



**brobot.tech**  
Crypto Intelligence

**Whitepaper**

# Abstract

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*The emergence of the blockchain technology and the subsequent development of cryptocurrencies has opened up new opportunities. With applications ranging from medical to energy, from security to finance, tokens and crypto coins might have found the world unprepared. There is undoubtedly a great resistance to change and among the driving factors could be fear or uncertainty, lack of trust or lack of understanding and technological education.*

*As much as there might be losses associated with the unsustainable development of these technologies, forcibly moving forward seems to be inescapable and embracing the tech imminent. The world will not stop moving and neither will cryptocurrency traders and users. It is our responsibility to alleviate any potential pain and to create the necessary means for a faster and more sustainable transition into the mainstream.*

*In the cryptocurrency sphere, a great deal of issues pose a threat to any trader's experience: managing their portfolio, getting the most relevant information and news, educating themselves, consulting with the best people or being involved in the right community, surrounded by the right people.*

*The solution to all these problems consists in a complete, customizable and reliable set of tools - a chatbot that can assist you in all your decision making processes, with features ranging from market signals and news aggregation to portfolio information and statistics.*

*Brobot (Broker Bot) is such a solution. Brobot addresses a vast range of users and promises to become a must-have for any cryptocurrency trader. Its defining traits comprise speed, full customization, convenience, completeness and resourcefulness. The product promises to minimize efforts and to maximize efficiency, allowing users to manage thier anywhere, anytime.*

*The platform is available on three of the most popular messaging apps (Slack, Telegram and Facebook Messenger) and can be linked to the top cryptocurrency exchanges. All the features are well integrated and together create a full-stack answer to the aforementioned problems.*

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# Intro

The world has seen dramatic changes in terms of technology in the past few decades and as we speak, we are surfing the highest waves of Gartner's hype cycle. Blockchain and cryptocurrencies are breaking into the mainstream a little bit every day, with skyrocketing numbers of users and entities adopting the technology and implementing innovative applications and services.

As more and more people become accustomed with the tech, more problems arise. We are witnessing an increasing resistance given the steep learning curves of some of the new technologies.

In terms of cryptocurrencies, we have witnessed a growth from \$18 bln. to +\$700 bln. in 2017 alone and a total number of coins of over 1300. However, circumstances such as an overload of information, scams and pump & dump schemes make it increasingly hard to get a good overview of what might seem like a viable investment and what not. Moreover, with so many different markets and so many different currencies, it is very challenging for both new players as more experienced traders to stick their head out above the crowd.

We have seen similar cycles happening across history (i.e. cars, personal computers or smartphones) and we have learned when to recognize change. However, recognizing is not enough and embracing it and finding the right solutions pose a fundamental challenge. It is no doubt that we are leaping into the future and it is in the light of these challenges we face that at Brobot, we are proud to be pioneers in this industry and to present you with a proposition that will facilitate your trading experience in an astonishing and profoundly new way.

Brobot is a data and community-driven product for business intelligence and asset management in the form of a chatbot. Brobot aims at becoming instrumental to any trader's experience and was born in response to a set of nerve-wrecking issues. How can you overcome the hurdles associated with managing your portfolio, getting the right market information about preferred coins and the most reliable news, finding the right people to consult with and never missing out on an investment opportunity again? In short, what is the best way to minimize your efforts and to maximize efficiency when trading cryptocurrencies and monitoring your investments?

In its current state (MVP), the product comes with four functional features available on our top 3 selection of messaging platforms (Slack, Telegram and Facebook Messenger) and a comprehensive list of other planned or in-progress functions.

The core function is represented by a smart chatbot that serves as an environment for performing a high range of trading-related tasks, including monitoring your portfolio, receiving market reports or signals and/or buying or selling. The second function is that of a market signal stream:

- 1) Public, based on relevant parameters that drive Brobot's algorithms.
- 2) Private, based on the contents of your wallet
- 3) To supply you with news related to your preferred coins and/or the type of coins you possess. Lastly, our APIs allow you to make use of the data we gather and build your own applications.

With hopes to become the killer-app of the industry, Brobot is working on bringing you an integrated and exhaustive set of personalized tools, all in one place. Brobot is not just another chatbot, but an application that is built on considerations higher than just functionality. Our aim is to provide you with a personal and convenient feature set that fills up the gaps in the current available products and that fulfills all your needs, through less effort and more learning. Our future plans are drawn upon creating a complete set of solutions, proven by action points such as integrating Natural Language Processing and Multilingual Support in our chatbot, creating an advanced Recommender System, founding the Brobot Educational Division or supporting the ecosystem through Community Programs.

Brobot is aiming at becoming a must-have for beginner and expert traders alike. This ambition is fueled by a team of successful young professionals, all experienced and skilled in their fields (technology, marketing, finance, strategy) and a group of like-minded advisors and experts. They have all been brought together to Amsterdam, the Netherlands, by a common vision and a willingness to revolutionize the status quo. On top of this, a 5 years growth plan and an extensive list of action points on the roadmap speaks volumes about our commitment.

# Value Proposition

1) Fast - Brobot will provide you with real-time market signals, performance reports and news according to the contents of your wallet. Speed and accuracy are traits we care about strongly, in our efforts to help you stay ahead of the crowd. Our algorithms are optimized to respond instantly to any request you may have, within the available commands.

2) Custom - Brobot allows you to become the master of the data streams you receive. The platform gives you full control over every interaction with your bot in terms of content, frequency and messaging environment. Hence, the private advice you will be receiving, will always be personal and tailored to your needs.

3) Convenient - It is without doubt your time is valuable, and for this reason Brobot is committed to make it as effortless as possible for you to decide. Our platform reduces the time necessary to learn about certain coins or projects, to deal with cumbersome user interfaces on trading exchanges, to filter out the relevant news and to make on-spot trading decisions.

4) Complete - At Brobot, we do not only care about helping users improve their portfolio, but also about helping them become more informed traders. We understand that trading is an all-in engagement and that a complete set of tools is essential. Brobot offers you all the necessary trading resources at hand. Ultimately, it is our pursuit to help set the grounds for a leaner transition of the crypto sphere into the mainstream.

5) Resourceful - We strongly believe that the key to a better crypto-world is mutual help and collaboration. This is the reason why we have already made our databases readily available through our APIs, for you to build your own custom tools, up to your preferences. These resources allow users to do even more with the capabilities of Brobot, while we welcome any ideas for further development.

Brobot has been, still is and will always be a people's project. Built and developed accordingly with the community's (Slack and Telegram) invaluable feedback, the platform aims to be a safe, custom and efficient alternative that will become the standard in cryptocurrency intelligence and portfolio and asset management. Regardless of the outcome of the Initial Coin Offering, Brobot is committed to continuing the project and stand by its plans and ambitions.

# Market Prospects

## What to expect in this section?

- 5 Target
- 6 User Personas / Use
- 9 Concluding Remarks
- 9 Reach

# Target Audience

Among Brobot's values, helping the technology around blockchain and cryptocurrency find its way into the mainstream plays a crucial role. Our ambition is to make this tech available and understandable to as many people as possible through offering a complete solution that addresses all the problems in the field and helps build the grounds for what is next.

## User Personas / Use Cases

As previously mentioned, the team at Brobot is constantly trying to not only be very responsive to the users' needs, but to also anticipate what these will be in the long term. In this sense, and concurrently with the subscription model explained in the following chapters, our target audience contains, but it is not limited to, three generic categories.



# Hobbyist Jane



**AGE** 25

**LEVEL** Beginner

**AGE** Marketing Officer

AMBITIOUS

ACTIVE

CREATIVE

ENERGETIC

## FAVORITE CRYPTO



## ABOUT

Jane is studying to become a marketing specialist and working part-time as a Marketing Officer for a sports apparel brand. She is merely a beginner in the cryptocurrency world and has found out about it from the mainstream media that is ever more interested in this field.

Some close friends of her had started investing as well and have been advising her to put some money into a pool of still young cryptocurrencies. The hype is fueled by her more and more frequent encounters with the topic, be it at work, in university or on the internet. Jane has now already made a few investments and has a portfolio consisted of seven different coins on two different exchanges. She hopes to make some profits and is looking for ways to keep up with her investments.

## USER GOALS

- Become more acquainted with the practices and terminology around cryptocurrency trading
- Leap into the technology around blockchain and cryptocurrency
- Become a better informed participant in the ecosystem

## USER NEEDS

- Integration of her crypto activity with the preferred social media
- A commonplace for all her cryptocurrency information streams

## HOW BROBOT CAN HELP

- It allows her to couple her wallets to her favorite messaging app, Facebook Messenger

- Because she uses Slack in her workplace, she now has a chance to integrate the bot on this platform as well, without the need to switch between two or more alternatives

- It allows her to have a daily overview of her portfolio, on-demand statistics about her assets and to follow the news related to the contents of her wallets

- Helps her make better informed decisions based on one-tap market signal streams

# Responsive Chad



**AGE** 32

**LEVEL** Advanced

**AGE** Financial Analyst

ORGANIZED

FOCUSED

CONFIDENT

INDEPENDENT

## FAVORITE CRYPTO



## ABOUT

Chad has been around the crypto space for a while now and has made early investments in some of the coins. Cryptocurrencies are his passion and he combines trading with his job. However, his schedule does not allow for too much time for him to allocate for this activity and he feels like he is missing out on a lot of opportunities.

He would also like to have more time to read about new projects, to get involved in the community and to be active on forums and threads. He strongly believes in the future of cryptocurrencies and is sure that one day everything will be digital. Chad would also like to have a reliable source of data so he can be better informed and to know which coins are worthy.

## USER GOALS

- Easily combine his daily routines with his passion for cryptocurrencies and the related activities
- Reduce his efforts when gathering all the necessary information
- Find a community of like-minded individuals from different backgrounds

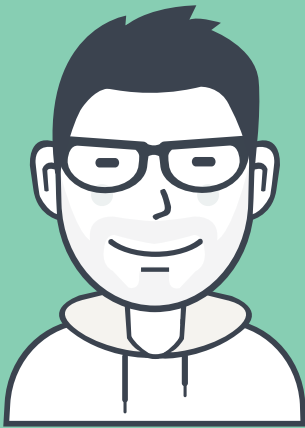
## USER NEEDS

- Integration of her crypto activity with the preferred social media
- A project with more than just a whitepaper to invest in and devote to
- An alert system to never miss out on opportunities again

## HOW BROBOT CAN HELP

- It allows him to configure his account to receive market signals and news every 15 minutes, for all the coins he possesses on different exchanges
- It allows him to buy and sell as easily as writing a line of text
- It empowers him to instantly react accordingly with market movements
- It enables him to be active with a purpose in a Telegram group

# Guru Lee



**AGE** 29

**LEVEL** Expert

**AGE** IT Consultant

RESOURCEFUL

LOGICAL

PATIENT

CONSIDERATE

## FAVORITE CRYPTO



## ABOUT

On top of being an early adopter and a crypto guru, Lee also knows how to code. He has been involved with cryptocurrency trading for half a decade now and his aim is to maximize his outputs. He is an enthusiast about Brobot and has been constantly offering relevant feedback for the development of the platform. He is happy to have the opportunity to exploit the available data streams and to be a pioneer of this industry. He is considering building his own DIY tools, where he can track large volume transactions and counter any coordinated efforts from other participants in the market.

## USER GOALS

- Fully make use of his technical capabilities
- Find an extensive database for cryptocurrency

## USER NEEDS

- Advanced functions such as sentiment analysis
- Safe, secure, reliable and instant access to millions of data entries
- Comprehensive and easy to integrate developer tools

## HOW BROBOT CAN HELP

- It allows him to configure his account to receive market signals and news every 15 minutes, for all the coins he possesses on different exchanges
- It allows him to quickly check the status and performance of specific assets and to react accordingly with simple commands
- Helps him correlate social sentiment and market price fluctuations
- It enables him to use Brobot's own APIs to build his own custom projects

# Concluding Remarks

Brobot is a full-stack solution for anyone interested in cryptocurrencies. As seen in the examples above, the chatbot fits any user profile regardless of their level of expertise, from total beginners to experts. Its capabilities fit a big range of needs and its high degree of customization make it a tool accessible for everyone.

Completing all the Milestones on the roadmap is our ultimate quest, thus completely making Brobot the product we intended to be - Your Personal Cryptocurrency Chatbot.

## Reach

Based in Amsterdam, the Netherlands, Brobot has quickly grown outside of just its local horizon immediately after the initial releases. Our location does not only play an important strategic role, but has also helped open up opportunities worldwide. Among them, being able to constantly receive feedback and support from all corners of the world has made the project what it is today.

And in this light, it has become our goal to serve the global community of crypto enthusiasts and to be accessible to everyone, anywhere and anytime. Brobot is a global product, made with dedication in Amsterdam.

At this stage in the platform's development, we are seeing a constant increase in the number of users on a daily basis. Our product is currently being (Q1 '18) used by over 4000 individual users and over 200 private Telegram and Slack groups.

# Chatbot

## What to expect in this section?

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13 Commands and Configuration

19 Limitations

19 Future

# Problem Definition

When it comes to trading, especially on existing exchanges, the user experience often suffers, primarily because of the UX design of certain interfaces or the interface being overall sluggish and unresponsive. Since the API is generally a separated component of the exchange it is less prone to heavy usage due to its protection mechanism such as rate limiting.

This allows users or other 3rd party entities to access and control their assets without using the UI of the exchange. This can be convenient especially during periods of heavy traffic or peak activity related to certain events.

If we multiply this problem with the number of exchanges the user holds assets on, we quickly realise that a simple wallet check-up on all exchanges becomes very time consuming.

Since security is really important, the user will also need to login frequently due to user session expiration and the use of Multi Factor Authentication at login. The situation can also get worse when the exchange is unresponsive and/or throws errors.

Although portfolio managers and visualizers exist, the prices displayed do not always reflect the actual prices found of the exchanges where the assets reside. This is due to the fact that the prices are an aggregate value (ex. coinmarketcap.com).

Another issue related to searching news about certain cryptocurrency tickers and markets is that the options for having a single point of search, is very limited. Therefore, the user needs to spend an increasing amount of time searching updates related to the contents of the portfolio. This amount of time is proportional to the diversity of the assets being held.

## Solution

Chatbots can be an extremely useful tool to manage assets and generally inquiring information on demand. Our solution allows users to communicate with the chatbot via multiple media platforms depending on preference.

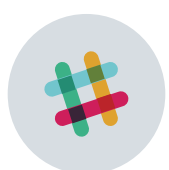


## Facebook Messenger Chatbot

Although the graphical interface and general UX of the Messenger App is generally better, users might not want to be public (on Facebook) due to privacy concerns.

This Messenger App allows us to reach a wide range of audiences, mostly the ones who are using social media quite often in everyday life.

Users who are just starting with or interested in popular cryptocurrencies (Bitcoin and Ethereum) have an easy time accessing the chatbot and beginning a conversation right away. This represents a gateway to accessing the cryptocurrency space, where the user acquires the necessary dictionary (blockchain, transactions) and understand the significance of certain events such as forks and ICOs.



## Slack Chatbot

Cryptocurrency enthusiasts and generally people who have a common passion in this field organize on forums and chat groups to share experiences, tips and news with each other.

Slack is a suitable tool for teams to coordinate work remotely, but also a good medium for people to engage in quality discussions.

Our chatbot solution is configured to reach differently in groups and treat it as a single entity. This allows us to run the application in large groups that require up-to-date information regarding certain assets.

The response of the chatbot is not only valuable for informing the entire group but also represents an excellent starting point for a fruitful discussion (thread). A practical example would be receiving news about a certain currency and then using the chatbot to verify signal trends and price information in the last period to validate assumptions made on the news article(s).

We recommend this tool for groups specialized in certain currencies as a means of staying up to date and reducing the amount of time spent searching for new information.

The group can also configure the chatbot as a single entity in the Brobot backend, thus allowing certain configuration. In addition to this, once the application is set up in a group, it can also be used individually to chat in private with Brobot.



## Telegram Chatbot

Users in the cryptocurrency space are generally very keen on security and privacy. Certain platforms are considered more susceptible to user data collection. To keep messages private (and encrypted) a convenient popular solution is Telegram. In comparison with other messaging platforms our general experience is that Telegram is faster to some extent and provides the much needed anonymity.

Similar to the Slack and Messenger platforms, Telegram allows users to have a private direct chat with the chatbot, with the convenience of using slash commands to interact with the bot when configured in a telegram group. In this way, the chatbot does not listen to any chatter in the group and only responds when directly addressed with a slash command.

Groups are treated as a single entity as well and can be configured appropriately.

## Commands

The chatbot possess a variety of useful commands that allow users to quickly check their wallets, check market prices and get the latest news.

In order to increase exposure and showcase the capabilities of the chatbot we have created a public and private usage tier. Public users do not need to register on the website and are limited to certain features and commands. Private users on the other hand, once they have coupled their Brobot account in the backend, will be able to receive signals, check their assets, perform trade tasks and much more.

Below is a list of commands currently available:



## **/ help**

Renders a help message containing a full list of commands. This message may change once the user has coupled the Brobot account with the chatbot. It is also returned sometimes if the user gets stuck or issues unknown commands.

Available for public and private use.

Usage: help

## **/ status**

One of the most useful commands, that shows the evolution of the market in the last 24 hours. All values are expressed in USD. The response to this command is returned in the format of an image containing the following:

- >\_ Market overview
- >\_ Total Market Cap
- >\_ Volume Change
- >\_ Bitcoin Price
- >\_ Bitcoin Dominance (% of the market cap)
- >\_ Top cryptocurrencies order by market cap
- >\_ Best performing coins ordered descending by price increase
- >\_ Worst performing coins ordered descending by price decrease

The values are refreshed on average every 5 minutes and are also part of the automatic daily subscription.

Available for public and private use.

Usage: status

## **/ top**

Similar to the status command the user can retrieve individual pieces of information about the market order by the following properties:

- >\_ Price
- >\_ Market Cap
- >\_ Volume
- >\_ Price change

Available for public and private use.

Usage:

```
>_ top price  
>_ top growth 5  
>_ top volume
```

## **/ info**

Straightforward command that returns the current status of a certain cryptocurrency. The fields returned are the following:

```
>_ Current price expressed in USD  
>_ 24 hour price change  
>_ 24 hour volume change  
>_ Current market cap
```

Available for public and private use.

The behaviour of this command changes slightly for private use, whereas the API performs a check to see if the coin is in your portfolio. The command will then return the following information:

```
>_ Total Balance of the cryptocurrency  
>_ Total Balance expressed in USD  
>_ 24 hour price change
```

Examples:

```
>_ btc info  
>_ verge info  
>_ rdd price  
>_ ethereum price
```

## **/ news**

The news commands provides a unique functionality that allows users to get the latest news regarding a specific cryptocurrency. As described in the news aggregator chapter, we rely on curated news sources that are ranked based on their origin and impact.

Depending on the platform, the chatbot will return a number of articles related to the queried ticker.

Facebook Messenger will return a total of maximum 5 news articles due to having the ability of compacting them into a single message. Telegram and Slack on the other hand will send only 1 article at a time. The articles are shuffled around every 15 minutes to insure new items are shown and not repeated.

The format of one news article contains the title of the news article, a short description and the thumbnail. On clicking, the user is then redirected to the original source of the article.

Given the fact that there are a lot of articles originating from social media such as Twitter and Reddit, we prioritize the news type to classic media first, followed by Steemit and finally Social Media.

Available for public and private use.

Examples:

- >\_ btc news
- >\_ verge news
- >\_ rdd news
- >\_ ethereum news

## **/ signals**

Following the signal channel or receiving price signals at a certain frequency may be too inflexible for certain users. To solve this issue we created a command that returns the signals for a certain coin within the last 24 hours.

The format of the message contains the following fields:

- >\_ Total number of signals and average transacted BTC volume
- >\_ Number of upward signals and average transacted BTC volume
- >\_ Number of downward signals and average transacted BTC volume
- >\_ Current price and price change in USD
- >\_ Optional: A recommendation of a buy or sell action if available. This functionality is described in detail in the Signal chapter.

Available for public and private use.

Examples:

- >\_ btc signals
- >\_ verge signals
- >\_ rdd signals
- >\_ ethereum signals

## /wallet

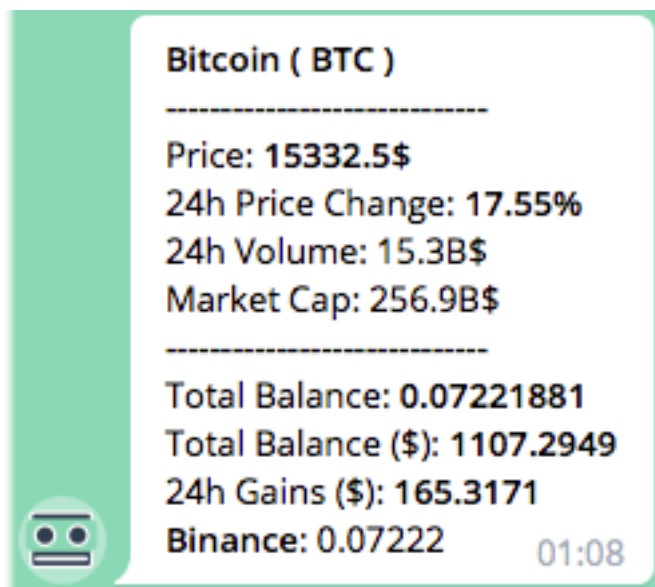
Previously we mentioned the hassle of having to check the status of the user's wallet on one or more exchanges. In the case of multiple exchanges the user would need to perform additional tasks such as adding the individual values to get the total sum of the portfolio.

Available for private use only.

The chatbot will return a summary of one's aggregated wallet displayed as a list of currencies with the following information:

- >\_ Name of the currency and ticker
- >\_ 24 hour price change in percentage
- >\_ 24 hour transacted volume in USD
- >\_ Summary
  - >\_ Total wallet worth in USD
  - >\_ 24 hour wallet change in USD
  - >\_ 24 hour wallet change in percentage
  - >\_ Name of the exchange
  - >\_ Amount held on the exchange

An example can be seen in the figure below.

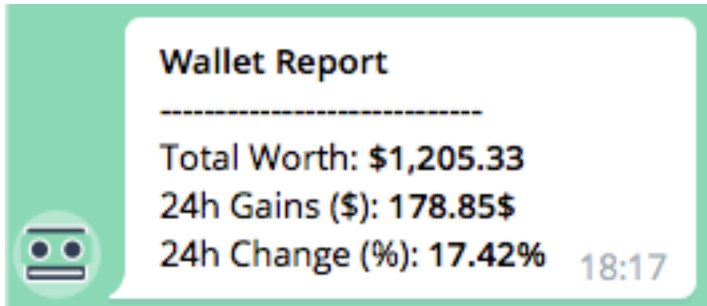


In some cases the users would like to receive minimal information such as the total worth of all the wallets.

The wally command will return the summary of the last 24 hours in the following format.

- >\_ Total wallet worth in USD
- >\_ 24 hour wallet change in USD
- >\_ 24 hour wallet change in percentage

This can be seen in the figure below



Available for private use only.

Usage: wally

**/sell** | **/buy**

In case the user is receiving signals from our notification system or just wishes to buy or sell at an arbitrary time, we facilitate the possibility of performing these trade transactions. The time it takes to perform a transaction is usually negligible and a confirmation is returned when the operation has completed.

Currently the price that the user will buy for is the last asking price (market order). In the future we plan to extend the actions that can be taken on an exchange such as setting up limit orders.

This command is available for private use only and it requires the 2 Factor Authentication protection to be enabled and delivered along with the trade message. This protection measure ensures that if the user's messaging medium is compromised it cannot perform damaging trades.

The format of the command is the following

Exchange name (bittrex, poloniex, etc)

>\_ Action to take (buy or sell)

>\_ Amount to buy or sell

>\_ Ticker (3 letter denominator, ex. ETH, BTC, ADA)

>\_ 2FA code, the 6 digit code supplied by the virtual MFA device

Example:

>\_ Bittrex buy 100 eth 123456

>\_ Binance sell 0.3 btc 654321

# Creating a Broker

Once the user has decided to create an account in the Brobot website backend, there are certain steps to take to couple the chatbot with the account.

## Creating a Broker

Currently users are limited to having only 1 broker. To create a broker the user must first choose whether to enter the API keys for an exchange.

After this step the user is presented with a set of Master Keys for each messaging platform.

## Coupling the Broker with a messaging platform

The user can copy paste the Master Key and send it to the chatbot on the messaging platform. It is also possible to have the chatbot operate on all platforms simultaneously.

The user then receives a confirmation message on success and the chatbot is now coupled with the Brobot account.

## Setting up notifications

In the notifications section the user can set up various filters to receive market and news signals. More information regarding this topic can be found in the Signals chapter.

## Action disambiguation

Sometimes users make mistakes such as typos when typing, especially if the ticker is unknown or some features like autocomplete might cause some errors when typing a long market name (ex. Basic Attention Token).

To combat this we offer simple commands and buttons using each native platform specific options. This option is limited for popular commands and static information (ex. Help, bitcoin price, status).

Punishing users for such mistakes is not very constructive, nor is giving ambiguous or repeating answers. This sort of interaction can ruin user experience and might drive away the user. Our solution is to always try to return an easy call- to- action command with the alternatives as seen below.

# Market Signals Monitoring

## What to expect in this section?

21 Intro

22 The PumpBuster

24 News delivery as a signal

25 Signal anatomy and validation

26 Advice and recommendations

26 Combining news and signals

27 Chatbot action followup

# Intro

Unlike regular stock markets, where trading is limited to certain hours of the day, the cryptocurrency trading space operates in a continuous interval, making current market analysis models sometimes incompatible.

The cryptocurrency market space is renowned for its volatility, that is not limited to low volume currencies and assets. Throughout 2017 we have witnessed the market cap reach heights of  $\pm 600$  Billion USD in December 2017, representing an increase of  $\pm 3429\%$  [cc\_ref] from 17 Billion USD in January 2017.

# Problem

Trading related activities require the users to constantly be engaged with the market to gain an advantage over others and maximize their profits. Given the continuous 24 hour opening hours of the market, the user can only have a limited window of time dedicated to this task.

Our philosophy is that users should engage as little as possible and enjoy other activities that are not related to trading. To accomplish this balance, users need to be informed about significant market movements, applying filters of their choice, thus greatly reducing the amount of noise. This allows users to be decision makers and not monitoring agents.

Decision making involves several factors ranging from user personality and behaviour (risk taker, calculated, etc) to previous trading experience and certain unique piece or source of information the user might be in possession of. Based on these factors alone, a system should be configurable from a high level perspective such as upwards or downwards movement of price, to very granular settings such as a specific ticker, on a specific market that has a volume change of a specific percentage in the last hour.



# Solution

Our solution to this problem comes in the form of an automated system that monitors all major exchanges, following the Pareto Principle. This principle allows us to monitor the exchanges that contribute the most to the overall market cap and the price changes of certain markets.

We have previously mentioned high volatility as being a trait of the cryptocurrency market space, which in turn is a source of unpredictability. This can result both in generous gains and in severe losses for others. These sudden spikes in prices sometimes range from single digits to triple digit increments in a time span of 5 minutes.

An explanation for this phenomenon is attributed to the existence of so called "whale wallets" that possess a sufficient amount of value to influence the volume and the price, both short and long term.

## The PumpBuster

The initial project, dubbed "PumpBuster" in the beginning, was designed to detect early signs of these behaviours and to act as an early warning sign of the "accumulation" phase where wallets would buy at a low price almost undetectable, while setting sell orders for higher prices later on.

The PumpBuster works in favour of the user, effectively allowing either the participation in such trends from an early moment or the avoidance of acquiring an asset because of the high volatility and/or manipulation. By default, the PumpBuster shows unfiltered signals to users in public channel on all our platforms. However, the Brobot backend (<https://brobot.tech/user/notifications>) allows the user to create an account and couple the desired messaging platform with the account for personal use.

This allows full configurability of the filters the user needs such as:

### **Notification frequency**

- >\_ Every 1/3/6/12 hours
- >\_ Daily
- >\_ Weekly

### **Notification medium**

- >\_ Telegram
- >\_ Facebook Messenger
- >\_ Slack

### **Exchanges**

- >\_ Include
- >\_ Exclude
- >\_ Tickers
- >\_ Include
- >\_ Exclude

### **Volume change**

### **Price change**

### **Signal confidence**

- >\_ Low
- >\_ Moderate
- >\_ High

### **Signal direction**

- >\_ Up
- >\_ Down

# News delivery as a signal

The users might also trial the news delivery feature where given a filter on ticker, a notification will be sent when a news article, tweet, reddit post, YouTube video or other social media post is created. More details will be covered in the News section of the whitepaper.

This feature allows users to react both on price change and on news delivery, which might in turn influence the short and long term price of the market. This is extremely valuable given the recent developments where individuals such as Jamie Dimon and expressed public opinions about certain projects, causing both crashes and upward movements in price. As see in the figure to the right.

**John McAfee** @officialmcafee  
Following

Coin of the day: Digibyte (DGB). Using a Blockchain which is 40 times faster than Bitcoin and having one of the most decentralized mining systems in the world - based on 5 different synergistic algorithms. DGB adherents call the coin "The Sleeping Giant".

[digibyte.co](https://digibyte.co)  
5:07 AM - 23 Dec 2017

3,148 Retweets 8,879 Likes

1.6K 3.1K 8.9K

## DigiByte Charts



# Signal anatomy and validation

The definition of signals in our system relies on a variant of MACD (Moving Average Convergence Divergence) with some added factors specific to the cryptocurrency market space.

The unit of time chosen here (1 minute) is not arbitrary, but confined to the rate limits of the API of the exchanges, that allows us to continuously poll ticker, trades and order book information from an exchange.

The interval window for changes are calculated on a 24 hour basis.

A signal notification is composed of several fields, whose values are calculated based on the 1 minute time interval. We consider the following fields essential in investigation and validating the signal not only by our system, but also by the user.

## **Ticker**

The name of the market that triggered the signal. This is usually a 3 to 5 letter indicator. Attached to the ticker is a link that allows users to directly navigate to the exchange.

## **Exchange**

The name of the exchange where the signal was detected. This is relevant to check whether it is an isolated change or if the arbitrage system is not aware yet, thus allowing exclusive deals on the other exchanges that have not caught up yet.

## **Rate Change**

The change in the amount of trade volume that triggered the signal.

## **Price change**

The total price expressed as a percentage.

## **Volume change**

The volume change of the market referenced by the ticker. For readability purposes it is also expressed in BTC and USD. This gives the users a more human way of interpreting the numbers.

## **Advice**

An advice generated by our recommendation system. More details below.

# Advice and Recommendations

One of the most interesting features is the trend-based action recommendation system, that allows the user to poll the feeling of the market at any given time.

Disclaimer: The signals are not financial advice and should be taken as is. Following these signals does not guarantee exact returns and should be considered a tool in aiding the decision making of the user.

The actions that are recommended are either buy or sell, based on the differences between the upward and downward trends, the price change and the volume changes within the last minute.

We then interpret the values in the form of confidence that is expressed in a human readable format:

- >\_ Low - negligible trend difference
- >\_ Moderate - important trend difference
- >\_ High - significant trend difference

The above mentioned confidence levels are based on a variable indicator which depends on the individual ticker price.

It should be noted that low confidence indicators can also be valuable in detecting the accumulation phases and emerging market interest.

## Combining news and signals

As mentioned before, certain news can sometimes have a dramatic effect on the market, based on the source of the news and the power of influence of that source. In order to increase the confidence of the recommendations and boost the strength of a signal, we compute the influencing factor of a news article. This factor is ultimately used as a padding value to the computed signal values. The single value is derived from a more complex variable that takes into account the following:

### **Official source**

Whether the source of the article is an official source (official twitter handle, official subreddit, etc.)

## **Single mention**

Whether the coin is mentioned alongside other cryptocurrencies or is purely a dedicated article.

## **Virality**

If the article was already posted before the market signal, it is possible to monitor metadata such as retweets, shares and views. This way you can effectively measure the spread of the article and reduce or increase the importance based on the distance between the signal and the news event.

This feature is an ever evolving procedure that is tuned and adjusted along the way, after validation.

## **Wallet contents**

One of the most useful features once the user has configured the signal preferences (<https://brobot.tech/user/notifications>) is the ability to influence received news signals weight based on the contents of the wallet. The information read from the wallet is stored only on user request, cached securely (encrypted) and only read when querying for relevant news.

A practical example can be querying for wallet information on Bittrex, where you hold DigiByte and Reddcoin. The algorithm will then personalize the results and rank news containing these coins, higher. This allows a zero configuration personalization mechanism based on the user's portfolio.

Remark: It should be noted we currently support the top 200 coins ranked by market cap. We will shortly extend this list to have greater coverage.

# **Chatbot Action Follow Up**

As discussed in the Chatbot chapter the user will be able to perform trading tasks based on intuition or the signals received including recommendations. This is extremely useful as it allows user to buy currencies without having to login to the exchange, which might slow down the buying process.

A potential scenario would be the following timeline:

- >\_ The user receives news regarding an important announcement later during the day
- >\_ The user receives a signal that the price of a currency has changed by +4% in the last minute. The user will not take any action yet.
- >\_ The user receives a second signal indicating a +5% change with a strong recommendation to sell
- >\_ The user decides to buy the currency using the chatbot with a prospect of potential gains

# News Aggregator

## What to expect in this section?

29 Intro

30 Visualizing and receiving news

33 Extracting information from news

34 Future plans



# Intro

The cryptocurrency market is one of the emerging financial sectors that does not make use of traditional printed media and is digitally distributed through social media, forums and specialized cryptocurrency publications.

Since the inception of Bitcoin in 2009, the technology has remained under that radar for a period of time until recently, where the audience has started realizing the benefits of blockchain-based currencies. Prior to that moment, communication and development was limited to exclusive groups and forums (ex. [bitcointalk.org](http://bitcointalk.org)) who are extremely passionate about the technology behind cryptocurrency and its potential.

After recent price surges in the last couple of years, Bitcoin and other alternative cryptocurrencies have begun receiving a great deal of attention both from classical media and social media channels, effectively becoming a wider known trend within the general audience.

# Problem

The rise in popularity prompted an explosion in the number of social media outlets, specialized publications for individual cryptocurrencies, the ICO (Initial Coin Offering) phenomenon and even blockchain based media such as Steemit. Soon enough, this explosion created an abundance of material that could be digested by users worldwide.

Along this event came also the realisation that there was too much information all of a sudden, and the user would have to spend large amount of times sorting through the materials and sources to get a feeling about the state of the market.

# Solution

Our solution to this problem comes in the form of a news aggregator that curates sources based on content quality, user adoption and diversity of the media (video, text, tweet, etc).

Currently we are collecting on average, approximately 15000 articles every week ( $\pm 2000$  per day) from over 180 sources that include the following:

Classic media such as Cointelegraph or The Merkle and currently 25 similar outlets

Social media such as:

>\_ YouTube

>\_ Reddit

>\_ Twitter

Specialized media such as:

>\_ Steemit

>\_ Bitcointalk\*

ICO Trackers such as ICORating or Coinschedule and currently 7 similar outlets

\* Currently behind the scenes for weighing purposes

The information for classic sources is updated on average every 5 minutes whereas Twitter, Steemit, Youtube and Reddit are updated instantly and propagated to the news stream. We use only official feeds and do not rely on other 3rd party sources. We believe the only source should be the original one.

It should be noted that our retention policy for news is 7 days after which we deprecate existing news articles and lower their rank.

## Visualizing and receiving news

Currently we provide 3 options to visualize news

1) On our website (<https://brobot.tech/news>)

2) On demand by issuing a news command about a coin using the chatbot (ex: news bitcoin)

3) Receiving news as signals automatically sent by the chatbot

### Website News Aggregator

Our current implementation found at <https://brobot.tech/news> displays in a simple format the latest news. The user is presented with 2 options, one for classic sources and another for community sources such as social media, as seen in the next figure.



### Mining With Energy From Humans - Is it Really Possible?

A Netherlands-based company has pioneered a way to harvest energy from body heat to power cryptocurrency-mining computers - but is it really worth it? ...

[altcoin](#)[bitcoin mining](#)[bitcoin](#)[energy](#)[cryptocurrencies](#)

### The Psychology of the Cryptocurrency FOMO-FUD Cycle Has Been Weaponized

17 minutes ago | classic:BitcoinCom



### Mining With Energy From Humans - Is it Really Possible?

an hour ago | classic:Cointelegraph



### Bitcoin Fork Updates Blockchain With A New Familiar Feature

an hour ago | classic:CryptoPotato



### Blockchain Technology Can Bring Efficiency and Transparency to Crypto Markets

an hour ago | classic:CoinIdol



### UK Garbageman Now Accepts Bitcoin Payments

2 hours ago | classic:BitcoinCom



### DigiByte Climbs Cautiously After McAfee's Recommendation

2 hours ago | classic:Cryptovest

[Load more items](#)

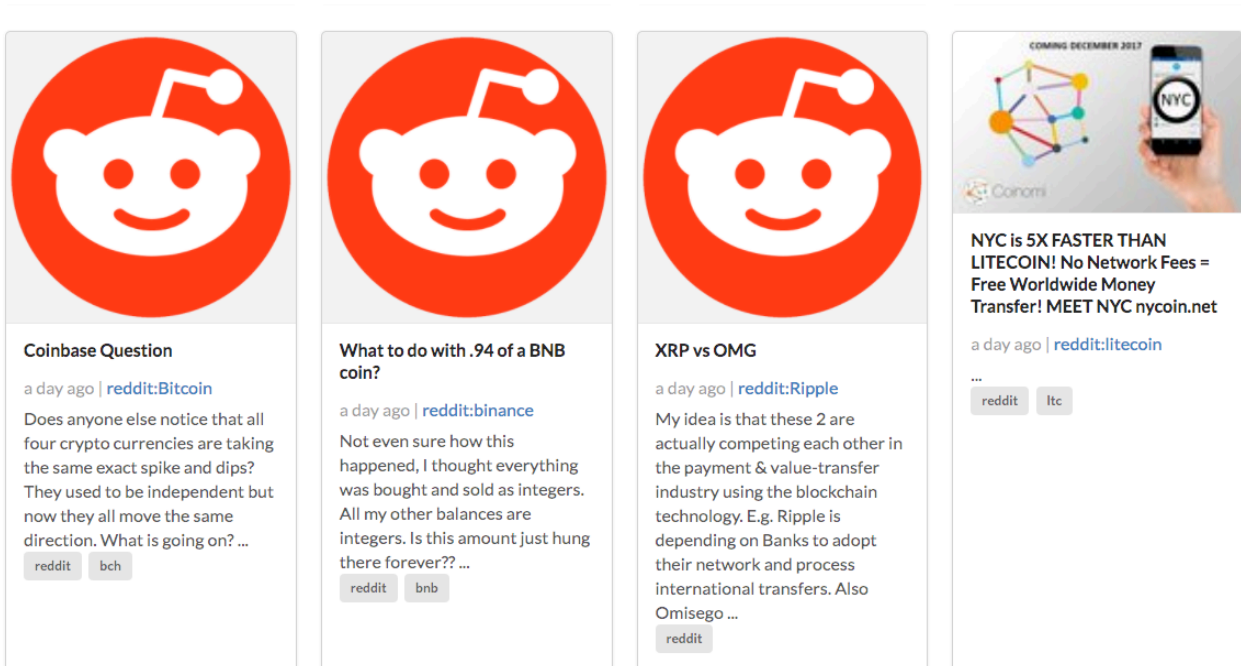
For classic media the user is able to search through the content of the articles and find any keywords or sentences matching their preferences. The search engine also allows users to search for specific tickers or cryptocurrencies, or a combination of these. For example the user may search any articles matching "mcafee" and "reddcoin" to find relevant information.

By default only a handful of articles are shown in the navigation bar on the right side, but the user can request more by clicking "Load more items".

The second part of website news display includes what we call community posts, consisting mainly of social media posts. These are not necessarily official posts from publication or the team behind a project. Therefore, any information found here should be considered with caution. This section provides information as it happens, on an event basis and can be very useful to poll the feeling of the community in general.

## Community

TWITTER, REDDIT AND OTHER COMMUNITY POSTS



## News signals

As mentioned in the Signals chapter the user can opt in to receive notifications about certain markets or tickers when they are detected in the source of the article. These settings can be found at <https://brobot.tech/user/notifications> and can be quite powerful in aiding the user to get a head start regarding a potential trend. In addition to this the signals received are influenced by the contents of the wallet, therefore news relevant to the user have a higher weight.

## Using the Websocket API

We love sharing our hard work with others, therefore we have exposed our sources to the public so that others can use our data and help the crypto community grow.

The Websocket API allows users to receive news at the moment when they happen, effectively allowing them to create their own news websites, alert mechanism and analysis tools.

More documentation can be found here <https://brobot-team.github.io/>.

A working example of a news aggregator can also be found here <https://brobot-assets.s3.amazonaws.com/examples/news.html>

## Ranking news by impact and weight

Our internal data collection system performs additional tasks such as retrieving information regarding official news sources for any cryptocurrency project within the top 200 ranked by volume.

These official sources may be one of the following:

- >\_ Twitter handle
- >\_ Youtube channel
- >\_ Facebook page
- >\_ Steemit ID
- >\_ Medium Page
- >\_ Github account

In the near future, Google Trends will also play a more important role. Currently we are experimenting and validating this solution.

The next step is to extract meta-information regarding such news sources, for instance:

- >\_ Number of followers
- >\_ Views
- >\_ Likes
- >\_ Other relevant metadata specific to a source

The ranking system affects the order of the news in the feed and may also affect the ranking of the signal when delivered to the user when the configuration covers the news target.

## Visualizing and receiving news

The platform offers users the possibility of reading a short summary of the article, following the link to the original website or viewing the tags associated with the article.

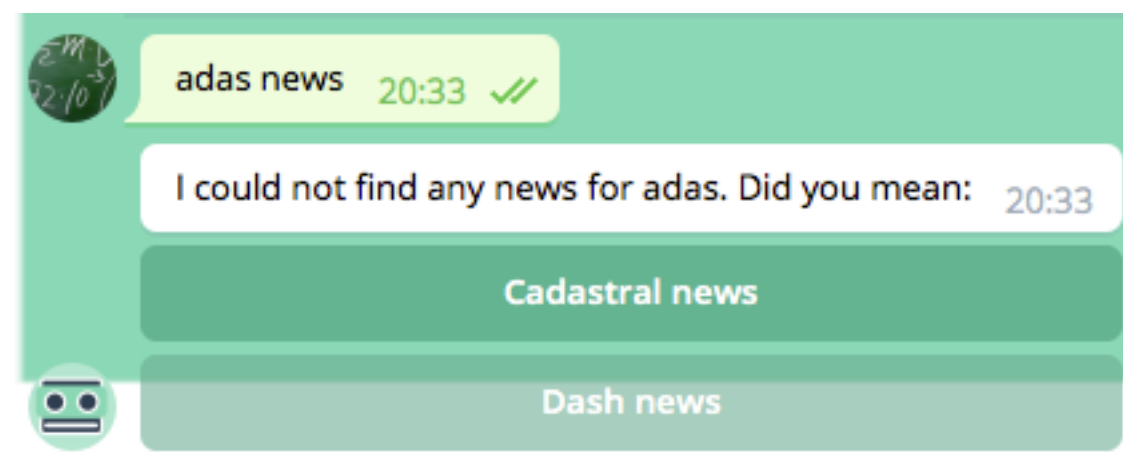
Behind the scenes, our collection system also performs a detailed analysis in an attempt to detect events, personalities, and most importantly: mentions of cryptocurrency tickers and events.

The collection system applies the NER (Named Entity Recognition) information extraction method, where relevant pieces of text are found in the text, ranked and identified as being a part of speech (i.e. noun) that is relevant in the cryptocurrency space. The extracted tags are then used to enrich the news articles with valuable data, which can also be used to influence the results of the signal.

# Future

Future plans for this project include a complete revamp of the UI that will include a rich range of information starting from simple information about the source of the news, sentiment analysis on the content, evolution of the price and volume and correlations with other events.

This is discussed in detail in the Milestones Chapter regarding the 2nd Milestone.



The process is that we first disambiguate what action is trying to be initiated, followed by the search of a coin from the message and returning the nearest match. Only if none of the conditions are met will we return a help instruction on how to use that specific command.

## Subscription

On first interaction with the chatbot the user is subscribed to an automatic notification system. This system delivers once a day messages that informs on the general market status. This message is identical to the status command and is generated when the message is sent, to ensure accuracy. Groups can also be subscribed and treated as a single user. The purpose of this message is to engage users into exploring more about the cryptocurrency world, check the latests news and other significant events.

## Limitations

Depending on the platform we encounter certain limitations.

Slack and Telegram allow only 1 message per second on average and Facebook Messenger 60 messages every hour per user.

# Future

As mentioned before, our future plans include the development of an inhouse chatbot that will get rid of the current limitations and can be fully customizable.

Customization covers both the visual aspect of the chatbot interface and the content of the messages received based on the user's previous activity.

For more information please check the Milestone 2 section.



# API and Security

## What to expect in this section?

37 Websocket API

37 Security

# Websocket API

## Websocket API

The Brobot team believes in transparency of data, and knowledge sharing. Our efforts put into data collection, curation, transformation and structuring would remain behind the scenes if we would not share this digital wealth. The intent behind exposing the collected data is to give users the ability to replicate our results but also to incentivise building new applications and creating features using the raw data.

The data gathered through our collection systems originate from exchanges and news feeds of various types, which we have mentioned in the Signals chapter.

Currently we collect data from the top 12 major exchanges based on market cap. This list will expand further as new exchanges are integrated. Data is delivered as events via a websocket. Events such as market data and classical news which need to be read from the feed at an interval, have a maximum 1 minute delay from the publication time. Social media article such as Twitter and Reddit will be delivered when they are posted.

For more information about the usage of the Websocket API please visit <https://brobot-team.github.io> . We also provide a demo app for this purpose <https://brobot-assets.s3.amazonaws.com/examples/news.html>.

## Security

One of the core issues in the cryptocurrency space is represented by the security of the assets. Users have multiple ways of storing their assets, be it a "paper" wallet file, a hardware wallet or generally the wallets issued and controlled by an exchange. All these options have their advantages and disadvantages, and of course nothing can be 100% secure; exchanges can be hacked and wallets can be stolen (even physically).

Our solution relies heavily on communicating with the exchanges via their APIs. This is performed on a regular basis on the demand of the user only. Brobot does not and will not perform any requests on behalf of the user unless asked to.

## Virtual Private Cloud

Our entire application functions within a Virtual Private Cloud that only allows communication with the outside via the HTTPS port. This ensures complete control over the resources and encloses the services in a sealed environment that cannot be accessed from the internet.

## Website

The first layer of protection happens in the Brobot backend, where we secure our domain using an SSL certificate, ensuring all communication happens via HTTPS. Users are also required to confirm their email addresses as part of the registration process to avoid any account hijacking.

The website is also subject to regular automatic penetration testing to avoid vulnerabilities with new package releases, ports and resources that should not be accessible to the public.

In addition to this the application possesses an anti DDoS (Denial of Service) mechanism that will limit user requests, similar to cloudflare.

## API keys

One of the most difficult challenges we needed to solve was the security of the API keys when being stored, decrypted and then used to communicate with the exchange. Feedback from the community has pushed us to always improve the security aspect of this process to the point where the user can trust the application.

We always advise users to use Read Only keys in the beginning so that trust can be built along the way. We do not support any withdrawal operations as this is extremely risky for both parties. Currently the operations that requires the most security are the trade actions such as sell and buy.

The process of saving the credentials begins when setting up a Broker in the backend. The first security measure is to remove the autocomplete feature from any of the fields and to not be able to view the secret key when entered. When a broker is created, the keys are encrypted and sent internally to our storage system, where they will remain encrypted until the user requests them. We do not store any sensitive information in cleartext.

Another aspect of this process is that the storage process is a one time, and one way action. This means that the keys are only sent once to the storage system and never retrieved again by the backend of the application.

The only means of communication with the exchanges is a services that handles outgoing requests and is not able to receive any incoming requests of any sort.

## **2FA**

Users who wish to perform trade actions such as buy and sell must first enable Multi Factor Authentication using a virtual device such as Google Authenticator. When the user has enabled this feature trade, operations must be accompanied by a 6 digit code generated by the MFA device. This extra layer of security is a much needed feature to establish trust.

## **Communication with exchanges**

Upon user requests the keys will be decrypted and sent securely to the API of the exchanges. This action is performed only when the user requests it.

## **Storage**

Since our applications and services run entirely in the VPC the storage systems are isolated even further, not being able to communicate except with certain services via secure protocols.

The disk space where the data resides is also encrypted at rest as an extra security measure.

## **Encryption keys rotation**

Our security policy ensures a strict, random encryption key rotation that is performed regularly. Rotating the keys represents a huge benefit in terms of security

## **Backup**

We perform regular backups of the system. Data is encrypted before archival and stored on backup storage systems that are also encrypted at rest by default. Backups are deleted regularly as well and are only meant to be used in extreme cases such as databases failures.

# Roadmap

## What to expect in this section?

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# History

In June of 2017 the Brobot team built the first prototype of the Pumpbuster, as a counter to the ongoing pump and dump schemes. The purpose was to advise us what not to invest into, when certain patterns were detected. The bot was initially inspired by another project called BeatBot, capable of playing YouTube videos via Facebook Messenger.

Once we realised that more users were interested, we quickly ported the chatbot to Telegram and Slack and made it public. Since there was no way of configuring the information received from the bot, the next endeavour was to create a platform that allowed user to create an account and link it to one of the chatbots.

Further along the way the chatbot was enriched with new features allowing it to also interact with users' wallet found on various exchanges such as Bittrex and Poloniex. Since the chatbot acted as a broker between the user and the exchange, it felt natural to name the project BroBot.

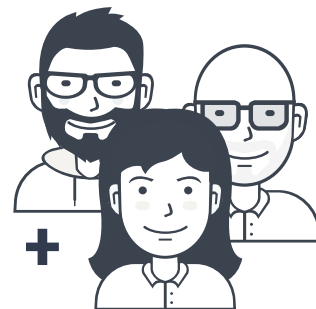
As the platform grew there were more needs coming from user feedback, that inspired us to create commands that support news search, trading actions and general market information queries. Since we wanted to give something back to the community we have also decided to expose our collected data via an API, to inspire developers to build great apps and features.

# Milestone I

The first milestone consists of a series of major improvements to both the Brobot team and the application that we deliver.

## Team Expansion

Currently we are working with a relatively small team of people, that is passionate about the product and its development. Our ambition is to double the team in the near future and create specialized roles for development, design & UX, marketing & PR finance and legal work.



## Backend UI Revamp

The Brobot backend has been in development for approximately 6 months and has suffered numerous modifications that improved the general user experience repeatedly. To fully deliver the best user experience we will be looking at the Backend with fresh eyes and start from scratch with a shiny new UI that will allow users better configuration and more intuitive filter settings.

Our plan is also to create User Profiles / Personas that are preselectable and can be used both by entry level users and experience users to set filter options. Such profile can be a Bear / Bull profile where the users only looks at Upward market movements, or a whale profile where users look at large transaction volumes that were displaced. More details can be found in the Target Audience section.



## Inhouse chatbot and Mobile App

One of the current limitation with the messaging platforms is the rate limiting performed on the server side of the provider. In some cases users are limited to 1 message every 2 seconds. While this may not be a problem for individual users, group users might suffer because of this limitation, especially when multiple users are asking for information at the same time.



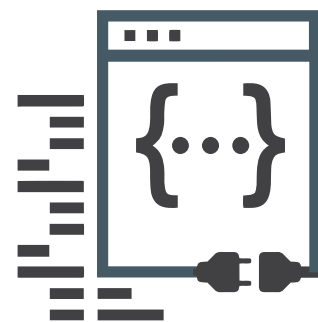
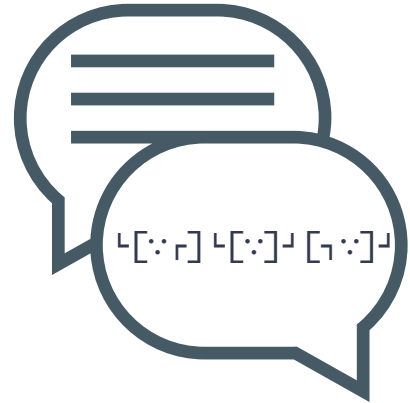
Another limitation is the styling factor of the messages. Messages are currently adjusted to fit the templates offered by the messaging platforms. These templates can be very strict at times, and complicate development greatly, since they are not compatible across platforms and the user might be confused to why they have a different look.

To mitigate this our plan is to first construct an inhouse chatbot, virtually limitless in terms of what it can deliver. This solves both the issue regarding the styling of the messages which will be uniform and the rate limiting problem, allowing users to receive a stream of messages at any given moment.

Brobot's main advantage is that the user can access the data from anywhere at any time and does not need any special software running locally on the user's device. To continue this tradition we will extend the reach of the inhouse with a mobile application that is built specifically to handle Brobot data; the lightweight application will not suffer from any bloated and over complicated features.

### Early access to Event API

As mentioned in the API Section we want to remain transparent with the data we collect and the techniques we apply, thus allowing users to access our data in a programmatic way using the API. Given the high amount of data delivered this feature will have certain tiers and limitation that will apply to the free usage.





## **Access to more exchanges**

Currently we support the top 6 exchanges based on market cap. The user can couple these accounts with Brobot and begin trading and checking their wallet. In the future we would like to expand this list to cover lesser known exchanges as well, and provide support for the up and coming ones. This will allow new users to also benefit from Brobot.

# Milestone 2

The second milestone will cover innovation and major functionality improvements that will enrich the chatbot with new behavior and make it even more adaptable to user needs

## .NLP & Conversational Chatbot

One of the experiences that can make or break interactions with a chatbot is the flexibility of the responses from the chatbot. The chatbot must tolerate user mistakes and respond appropriately and helpfully. To counter this we have several fallback scenarios in place where the user detects the context and tries to approximate a good answer.

It happens very often that users who are not familiar with what a chatbot does try to write very extensive commands such as "What is the price of Dash today?". Our intent is to create an NLP (Natural Language Processing) model specifically for the cryptocurrency space that can detect user intent and respond as best as possible.

This step will consist of the following:

- >\_ Collecting and creating data for the training of the model
- >\_ Validating the model with actual user input
- >\_ Performing A/B testing to perfect the model
- >\_ Deploying the model and use a feedback loop to continuously learn and adapt

There are some limitations to this model that are put in place on purpose, such as when issuing trading commands. That is one of the situations where the user will get a confirmation question before executing anything.



## Multilingual Support

The NLP model sounds great but what about users who are not very fluent in English or would like to use some native device features of the phone to rapidly enter commands?

In order to solve this issue we will apply to model to several languages, fully configurable by the user in the Brobot backend. This will not only smoothen the overall experience and give it a personal touch but will also facilitate the entry of new users in the cryptocurrency space that might have been intimidated by language used in this field.

Multilingual support will not only apply to commands and bot interactions but also to the signals and news received which will be translated using a best effort method such as Google Translate.

This decision on which languages to include will be inferred primarily on the user base that we have and also on request.

## Portfolio tracker

Although multiple portfolio tracker solutions exists, we are not trying to reinvent the wheel. Our aim is to make Brobot a complete solution, that has all the necessary tools in one place. Currently we present the users the status and 24 hour changes of the wallet, but our higher goal is to have a solution that not only allows users to monitor each individual asset across multiple exchanges and get a full summary on demand.

The portfolio tracker will allow users to check the latest signals and news for an asset, the market sentiment and other rich information that will aid in trading.



## Sentiment Analysis

One of the top influencing factors in the cryptocurrency space has always been the sentiment of the market. Regular businesses which are covered by the mass media make polling and sampling of market emotions much easier.

Although there are emerging media outlets that have begun covering this topic exclusively it might still be difficult to get the general market feeling, and even more difficult for a single asset.

Our solution is to analyze each individual cryptocurrency and its related news source and groups. This will allow us to construct the big picture of the overall market from the individual pieces with greater accuracy.

The applications for this metric are huge, ranging from influencing market signals and creating signals based on mood change, to enriching the news aggregator items with the influencing factors and virality of topics.

## **Community Programs**

The community around us has been a crucial factor into developing the project as it is today and we believe in its ability to continue helping us achieve our goals. Brobot is not only a data-driven project, but also a community-driven venture. We are proud to say that listening to your valuable feedback and your needs have been materialized into the groundwork of Brobot.

The demand for community involvement from responsible and sustainable ventures is at an all time high and while the list of actions is not definitive, here are some of the points on the action list:

- 1) Partnering up with foundations that require support to carry out their activity towards increasing technological literacy, access to technology and bettering life through technology
- 2) Supporting ambitious projects that will be where we had already been, with advice and funds where necessary
- 3) Pro bono advising from a team that is seasoned with the ICOs and cryptocurrency world
- 4) Token rewards for involved users and sustainable development ideas
- 5) Scholarships for talent in tech
- 6) Rewards for referral, bug hunting and creative marketing campaigns

This final point under Milestone 2 is of high relevance to us, as it could be one more piece of evidence about our attitude towards this project. In an industry dominated by soulless products and functions, where no attention is given to their intrinsic value and their users, Brobot is stepping in to offer a complete tool that considers all the necessary aspects of a functional business.

# Milestone 3

This final milestone consists of series of advanced features which will need significant amounts of time and resources to implement, test and validate. This final milestone will consolidate Brobot as a complete solution and allow advance usage, flexible enough to be scalable and allow the addition of new tech.

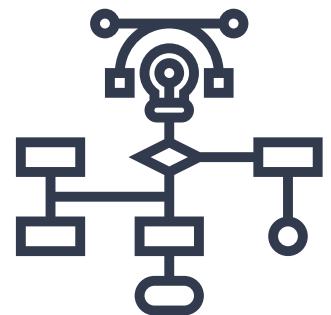
## Advanced Signaling & Machine learning filters for API and Signals

The current signal mechanism and filter options are a robust solution to monitor certain events that the user can validate. There are events, which are more subtle and only apparent when using specific types of filters and apply specific technical analysis methods to the data.



## Machine learning on transaction data

Machine learning has proven to be a particularly useful tool when it comes to detecting underlying trends in the data, phenomenon such as "dark data", and unobserved variables that cause certain behaviour. Given the highly volatile nature of the cryptocurrency space, it proves to be a good candidate for applying machine learning algorithms.



In our case we propose to use the following algorithms to determine what actions to take given a certain market or news event.

- >\_ Nearest Neighbors
- >\_ Linear SVM
- >\_ RBF SVM
- >\_ Decision Tree
- >\_ Random Forest
- >\_ AdaBoost
- >\_ Naive Bayes
- >\_ Linear Discriminant Analysis

The user will have the ability to apply any of the filters above and get a certain result for an event (signal), allowing the customization and management of the signals in a system such as a committee machine. The committee machine will be able to infer which filter has been the most successful and use it accordingly. In some other cases the user will get combined result of the filters and use each filter with a specific weight based on previous performance during the validation period.

## **Technical Indicators**

Another way of validating and asserting certain hypotheses is to use technical financial indicators. These indicators are popular in the classic financial world such as foreign exchange, stocks and other asset trading.

Our proposal is to provide user with the ability to use these technical indicators to analyze the the incoming signals either standalone or a combination of them. Additionally the user can combine these indicators with the machine learning indicators to ensure full flexibility of choice when it comes to choosing which tools and methods to use.

The type of indicators that will be used will be found in the following categories:

- >\_ Overlap Studies (ex. MA, EMA, HT)
- >\_ Momentum Indicators (ex. MACD, MFI)
- >\_ Volume Indicators (ex. Chaikin)
- >\_ Volatility Indicators (ex. true range, average true range)
- >\_ Price Transform (ex. average, median)
- >\_ Cycle Indicators (ex. Hilbert transform variants)
- >\_ Pattern Recognition (ex. Hikkake, Ricksaw)
- >\_ Mathematical and Statistical functions (ex. variance)

## **Recommender System**

Currently the recommendations done by our system are attached to a specific signal, which usually come in the form of an action (whether to buy or sell).

In the future we plan to create a recommendation system that is based on user behaviour on both the Brobot platform and on the exchanges that the user operates on. An example for this behaviour would be recommending:

- >\_ New ICOs to invest in
- >\_ News outlets or tags to follow based on preferences
- >\_ Intelligent signaling outside the normal defined schedule
- >\_ Filter or combination of filters to apply to maximize profits
- >\_ Amount of net worth to invest in certain assets

The aim of the recommender system is to guide the user and work as a consultation mechanism that can validate current beliefs or try out new ventures. The recommender system will also give feedback on the actions taken by the user and show ways on how to improve strategy.

## Educational Division

As previously mentioned, Brobot is aiming to become a complete set of tools that fit the needs of as many user profiles as possible. The novel nature of the cryptocurrency space comes with limitations not only in terms of usage, but also in terms of general understanding of the technologies behind it. While the latter can possibly have harmful effects on the overall dynamics of the markets - with, for example, non-investors jumping aboard driven by hype and Fear of Missing Out -, its potential can be turned around towards by:

- 1) achieving a high level of technological literacy,
- 2) learning how to make informed decisions and
- 3) ultimately helping technologies develop in a faster, more harmonious and more sustainable way.

At Brobot, it has become our quest to create an Educational Division heavily focused on offering the community the right incentives to become both better investors and more informed participants in the development of the ecosystem.

The list of planned projects that the Educational Division will entail consists of, but is not limited to crash courses on cryptocurrencies, discussion threads that encourage informed and educated discussions, AMA (Ask-Me-Anything) sessions with experts in the field, academic publications in the crypto sphere or resources for learning how to make use of the data we publicly offer for free.

This way, we stand by our belief that progress can only be achieved through giving back to the community, in terms of access to education and information.

## Chatbot Smart Contract Interaction

The ultimate goal of milestone 3 is to allow users to interact with contracts via the chatbot directly. This implies users would be able to perform actions such as the following:

- >\_ Perform transactions from a wallet
- >\_ Participate in an ICO
- >\_ Call a specific function of a contract
- >\_ Read the state of a specific contract variable
- >\_ Verify account or contract information
- >\_ Verify transaction status
- >\_ Buy assets from decentralized markets such as Etherdelta

While this option will be initially limited to Ethereum based contracts in the future we plan to support all major blockchain implementation, including upcoming ones such as EOS and Cardano (ADA). This functionality provides an important gateway to interacting with blockchain solutions and other applications.

# Team

## What to expect in this section?

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53 Contributors

54 Advisors



# Founders



 **George Visniuc**  
Founder / Tech Lead

George is a senior DevOps engineer with over 8 years of experience in a wide range of tech ventures and the mastermind at Brobot. He has obtained his MSc in Artificial Intelligence at the University of Amsterdam.

He recognizes the revolutionary nature of the blockchain technology and, as an early investor in cryptocurrencies, he has a deep understanding of the shortcomings in this environment.

Brobot is the proof that George is not only passionate about solving real world problems, but also committed to delivering high quality services.

His inspiration for this platform came from personal struggles when trading cryptocurrencies, later escalating into a full stack solution that serves everyone, anywhere and anytime.

George's previous startup experiences, his international background and his technical skills and knowledge fully qualify him to be in charge of everything that technology means at Brobot.



 **Stathis Charitos**  
Founder / R&D

Stathis carries a background in Physics from the University of Patra and in Computer Science from the University of Amsterdam, where he specialized in Artificial Intelligence. He has worked in research and development of web products with a focus on natural language processing and recommender systems in the Netherlands and the United Kingdom and brings in nearly a decade of experience in the field.

Being a strong believer in the potential of crypto markets and their promise of a new way of participating in the world economy, he created Brobot as a tool that could help users be more informed and eager to start actively investing in projects they like. Stathis led the initial R&D for the core Brobot Platform architecture.

# Founders



**in** **Vlad Marin**  
**Co-Founder / Biz Dev**

Vlad is a devoted social entrepreneur with vast relevant experience in business development, marketing and technology. While completing his studies in Economics and Business at the University of Amsterdam, he founded an NGO for students to get closer in touch with technology, with the hope to inspire others to get involved. His passion for both people and tech and his appetite for challenges pushed him into joining the Brobot core team, ultimately taking charge of business development opportunities.

His interests in blockchain and cryptocurrencies go beyond just trading and investing, as Vlad is a strong believer in a future where this tech will solve fundamental societal issues. With his role as the middle ground between tech and business, Vlad makes sure that the two sides are internally aligned in terms of vision and that there is symmetry and harmony with external parties.



**in** **Jasper Roosendaal**  
**Co-Founder / Strategy**

Jasper is an ambitious entrepreneur holding an MSc Sustainable Business & Innovation from Utrecht University. Past ventures include co-founding a consultancy company in the circular economy sphere and numerous other professional and voluntary projects around the world that have given him relevant expertise. Jasper brings in a consistent working style and fresh perspectives on the potential innovations at Brobot.

Jasper has gotten involved in the cryptocurrency sphere back in 2015 and ever since he has become passionate about the applications of blockchain technologies that go beyond only cryptocurrencies. He hopes that his enthusiasm will inspire many others in the race towards a better future. Brobot is the common ground for his entrepreneurial mind and his passion for technology. His role in the team is to create and develop sound strategies for growth, networking, research & development and marketing.

# Contributors



 **Claudio Semeraro**  
Senior Frontend Developer



 **Robert Broersma**  
Full Stack Developer



 **Minha Lee**  
PhD. TUE & NLP Expert



 **Thomas Modeneis**  
Blockchain/Backend Developer

# Contributors



 **Marios Tzakris**  
**Full Stack Developer**

# Advisors



 **Mathias Lutz Rackow**  
Business & Strategy Expert



 **Adrian Lisko**  
Machine Learning Expert



 **Jefferson Martina**  
Senior UX Designer