Bitcoin Price Scraper

Implementation of Web Crawler
and Real-time Plots

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***Abstract*—In this project, we scraped bitcoin price from five major online cryptocurrency exchange markets, and collected, visualized and analyzed the price through real-time plots. We leveraged several python packages for web scraping and matplotlib for real-time plotting. Our result can serve as a complementary tool for investors of cryptocurrencies to better monitor the changing dynamics of the market. We also plan to further expand its function to perform arbitrage trading across platforms.**

I. Introduction

Bitcoin is a cryptocurrency and worldwide payment system. It is the first decentralized digital currency, as the system works without a central bank or single administrator.The network is peer-to-peer and transactions take place between users directly through the use of cryptography, without an intermediary.These transactions are verified by network nodes and recorded in an immutable public distributed ledger called a blockchain. Bitcoin was invented by an unknown person or group of people under the name Satoshi Nakamoto and released as open-source software in 2009. [1].

To facilitate users of digital currency to trade for other assets, multiple exchange markets set up around the world. The major ones include GDAX/Coinbase operated in the US, Bitfinex operated from Taiwan, Bithumb operated in Korea and several other larges ones in Europe. However, due to customers of each exchange are still restricted to some extent by local currency and language of the interface, there is pricing difference among different exchange on bitcoin and other cryptocurrencies.

As the difference in pricing on the bitcoin could reflect the dynamics in the market among different type of investors, we can gauge the sentiment and trends in the market through monitor the spread of bitcoin price among major exchanges. Moreover, we could further explore arbitrage opportunity out of this price spread.

II. Methodology

The main methods we used for this project are web scraping and real-time plotting. At first, we created a class called scraper.py, and then we implemented the BeautifulSoup package to scrape the bitcoin price against US dollars on five major online cryptocurrency exchange markets, Bitfinex, Bittrex, Gdax, Bitstamp and Bithump. Since the prices on those websites are fluctuating every few seconds, we created five lists to keep tabs on those every second. Afterwards, we imported this class to our python file and plotted prices and other features in a real-time manner.

After our first trial, we found out sometimes the website needs time to load. Thus, we added more try/except bundles in our fetch data function called fetch(website name, data list). The fetch function will read the data online, and if it fails to read the data after one second, fetch function will read the data again in three seconds. If it is unfortunate enough that the function still cannot catch the data, the last data value will add to the list.

In order to manually put a stop to the data fetching process, an error representing the stop should be excluded by the try/except bundle. We set a flag at the each of web crawler function and if the flag doesnt change by the price data, an AttributeError will raise.

The three real-time plots we generated are Price History, Spread, and Volatility. We used most of the basic matplotlib commands to achieve our goal. We also used numpy functions to get values we needed, as the spread is the difference between the maximum price and the minimum price at a single time, and volatility is the standard deviation of the different prices at a single time. We stored these values in lists, and plotted them out using the real-time command in a while loop.

III. Results

We generated three real-time plots as shown in Fig.1., Fig.2. and Fig.3 using the web scraper discussed in the Methodology part. 1.

A. Discussion

From the above result, we can see that the bitcoin price in the South Korea exchange has a clear premium over the other exchanges. This very likely was due to the frenzy about digit currency among Korean. We can also see that GDAX also has some premium over other exchanges as well. We think thats potentially due to. Moreover, from the plot, we can see the maximum spread stays pretty stably at around 10% of the

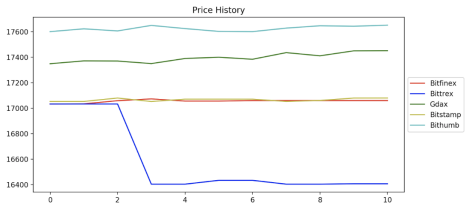

Fig. 1. Figure in one column.

bitcoin price which means there is decent room for us to do some arbitrage trading.

IV. Conclusion

We successfully scrapped the data from all five websites. And based on the plots we drew real-timely, Bithump from Korea has the highest BTC/USD exchange rate all the time. The spread plot demonstrates the arbitrage that can be invested in.

References

[1] Bitcoin.(n.d.). In *Wikipedia*, Retrieved December 9, 2017, from https://en.wikipedia.org/wiki/Bitcoin

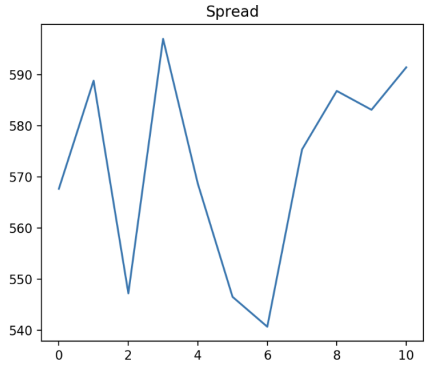

Fig. 2. Figure in one column.

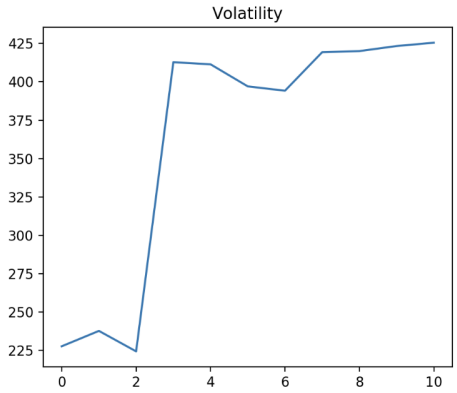

Fig. 3. Figure in one column.