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Use of the Web API as a basis for obtaining the latest data on bitcoin prices at 30 exchange places

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Abstract. Bitcoin has become a commodity traded by millions of traders from all over the world. This is one of the causes of fluctuating price movements. From the data we got on coinmarketcap, Bitcoin is traded on various cryptocurrency trading exchanges. And at every exchange that has a reputation, of course, has an API service to access historical data about the price movements of all the crypto commodities they have traded from the start. By using the PHP programming language and implementation of the CURL function for JSON readings, we can pull Bitcoin movement data in real time. In this paper, Bitcoin is specifically observed because it is the forerunner and the main cryptocurrency commodity traded and is a determinant of Alternative coin price movements in general. In this paper Bitcoin price monitoring is carried out at 30 reputable exchange places through API access provided by each exchange place. Furthermore, conclusions are drawn about the various variants of how to access the API from the 30 bitcoin exchange places. The program code that is displayed directly in this paper can then be used as an initial reference if you want to develop a Cryptocurrency price movement monitoring application for Bitcoin. At the end of the paper, an example of the application of Bitcoin price monitoring will be presented using a web-based application containing charts and supporting indicators as well as a telegram bot to display price depth charts.

Keywords: bitcoin, web API, price monitoring, web application, telegram bot

1. Introduction

CryptoCurrency has now as a commodity that is traded 24 hours nonstop and 7 days a week fulltime on various exchanges throughout the world. The basic nature of trading on cryptocurrency is how to obtain the lowest buying/price point and how to sell it at a higher price [11]. It's so fast that we can't just rely on our eyes to predict the next price movement. Previous researchers stated that bitcoin is emerging as an investment alternative, which has great popularity but is highly speculative [16]. For that it is very important to code it based on time series data [7].

In previous research which of course used different datasets, we managed to encode APIs from 30 markets trade Bitcoin which has a daily trading volume of more than 100 million dollars [10]. Whereas in this paper we present 30 different datasets with further development into a monitoring application for bitcoin price movements that can run on browsers and telegrams. Our dataset is



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obtained from coinmarketcap.com [3], which was accessed in August 2020 where the total articles listed have reached more than 270 exchange markets.

To get web api shares on 30 bitcoin exchange markets : Binance, Bibox, Bidesk, Biki, Bilaxy, Bitmart, Bitmax, Bitmex, Bittrex, Bitz, Bkex, Bybit, Catex, Coinbase Pro, Coinex, Digifinex, DSX, EXX, FTX, HBTC, HitBTC, Huobi, Indodax, Latoken, Okex, P2pb2b, Sistemkoin, Tokok, Tagz, and Yobit can be seen in table 1.

2. Methodology

The method used in this study is as follows:

1. Literature Study

Collecting information data about web API on 30 reputable exchange markets listed on coinmarketcap [3]

2. Programming

Perform PHP CURL programming to make it easier to read the JSON-structured API web

3. Web and Telegram based application development

Displays an example of a web-based Bitcoin price monitoring application that contains charts and supporting indicators. In addition, this paper also displays an example of a telegram bot that displays a price depth graph as an example of Web API development.

3. Implementation

The steps taken to obtain realtime bitcoin prices at each bitcoin exchange place are:

- 1) Open one by one the place of exchange link that has been listed in table 1
- 2) In general the position of the API Documentation link at each exchange place is at the bottom, but to simplify the API documentation link at each exchange place can also be seen in table 1
- 3) If you find a specific API that points to Bitcoin (BTC) with Variant Pair such as USDT, USD (if the combination with USDT is not found), or the official currency of the country of origin of exchange such as IDR (Indonesia), if no USDT or USD pair is found
- 4) Run API code on browsers like mozilla to make it easier to read the JSON structure
To simplify JSON reading, a program is created using the PHP Programming Language using the CURL function
- 5) Then save it in the format. php extension then run the results in the browser, it will appear as expected

Binance Example

The following is the Binance API code used

<https://api.binance.com/api/v3/ticker/24hr>

When executed in the browser Json code will appear as follows

```
[{"symbol": "ETHBTC", "priceChange": "0.00040500", "priceChangePercent": "1.931", "weightedAvgPrice": "0.02107319", "prevClosePrice": "0.02097600", "lastPrice": "0.02138300", "lastQty": "0.09900000", "bidPrice": "0.02137600", "bidQty": "4.55400000", "askPrice": "0.02138200", "askQty": "0.00900000", "openPrice": "0.02097800", "highPrice": "0.02144900", "lowPrice": "0.02068200", "volume": "280129.71300000", "quoteVolume": "5903.22756528", "openTime": 1589556861010, "closeTime": 1589643261010, "firstId": 175860945, "lastId": 175981784, "count": 120840}, ...]
```

The following is the Binance PHP CURL code used

```
<?php
echo '<font color=blue>Binance BTC USDT</font><br>';
$content=file_get_contents("https://api.binance.com/api/v3/ticker/24hr");
$content=utf8_encode($content);
$result=json_decode($content,true);
```

```
echo "Low : ".number_format($result["11"]["lowPrice"], 0, ',', '.').' USDT <br>';
echo "Last : ".number_format($result["11"]["lastPrice"], 0, ',', '.').' USDT <br>';
echo "High : ".number_format($result["11"]["highPrice"], 0, ',', '.').' USDT <br>';>
```

When executed in the browser those code will appear as follows

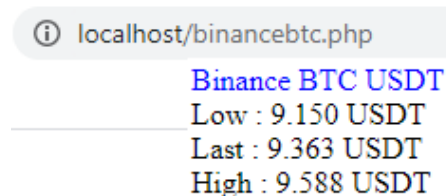


Figure 1. Bitcoin-USD prices on the Binance exchange

As for the brief summary of the entire web of api described above in table 1 below.

Table 1. API structure and pair in each market

	Structure	Pair	API URL
Binance	["11"]["lastPrice"]],	BTC USDT	https://binance-docs.github.io/apidocs/spot/en
Bibox	['result']['last']	BTC USDT	https://biboxcom.github.io/en/rest_api_spot.html#t0
Bidesk	['47']['lastPrice']	BTC USDT	https://github.com/bidesk/bidesk-api-docs/tree/master/doc
Biki	['data']['last']	BTC USDT	https://github.com/code-biki/open-api
Bilaxy	["BTC_USDT"]["low"]	BTC USDT	https://github.com/bilaxy-exchange/bilaxy-api-docs/blob/master/restapi.md#v1pairs
Bitmart	['current_price']	BTC USDT	https://developer.bitmart.com/v2/en/#introduction
Bitmax	['data']['close']],	BTC USDT	https://bitmax-exchange.github.io/bitmax-pro-api
Bitmex	['6']['lastPrice']	XBT USD	https://www.bitmex.com/app/apiOverview
Bittrex	->Last	BTC USDT	https://bittrex.github.io/api/v1-1
Bitz	['data']['btc_usdt']['now']	BTC USDT	https://apidoc.bit-z.com/en/
Bkex	["data"]["0"]["close"]	BTC USDT	https://www.bitmex.com/app/restAPI
Bybit	['result']['0']['last_price']	BTC USD	https://bybit-exchange.github.io/docs/inverse
Catex	['data']['priceByUSD']	BTC USDT	https://github.com/catex/catex_exchange_api/wiki
Coinbase Pro	['last']	BTC USD	https://docs.pro.coinbase.com/#the-status-channel
Coinex	['data']['ticker']['last']	BTC USDT	https://github.com/coinexcom/coinex_exchange_api/wiki
Digifinex	['ticker']['3']['last']	BTC USDT	https://docs.digifinex.com/en-ww/v3/#/
DSX	['0']['last']	BTC USDT	https://api.dsxglobal.com/#tickers
EXX	['ticker']['last']	BTC USDT	https://www.exx.com/help/restApi
FTX	['result']['35']['last']	BTC USDT	https://docs.ftx.com/#rest-api
HBTC	['62']['lastPrice']	BTC USDT	https://apidocs.hbtc.com/spot
HitBTC	['last']	BTC USD	https://api.hitbtc.com/
Huobi	['tick']['close']	BTC USDT	https://huobiapi.github.io/docs/spot/v1/en/#change-log
Indodax	['ticker']['last']	BTC IDR	https://indodax.com/downloads/bitcoinoid-api-documentation.pdf
Latoken	['BTC_USDT']['last_price']	BTC USDT	https://api.latoken.com/doc/v2/#section/API-v1-And-WebSocket-Documentations
Okex	['last']	BTC USDT	https://www.okex.com/docs/en/#spot-currency
P2PB2B	['result']['last']	BTC USDT	https://documenter.getpostman.com/view/6288660/SVYxnEmD?version=latest

	Structure	Pair	API URL
Sistemkoin	['USD']['BTC']['current']	BTC USD	https://api.sistemkoin.com/ticker
Tagz	['btc_usdt']['lastPrice']	BTC USDT	https://trade.tagz.com/exchangedata/swagger/index.html
Tokok	['ticker']['last']	BTC USDT	https://www.tokok.com/api/tokok_api_en.pdf
Yobit	['btc_usdt']['last']	BTC USDT	https://yobit.net/en/api/

3.1 Application of the Ichimoku kinko hyo Indicator

Based on the 30 web api presented above, we will present one of the web API developments [2] into a web-based monitoring application using a combination of the programming languages PHP, Javascript, and html by also implementing the Ichimoku kinko hyo indicator as shown in the picture

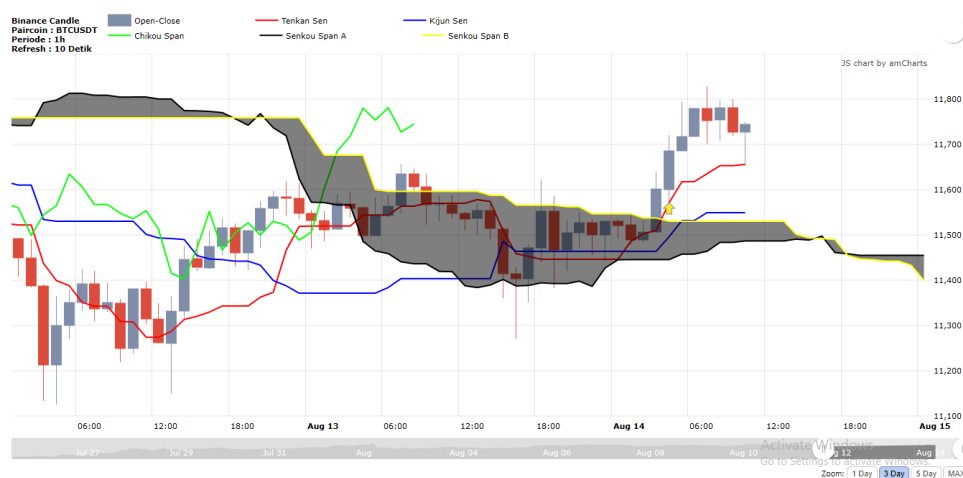


Figure 2. Bitcoin-USDT on the Binance exchange with indicator Ichimoku Kinko Hyo

Previous researchers suggested that Ichimoku Kinko Hyo is a technical system that illustrates support and resistance values in a simplified form and is considered an extension of the very popular candlestick charting system [13]. In fact, the system was built on the idea that at "one glance" you should be able to determine whether an instrument is in equilibrium (consolidation) or out of equilibrium (trending).

3.2 Application of Moving Average, Stochasti, and Parabolic SAR Indicators

Another development is to implement a combination of 3 monitoring indicators namely Moving Average, Stochastic, and Parabolic SAR which are all coded using PHP, Javascript, and HTML as shown in Figure 3.

A moving average is a time series constructed by taking averages of several sequential values of another time series [5]. The stochastic Oscillator is a two - line indicator that fluctuates between 0 and 100. It is basically a momentum indicator comparing the closing price of a security to the range of its prices over a certain period of time. It is used for overbought/oversold readings, divergence, bull/bear trade setups and crossovers [8]. The Parabolic SAR, also known as the "Stop And Reversal" system or PSAR, by Welles Wilder, is a trading indicator that was devised to find potential reversals in the market price direction. A dot placed below the price is a bullish signal suggesting momentum will remain in an upward direction. A dot placed above the price is a bearish signal suggesting momentum will remain in a downward direction [9].



Figure 3. Bitcoin-USD on the Binance exchange [2] with Moving Average, Stochasti, and Parabolic SAR Indicators

3.3 Telegram Bot to display depth charts

Telegram has a bot facility that makes it easy for software developers to create services according to their intended purpose. One of the interesting features is the Bot telegram, a special account without number that can handle Command from the User and gives answers appropriate to Command functionality. The account serves as the interface of the running system that communicate via Telegram Bot API [12]. By using the telegram bot we can also create a depth chart based on indodax api [1] to assess more which is the buy side and the sell side. Where if the buy side is bigger, it is predicted that the price will immediately rise because demand is greater and vice versa. As here we apply it to the Indodax exchange market



Figure 4. Bitcoin-IDR Depth Chart on the Indodax exchange market

4. Future Development

Future developments that can be done such as mining data on bitcoin price movements from various exchange markets above then looking for patterns based on technical analysis in trading and also to

find the start to the end of a price movement trend. It would be very interesting to apply smart computing to the mining results of bitcoin price movement data to support predictions of where the price will move next.

The development of graphical applications by tethering the ability to display notifications on the right time to make realtime purchases and or sales will get a lot of attention from the bitcoin trader community from around the world.

The implementation of intelligent computing on predicting Bitcoin price movements using Time Series Algorithm [14], ARIMA [18], LSTM [20], Neural Network [17], Bayesian Regression [15], Machine Learning [19], Deep Learning [6], and other forms will increasingly lead to the acquisition of the next bitcoin price prediction accurately. In addition, monitoring from the Bitcoin blockchain [4] side is very interesting to research in order to find the correlation or influence of asset movements on the blockchain with price movements in the market.

5. Conclusion

The conclusions that we can give are as follows

1. Any reputable bitcoin exchange market will certainly provide a web service that is easily accessible by developers to build third-party applications to facilitate reading of price movements
2. Each exchange market has a different api web structure so the way to access it is different.
3. Each Web API in this paper provides initial results in the form of a JSON structure so that it can be read using a web-based programming language such as PHP using the CURL function
4. By combining PHP, Javascript, and html programming techniques the Web API can be developed to display graphical applications, as well as implement general technical indicators such as Ichimoku kinko hyo, moving average, stochastic, and parabolic sar
5. By utilizing a telegram bot, it can also be programmed with PHP to produce a price depth chart feature

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