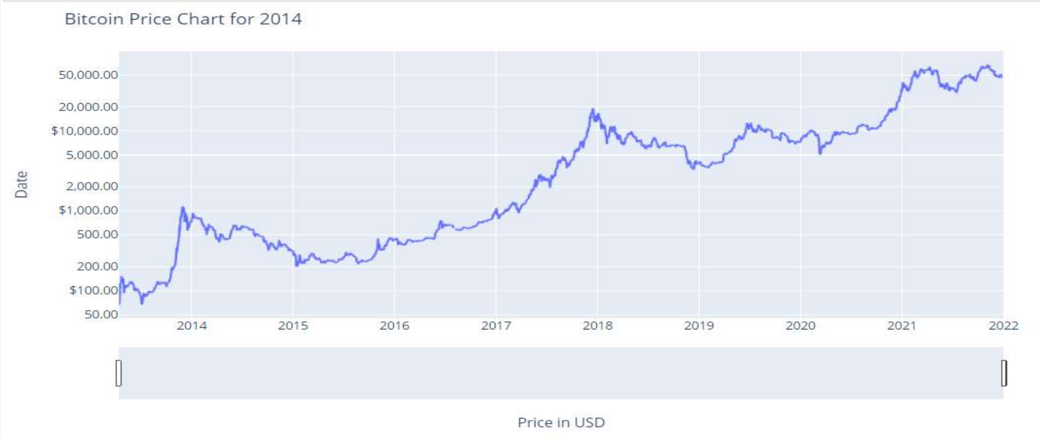
What's it all about?

- **Timeseries analysis of Stocks have existed for a long time and Cryptocurrencies are joining them quickly.**
- **Stocks and Cryptocurrencies might look the same on the outside, but they have some key differences.**
- **This project is a timeseries analysis of Bitcoin where I test Cryptocurrency specific metrics for their predictive power in timeseries forecast models, and adapt unique properties of Bitcoin into the workflow.**



Acquiring the Data

- **The trading exchange Bitfinex was used to gather just over 8 years of Bitcoins Price History ending on January 1st, 2022.**
- **The data was cleaned, and missing values were imputed using time-based interpolation.**



Feature Engineering

- **Traditional and Crypto Indicators were found**
- **Custom functions for all features were written for modularity**
- **Unique Cryptocurrency Metrics:**

    The Puell Multiple (Indicator of Miner incentive)

    The Fear and Greed Index (Market Sentiment)

    The Stock-to-Flow Model

Exploratory Data Analysis

- **I explored all of the unique features in the dataset, including the Stock-to-Flow Model.**
- **Relates Price with scarcity. Many traders look to this model as a quick and useful metric about market price.**

Exploratory Data Analysis

- **Another step of Timeseries EDA is to decompose a timeseries into seasonal trends, to determine any underlying patterns than can be removed to make better predictions on what remains.**
- **Bitcoin halving's are when the reward for verifying a transaction is cut in half, and this occurs about every 4 years and signal a Bull-run within 4 months.**

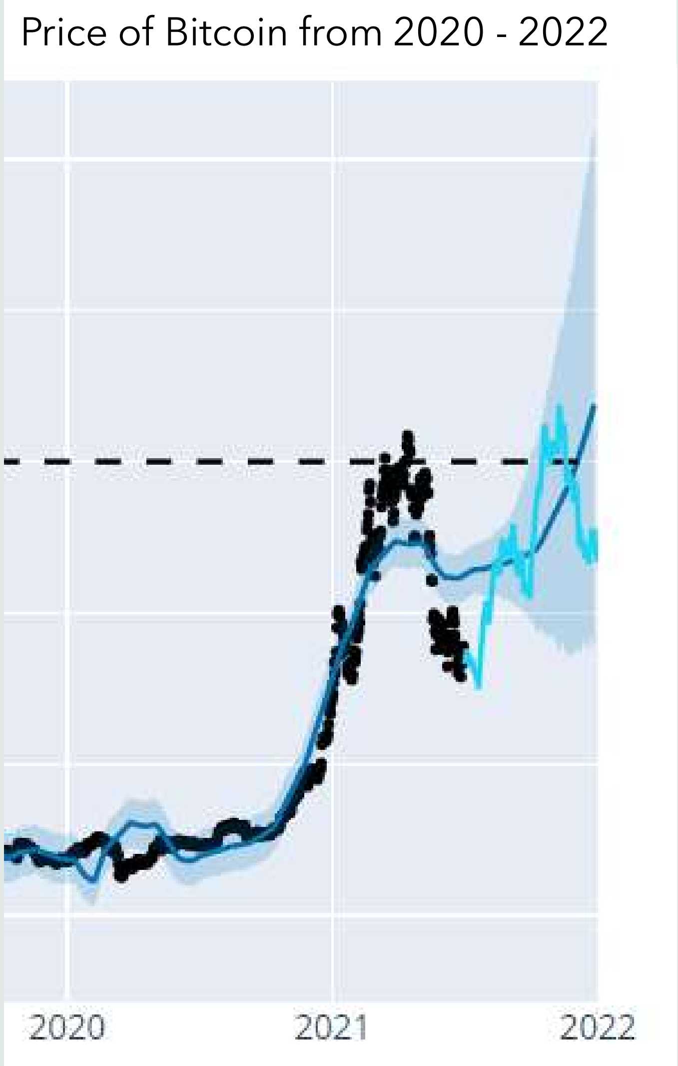
Modelling with SARIMAX

- The first model used was a SARIMAX model, although this evolved into a ARIMAX model.
- A base model was built and optimized to determine a baseline accuracy.
- A new model was built and optimized for each of our engineered features.

Model Name	Test MAPE
ARIMA Base Model	5.11%
ARIMAX w/ Volume	4.82%
ARIMAX w/ OBV	4.67%
ARIMAX w/ S2F_463MA	4.58%
ARIMAX w/ fg_index	4.16%
ARIMAX w/ Puell	2.43%
ARIMAX w/ RSI	1.32%

Modelling with Prophet

- **Modelling was done with Facebook's Forecasting Tool "Prophet"**
- **Forecast 6 months into the future to try and capture the next upswing in price.**
- **Prophet can account for multi-seasonality**



Summary & Next Steps

- **Some things learned:**

  Bitcoin Specific Metrics should be considered when doing Timeseries analysis

  Seasonal decomposition can be difficult but Bitcoin halving's should be taken into consideration

- **Next Steps:**

  Try other models optimized for multiple regressors such as Amazon's DeepAR

  Find more useful Cryptocurrency Metrics directly from the Blockchain

Thank you for listening?

- Questions?

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