

Crypto Analysis1.0

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Introduction

Cryptocurrency is a revolution in Finance. In 2017, its market value has reached more than \$200 billion with an increase of about 1200% and created a buzz in the market.

As of 7 January 2018 there are 1384 cryptocurrencies and the count is still growing. Out of all these Bitcoin is the most famous cryptocurrency followed by Ethereum, Ripple, Bitcoin Cash.

Cryptocurrency experiences high volatility in prices and analytics is useful in understanding this variations quantitatively and making strategic decisions.

R being a power statistical analysis tool is one of the best choice to analyze the cryptocurrency data.

Import the data

There are many websites which provides API to import the cryptocurrency data.

coinmarketcap and Quandl provides an API to get the both live and historical data. These APIs are used to get the data in USD. To import the data in INR use the koinex or coindelta api.

coinmarketcap library in R is used to get prices of cryptocurrencies from 'Coin Market Cap'

get_marketcap_ticker_all function in coinmarketcap library is used to get the live data of top 100 cryptocurrencies.

```
top_cc <- get_marketcap_ticker_all()
kable(head(top_cc))
```

id	name	symbol	rank	price_usd	price_btc	X24h_volume_usd	market_cap_usd
bitcoin	Bitcoin	BTC	1	6628.5	1.0	4304610000.0	113692032000
ethereum	Ethereum	ETH	2	474.793	0.0715465	1688000000.0	47824600479.0
ripple	XRP	XRP	3	0.465082	0.00007008	221602000.0	18260256314.0
bitcoin-cash	Bitcoin Cash	BCH	4	783.816	0.118113	456600000.0	13513585500.0
eos	EOS	EOS	5	7.85973	0.00118438	666369000.0	7043493048.0
litecoin	Litecoin	LTC	6	82.8267	0.0124811	289031000.0	4756829144.0
Before analyzin	g the data , lo	ok at the	class	of each colu	mn		

```
mapply(class,top_cc)
```

```
##           id           name           symbol
## "character" "character" "character"
##           rank      price_usd      price_btc
## "character" "character" "character"
## X24h_volume_usd market_cap_usd available_supply
## "character" "character" "character"
## total_supply      max_supply percent_change_1h
## "character" "character" "character"
## percent_change_24h percent_change_7d      last_updated
```

```
##          "character"          "character"          "character"
```

From the output it can be observed that class of all the columns is “character” but except the columns id,name,symbol all other columns contains numerical data. So, convert these columns to double data type before performing analysis.

```
for(i in c(4:ncol(top_cc))) {
  top_cc[,i] <- as.double(top_cc[,i])
}
```

Market Cap of 15 leading cryptocurrencies

Market Capitalization of a cryptocurrency is product of price of the currency and circulation available. Cryptocurrencies are ranked based on Market Capitalization.

```
mark <- gvisColumnChart(top_cc[1:15, ], "name", "market_cap_usd", options = list(title = "Market Cap Of
  legend = "left"))

#plot('mark')
cat(mark$html$chart, file = "MarketCapOfTop.html") # this store a html with g1 graph.
```

Variations in Price

Now let us look at the variation of prices. Negative value of percentage variation shows a drop in the prices and positive means increase in the prices.

```
var <- gvisColumnChart(top_cc[1:15, ], "name", c("percent_change_1h", "percent_change_24h",
  "percent_change_7d"), options = list(title = "% change of prices", legend = "top"))
#plot(var)
cat(var$html$chart, file = "PriceVariation.html") # this store a html with g1 graph.
```

Variations in Volume

```
var2 <- gvisColumnChart(top_cc[1:15, ], "name", c("percent_change_1h", "percent_change_24h",
  "percent_change_7d"), options = list(title = "% change of prices", legend = "top"))
#plot(var)
cat(var2$html$chart, file = "VolumVariation.html") # this store a html with g1 graph.
```

Volume is the number of transactions of a cryptocurrency. It can be noticed from the plot that number of transactions of top 3 currencies are very high compared to other currencies.

We have seen that market cap of each top 5 currencies is too high compared to other currencies, now let us find the market share of these top 5 currencies:

```
format(sprintf("Market share of top 5 cryptocurrencies is %f",sum(top_cc[1:5,"market_cap_usd"])/sum(top
## [1] "Market share of top 5 cryptocurrencies is 0.782431"
```

About 75% of the cryptocurrency market share is covered by these 5 currencies.

Secondary Analysis

So let us take past data of these 5 currencies and analyze.

First import the historical data using crypto library. Crypto library in R retrieves the historical market data provided by 'Cryptocurrency Market Capitalizations'

```
library(httr)
library(RCurl)

## Loading required package: bitops

library(crypto)

## Warning: package 'crypto' was built under R version 3.4.4

## Loading required package: foreach

## Loading required package: rvest

## Loading required package: xml2

library(knitr)
```

Market Cap Trend

Import the historical data of top 5 currencies and plot the trend of their market ca.

listCoins function returns the list of all the coins and url to download their history data. getcoins function is used to get historical data of the coins.

```
coins <- crypto::listCoins()

## Warning in ifelse(as.character(match.call()[[1]]) == "listCoins",
## warning("DEPRECATED: Please use crypto_list() instead of listCoins().", :
## DEPRECATED: Please use crypto_list() instead of listCoins().

## [1] " "

kable(head(coins))
```

symbol	name	slug	rank	exchange_url	history_url
BTC	Bitcoin	bitcoin	1	https://coinmarketcap.com/currencies/bitcoin/#markets	https://coinmarketcap.com/currencies/bitcoin/#markets
ETH	Ethereum	ethereum	2	https://coinmarketcap.com/currencies/ethereum/#markets	https://coinmarketcap.com/currencies/ethereum/#markets
XRP	XRP	ripple	3	https://coinmarketcap.com/currencies/ripple/#markets	https://coinmarketcap.com/currencies/ripple/#markets
BCH	Bitcoin Cash	bitcoin-cash	4	https://coinmarketcap.com/currencies/bitcoin-cash/#markets	https://coinmarketcap.com/currencies/bitcoin-cash/#markets
EOS	EOS	eos	5	https://coinmarketcap.com/currencies/eos/#markets	https://coinmarketcap.com/currencies/eos/#markets
LTC	Litecoin	litecoin	6	https://coinmarketcap.com/currencies/litecoin/#markets	https://coinmarketcap.com/currencies/litecoin/#markets

```
data1 <- crypto::getCoins(coin = c("Bitcoin", "Ethereum", "Ripple", "Bitcoin Cash",
  "Cardano"))

## Warning in ifelse(as.character(sys.call()[[1]]) == "getCoins",
## warning("DEPRECATED: Please use crypto_history() instead of getCoins().", :
## DEPRECATED: Please use crypto_history() instead of getCoins().

## [1] " "

## Retrieves coin market history from CoinMarketCap. [1] " "
```

```
## Warning in name == coin: longer object length is not a multiple of shorter
## object length

## Warning in symbol == coin: longer object length is not a multiple of
## shorter object length

## Warning in slug == coin: longer object length is not a multiple of shorter
## object length

##
|
|
| 0%

## If this helps you become rich please consider donating
## ERC-20: 0x375923Bf82F0b728d23A5704261a6e16341fd860
## XRP: rK59semLsuJZEWftxBFhWuNE6uhznjz2bK
## LTC: LWpiZMd2cEyqCdrZrs9TjsouTLWbFFxwCj
##
|
|=====| 33%
|
|=====| 67%
|
|=====| 100%

## user system elapsed
## 0.177 0.017 8.608
```

```
markettrend <- gvisAnnotationChart(data1, idvar = "name", "date", "market", options = list(title = "Market Trend",
  legend = "top"))
#plot(p)

cat(markettrend$html$chart, file = "marketcaptrend.html") # this store a html with g1 graph.
```

The plot shows that over years bitcoin has highest market share.

Price Movement

OHLC chart(open high low close chart) is used to look at price movements.

In the following plot blue color filled candlestick bar means on that particular day closing price is more than opening price and white color filled candlestick means the that closing price is lower than opening price.

```
ohlcv = gvisCandlestickChart(data1[data1$name == "Bitcoin" & data1$date < "2017-01-31" &
  data1$date > "2017-01-01", ], "date", "low", "open", "close", "high", options = list(title = "OHLC",
  legend = "top", height = 600))
#plot(ohlcv)
cat(ohlcv$html$chart, file = "OHLC.html") # this store a html with g1 graph.
```

Market Cap Growth

Bitcoin is the first cryptocurrency and there are many coins which have originated later But their market cap is growing rapidly.

Now let us look at the % increase in market cap over past 3 months data and see which coin is evolving rapidly.

quantmod library in R provides Delt function which is used to calculate the % difference over a period. Using this function, we will calculate the market growth of each currency across over 3 months time period.

```
library(quantmod)

## Warning: package 'quantmod' was built under R version 3.4.4
## Loading required package: xts
## Warning: package 'xts' was built under R version 3.4.4
## Loading required package: zoo
##
## Attaching package: 'zoo'
## The following objects are masked from 'package:base':
##
##      as.Date, as.Date.numeric
## Loading required package: TTR
## Version 0.4-0 included new data defaults. See ?getSymbols.
#=====
coins <- unique(data1$name)
s_date = Sys.Date() - 1
data1$market_growth <- NA
for (i in coins) {
  data1[data1$name == i, ]$market_growth = Delt(data1[data1$name == i, ]$market,
    type = "arithmetic", k = 90)
}
c_data = data1[complete.cases(data1), ] #complete.cases is used to get rwcords without NA
mg_3 = gvisColumnChart(c_data[c_data$date == s_date, ], "name", "market_growth",
  options = list(title = "Market Growth in the last 3 months", scaleType = "allfixed",
    legend = "top"))
#plot(mg_3)
cat(mg_3$html$chart, file = "growth.html") # this store a html with g1 graph.
```