# CRYPTOCURRENCY PRICE PREDICTIONS
# using MACHINE LEARNING

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## Blurb

The popularity of cryptocurrencies increased exponentially in 2017 due to several consecutive months' growth of their market capitalization. The entire cryptocurrency market was worth more than $1,833,940,056,538 AUD in early February 2021 due to several factors that saw massive spikes in prices.

Machine learning can work through many problems, but its application in predicting crypto prices may be limited by several factors. As cryptocurrencies are decentralised, they have more factors that influence their price than traditional assets, which can make modelling & predictions very hard. Some factors affecting cryptocurrencies are technological progress, political pressures, security, consumer sentiment, sheer variety of currencies etc. Their high volatility can be very rewarding if they are traded at the correct time. Unfortunately, due to their lack of indexes, cryptocurrencies are relatively unpredictable compared to traditional financial models.

This project aims to yield applicable models & predictions into the future pricing of selected cryptocurrencies. This will be achieved by using OHLCV (Open, high, low, close, volume) data of several cryptocurrencies, and passing the values into an ARIMA (Auto Regressive Integrated Moving Average) model for machine/deep learning. Target output will be aimed at the closing price for the following days/week, in order to try and judge the best time to purchase and sell. This can be gauged by comparing the delta values of daily trends in order to find the largest predicted returns.

Using ARIMA data from alternative asset classes (oil, gold, and S&P 500); we will make comparisons to the results returned from cryptocurrency predictions in order to benchmark the percentage returns of all classes.

## Summary

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Topic: Cryptocurrency Price Predictions using Machine Learning
Target for Machine Learning: Closing delta prices
Variables: OHLCV, internal model calculations (rolling average, rolling std dev)
Model: ARIMA
Sample Datasets:

| | asset_id | name | type_is_crypto | data_start | data_end | data_symbols_count | volume_1hrs_usd | volume_1day_usd | volume_1mth_usd | price_usd | id_icon |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | BTC | Bitcoin | 1 | 2010-07-17 | 2021-02-08 | 47678 | 9.060663e+12 | 3.153321e+14 | 1.315314e+16 | 39186.174251 | 4caf2b16-a017-4e26-a348-2cea69c34cba |
| 1 | USD | US Dollar | 0 | 2010-07-17 | 2021-02-08 | 43055 | 9.283904e+12 | 3.214332e+14 | 1.327275e+16 | NaN | 0a4185f2-1a03-4a7c-b866-ba7076d8c73b |
| 2 | PLN | Zloty | 0 | 2011-04-05 | 2021-02-08 | 57 | 3.719296e+06 | 5.076524e+07 | 2.562955e+09 | 0.266961 | 3f682b5b-77ec-4d8c-b612-b8ff3ac748f7 |
| 3 | EUR | Euro | 0 | 2011-04-06 | 2021-02-08 | 1265 | 1.414691e+10 | 2.097391e+11 | 5.891991e+12 | 1.198300 | 688fcf1c-92bb-4c84-ac95-0971e9bfed2f |
| 4 | CNY | Yuan Renminbi | 0 | 2011-06-13 | 2021-02-08 | 421 | 0.000000e+00 | 0.000000e+00 | 2.063000e+01 | 0.154984 | NaN |

| | time_period_start | time_period_end | time_open | time_close | price_open | price_high | price_low | price_close | volume_traded | trades_count |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 2011-09-13T00:00:00.0000000Z | 2011-09-14T00:00:00.0000000Z | 2011-09-13T13:53:36.0000000Z | 2011-09-13T19:34:36.0000000Z | 5.80 | 6.00 | 5.65 | 5.97 | 58.371382 | 12 |
| 1 | 2011-09-14T00:00:00.0000000Z | 2011-09-15T00:00:00.0000000Z | 2011-09-14T07:00:00.0000000Z | 2011-09-14T15:42:31.0000000Z | 5.58 | 5.72 | 5.52 | 5.53 | 61.145984 | 14 |
| 2 | 2011-09-15T00:00:00.0000000Z | 2011-09-16T00:00:00.0000000Z | 2011-09-15T08:39:33.0000000Z | 2011-09-15T15:11:22.0000000Z | 5.12 | 5.24 | 5.00 | 5.13 | 80.140795 | 6 |
| 3 | 2011-09-16T00:00:00.0000000Z | 2011-09-17T00:00:00.0000000Z | 2011-09-16T07:02:06.0000000Z | 2011-09-16T16:13:02.0000000Z | 4.82 | 4.87 | 4.80 | 4.85 | 39.914007 | 4 |
| 4 | 2011-09-17T00:00:00.0000000Z | 2011-09-18T00:00:00.0000000Z | 2011-09-17T15:32:08.0000000Z | 2011-09-17T15:32:08.0000000Z | 4.87 | 4.87 | 4.87 | 4.87 | 0.300000 | 1 |
| 5 | 2011-09-18T00:00:00.0000000Z | 2011-09-19T00:00:00.0000000Z | 2011-09-18T10:06:49.0000000Z | 2011-09-18T20:11:23.0000000Z | 4.87 | 4.92 | 4.81 | 4.92 | 119.812800 | 8 |
| 6 | 2011-09-19T00:00:00.0000000Z | 2011-09-20T00:00:00.0000000Z | 2011-09-19T13:47:03.0000000Z | 2011-09-19T13:47:03.0000000Z | 4.90 | 4.90 | 4.90 | 4.90 | 20.000000 | 1 |
| 7 | 2011-09-20T00:00:00.0000000Z | 2011-09-21T00:00:00.0000000Z | 2011-09-20T06:51:41.0000000Z | 2011-09-20T16:38:45.0000000Z | 4.92 | 5.66 | 4.92 | 5.66 | 89.280711 | 17 |
| 8 | 2011-09-21T00:00:00.0000000Z | 2011-09-22T00:00:00.0000000Z | 2011-09-21T06:43:16.0000000Z | 2011-09-21T16:47:28.0000000Z | 5.70 | 5.79 | 5.66 | 5.66 | 17.629322 | 5 |
| 9 | 2011-09-22T00:00:00.0000000Z | 2011-09-23T00:00:00.0000000Z | 2011-09-22T06:19:59.0000000Z | 2011-09-22T13:32:57.0000000Z | 5.68 | 5.72 | 5.68 | 5.72 | 43.778422 | 5 |