



CA400 User Manual

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Abstract

SmartPredict is a Web application trading platform which aims to help users make intelligent decisions about buying and selling of currencies (foreign exchange & cryptocurrency markets). This is achieved through machine learning and chart analysis. The application will provide the user with predictions for the market based on the knowledge it has acquired from past data. Recommending whether the user should buy, sell or hold their specific currency according to its current value. A user is able to view the current market sentiment, review the prediction of the machine learning algorithms and interact with charts of past prices data all within the application. The following manual will be a guide to aid the user set-up, install and use the application on their own machine. Download and installation are not necessary to use the application, if the user does not wish to install the application locally it can be found online at <http://kellyb45.pythonanywhere.com/smartpredict>.

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1 Installation

1.1 Python & PIP

In order to install Smartpredict on the user's local machine, some programmes must be installed. The following instructions will assume that the user is using MacOS or Ubuntu and has sudo privileges.

To install Python, the user must go to <https://www.python.org/downloads/> and download python 3.7.

The user must then open the terminal and type the following command to install PIP.

```
sudo easy_install pip
```

Upon installation of PIP, the user will need to go to the following link <https://gitlab.computing.dcu.ie/kellyb45/2019-ca400-kellyb45/tree/master/src> in order to download the SmartPredict source code repository.

1.2 Django & Library Prerequisites

The following libraries will need to be downloaded in order to run the app successfully:

```
pip install django==2.1.5
pip install matplotlib
Pip install sklearn
Pip install statsmodels
pip install keras
pip install numpy
pip install pandas
pip install pylab
pip install seaborn
pip install textblob
pip install tweepy
pip install oandapyv20
pip install coinbase
```

To run the server the user must be working in the directory in which the manage.py file is contained and run the following command.

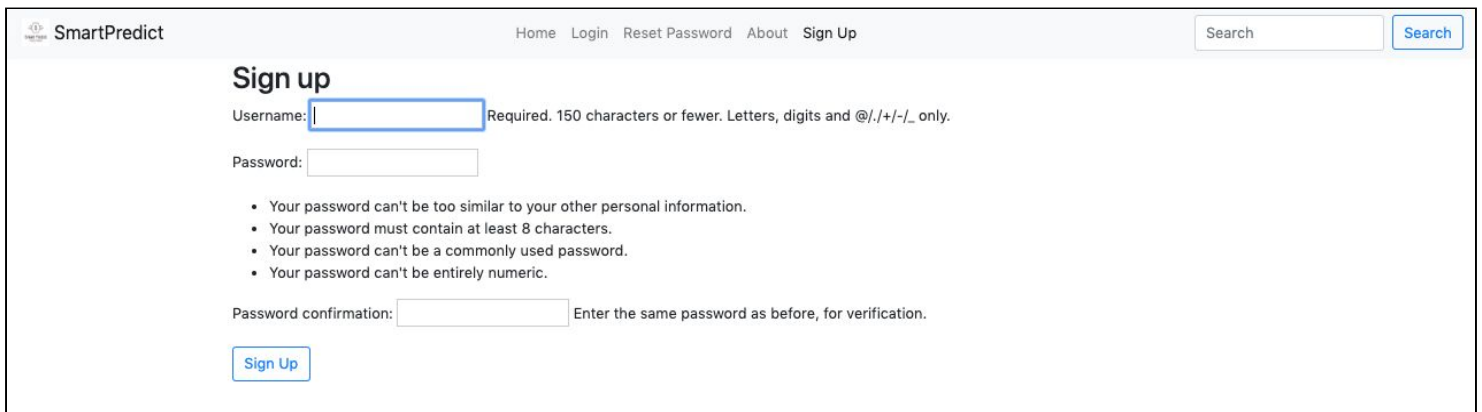
```
python3 manage.py runserver
```

2. General Use

2.1 Registration

smartpredict/register

If a user wishes to access SmartPredict they need only create their account. The user will not be able to access the app until they register. The user will be met with the following screen where they should enter a unique username and a password which meets the requirements specified and click 'Sign Up'.



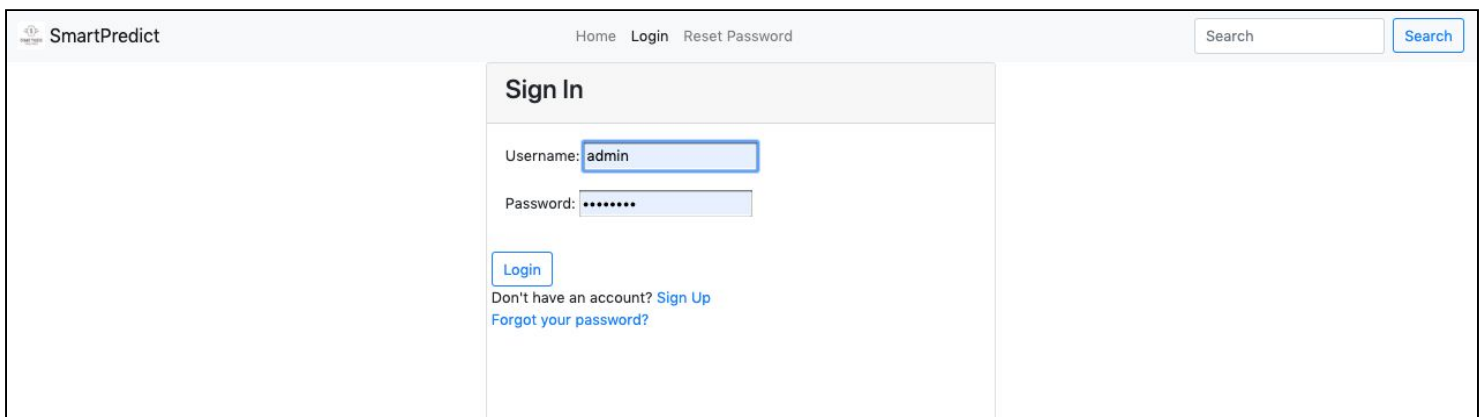
The screenshot shows the 'Sign up' page of the SmartPredict application. The page has a header with the SmartPredict logo, navigation links (Home, Login, Reset Password, About, Sign Up), and a search bar. The main content area is titled 'Sign up' and contains the following elements:

- Username:** A text input field with a blue border. To its right, the text reads: 'Required. 150 characters or fewer. Letters, digits and @/./+/-/_ only.'
- Password:** A text input field.
- Password requirements:** A bulleted list:
 - Your password can't be too similar to your other personal information.
 - Your password must contain at least 8 characters.
 - Your password can't be a commonly used password.
 - Your password can't be entirely numeric.
- Password confirmation:** A text input field with the label 'Password confirmation:' and the instruction 'Enter the same password as before, for verification.'
- Sign Up button:** A blue button with the text 'Sign Up'.

2.2 Login

smartpredict/login

Once registration is complete the user will be redirected to the login page where they should enter the details they just created and press 'login'.



The screenshot shows the 'Sign In' page of the SmartPredict application. The page has a header with the SmartPredict logo, navigation links (Home, Login, Reset Password), and a search bar. The main content area is titled 'Sign In' and contains the following elements:

- Username:** A text input field with the value 'admin' and a blue border.
- Password:** A text input field with masked characters (dots).
- Login button:** A blue button with the text 'Login'.
- Links:** Two links below the login button: 'Don't have an account? [Sign Up](#)' and '[Forgot your password?](#)'.

2.3 About

smartpredict/about

The about page is where the user can gain some more information about the app itself. Here the Functional Specification can be viewed as well as a link to the Gitlab repository. On the bottom of every page, a footer can be found which links to the creators LinkedIn profile.

SmartPredict

Home Logout Connect API About Dashboard

Search Search


About SmartPredict

This is a fourth year project by Ben Kelly, a student in Dublin City University studying Computer Applications with Software Engineering.

SmartPredict is a Web application trading platform which aims to help users make intelligent decisions on buying and selling of currencies (foreign exchange & cryptocurrency markets). This is achieved through machine learning and chart analysis. The application will provide the user with predictions for the market based on knowledge it has gained from past and present data. Recommending whether the user should buy, sell or hold their specific currency relative to its current value. A user will be able to trade, view the current market sentiment and review the prediction of the machine learning algorithm all within the application.

[Gitlab repo](#) [Functional Spec](#)

This is the logo



Smart Predict
Trading Platform

This is a fourth year project by Ben Kelly, a student in Dublin City University studying Computer Applications with Software Engineering: [LinkedIn profile](#)

2.4 Dashboard

smartpredict/dashboard

The Dashboard page is where the user can select which dashboard to view, The two markets which Smartpredict supports are Cryptocurrency and Foreign exchange.

SmartPredict

Home Logout Connect API Dashboard About

Search Search

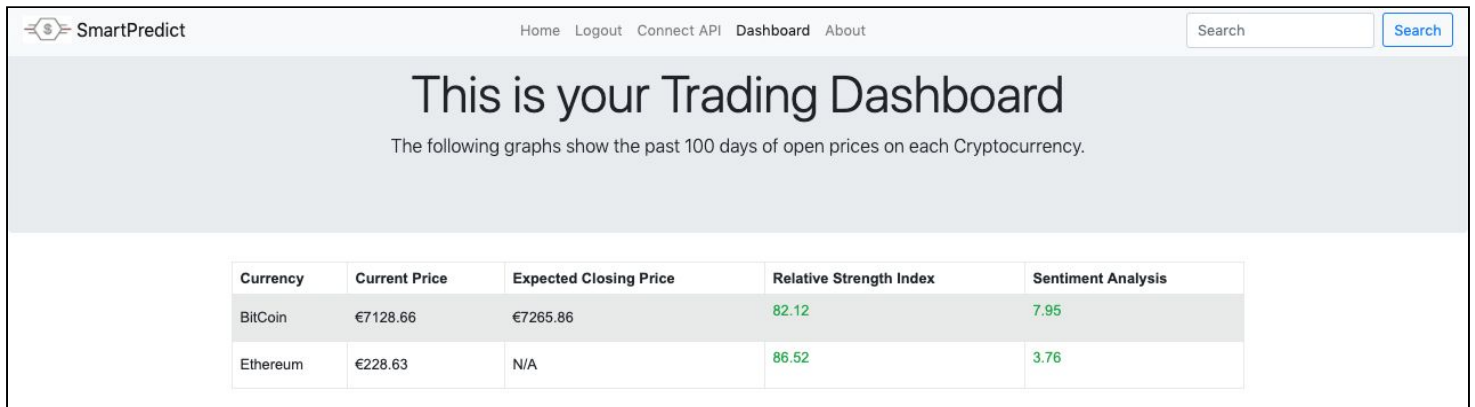
Choose which Dashboard you would like to view.

[Crypto](#) [Forex](#)

It is 10:51 on the 16th May 2019

2.5 Cryptocurrency Dashboard

smartpredict/cryptodashboard



Currency	Current Price	Expected Closing Price	Relative Strength Index	Sentiment Analysis
BitCoin	€7128.66	€7265.86	82.12	7.95
Ethereum	€228.63	N/A	86.52	3.76

The crypto dashboard is where the user can view data on two separate cryptocurrencies. The user is met with a table indicating the following:

- The current price.
- The expected closing price.
- The relative strength index.
- The sentiment analysis.

This is where the user should focus his/her efforts as it contains the most amount of data pertaining to the specified currency. If the user is unfamiliar with RSI and Sentiment analysis the colour of the numbers should be noted. The number will glow:

- **Green** if the number is deemed to be positive/strong.
- **Yellow** if the number is deemed to be neutral.
- **Red** if the number is to be deemed negative not to be confused with a number with a value that is less than zero.

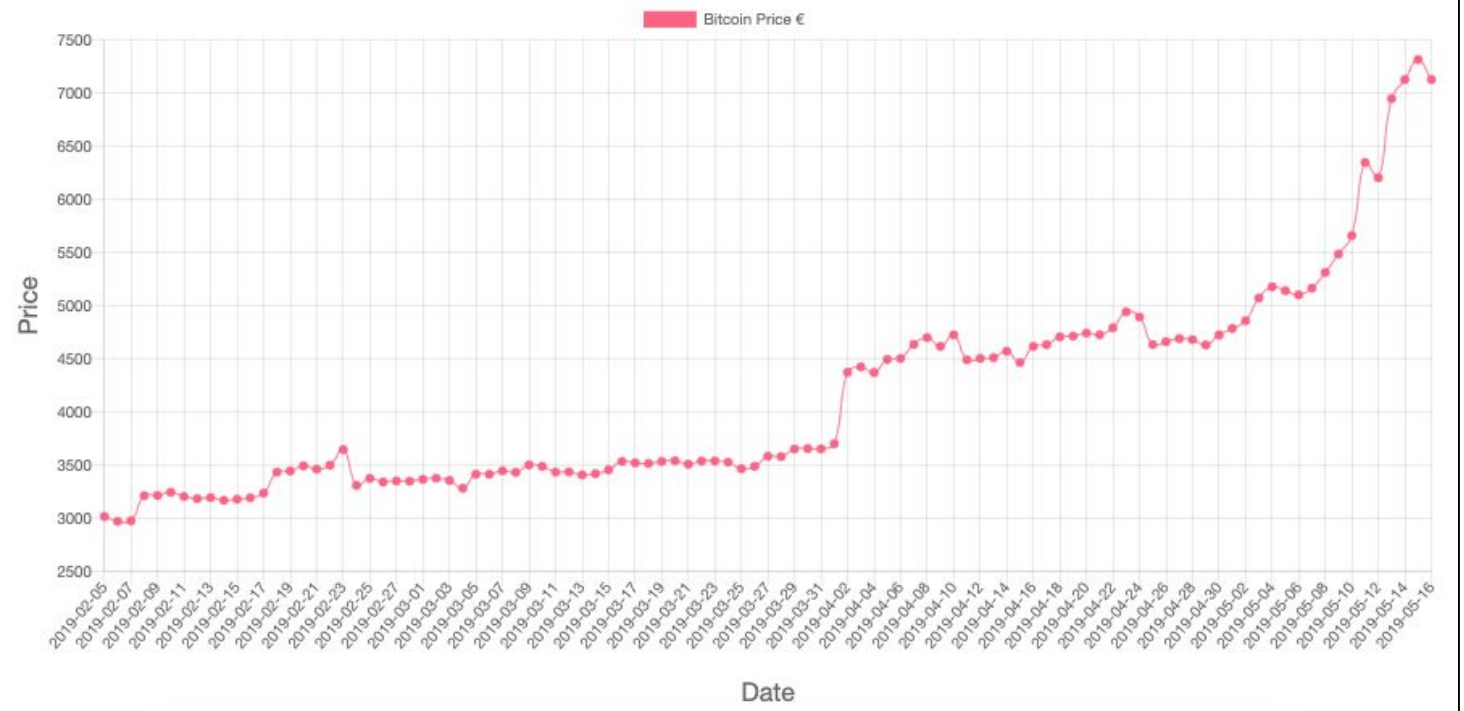
These colours are simply to indicate performance, not the specific number shown.

Graphs of each currency can also be seen, the data is graphed over the last 100 days of trading. The user should take note of the rise and dips of the graph this is where the currency has gained/lost value and may be a good time to buy/sell. The user can hover their mouse over each dot to get more data about each price point i.e. the price in euro and the date. Above the graph, we can see the output of the prediction algorithm as well as the RSI and the current price of the currency. The algorithm itself is Long Short Term Memory (LSTM) model trained on the past 2,000 daily price points (about five and a half years worth of data). If the user wishes to learn more about the machine learning aspect of SmartPredict they can consult the Technical Manual on the Gitlab repository.

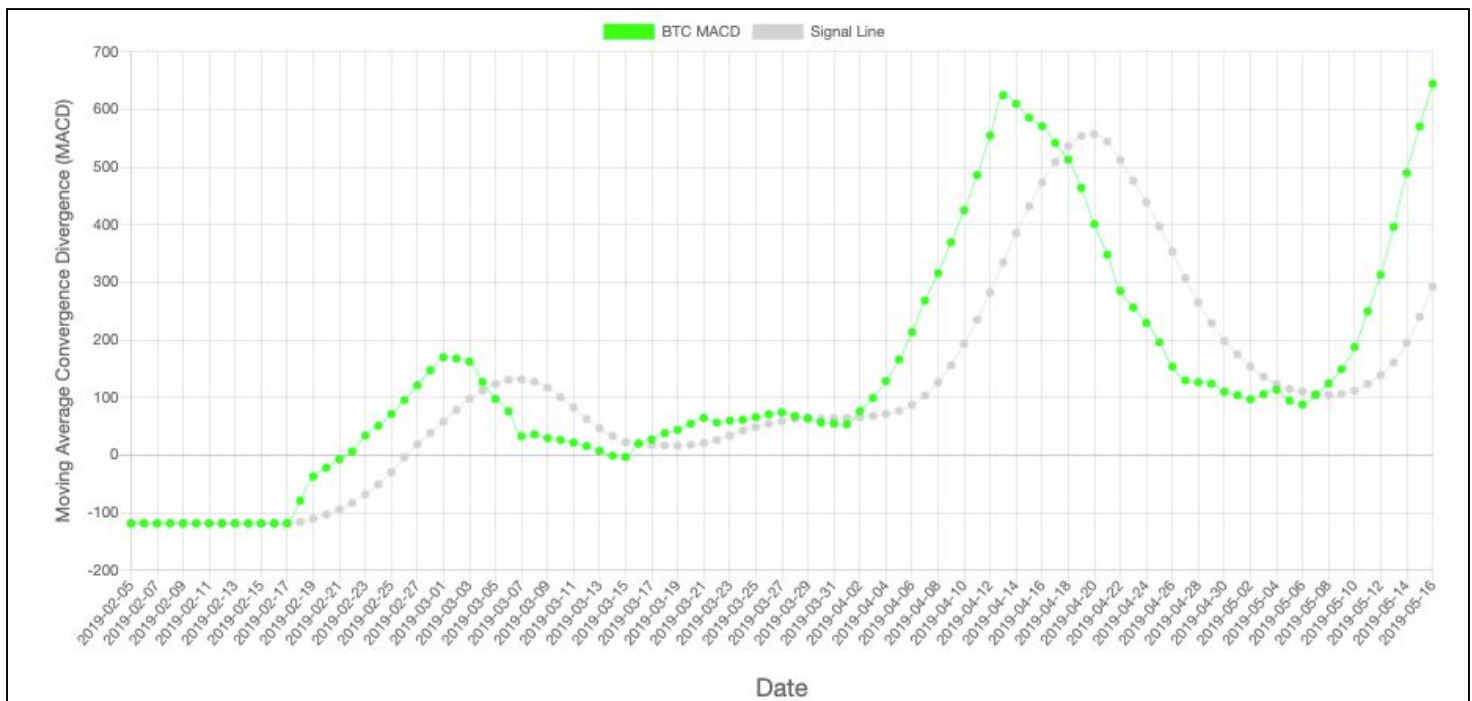
Bitcoin RSI: 82.12

Current Bitcoin Price: €7128.66

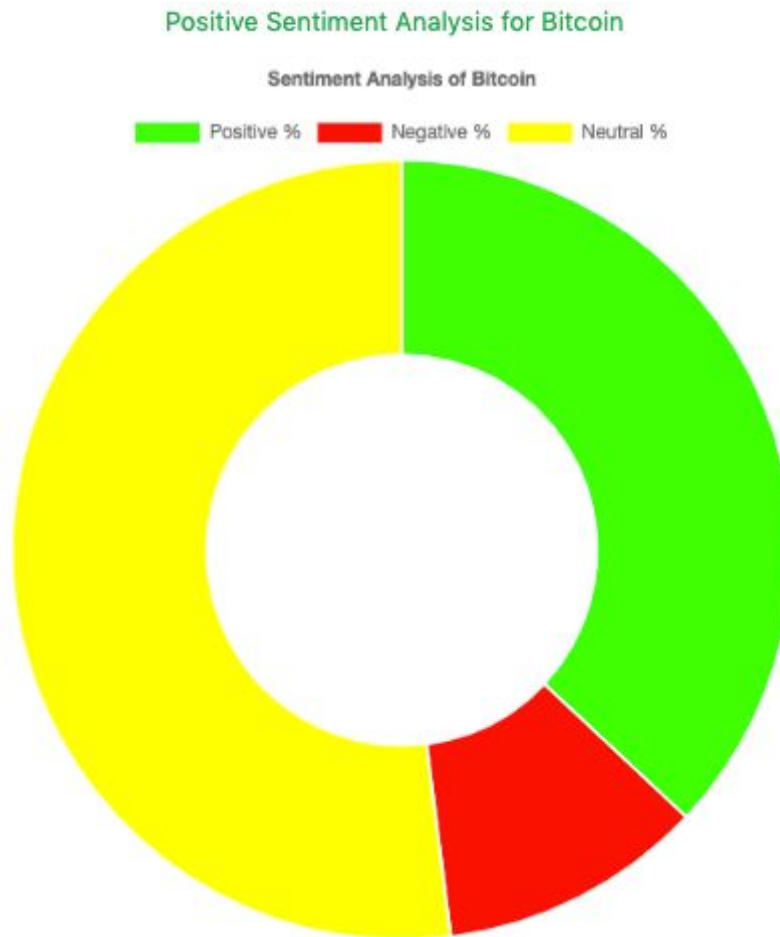
Expected closing price: €7265.86



For further analysis, a Moving Average Convergence/Divergence (MACD) graph is also displayed. This indicates trend momentum and can be useful when looking to invest. The graph is intended to act as a buy/sell trigger to possible investors. Users may buy the currency when the MACD (green line) crosses above the signal line (grey) and sell the currency when the MACD crosses below the signal line.



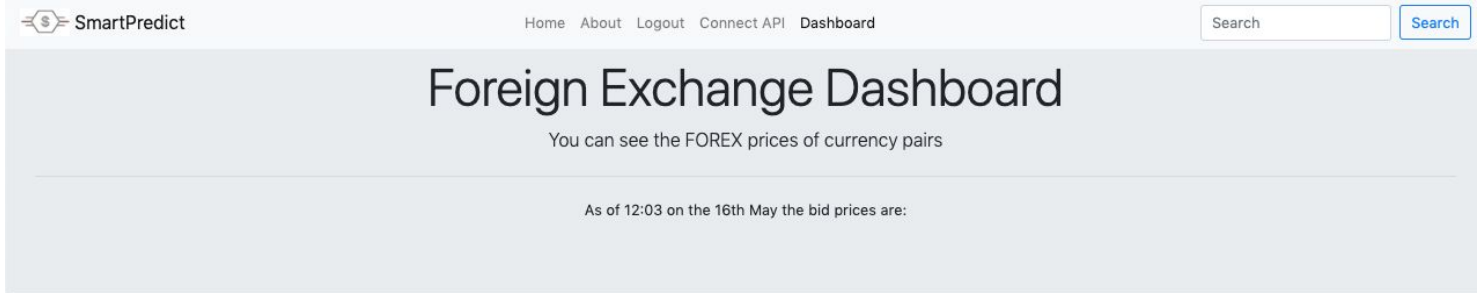
For some less technical analysis, the user can study the sentiment analysis doughnut chart displayed below. Accurately predicting currency prices solely on past data is a challenge, this is why sentiment analysis is utilised, it adds another dimension to the overall prediction. The system analyses Twitter to get a better understanding of what the overall opinion of the currency is. The latest 100 tweets are analysed to determine if they are positive, negative or neutral. The chart is then displayed based on these findings with an overall sentiment statement returned alongside it. Like all the graphs displayed on Smartpredict, it is interactive and a user needs only hover their mouse over the segments to analyse what percentage of tweets was deemed positive etc.



2.6 Foreign Exchange Dashboard

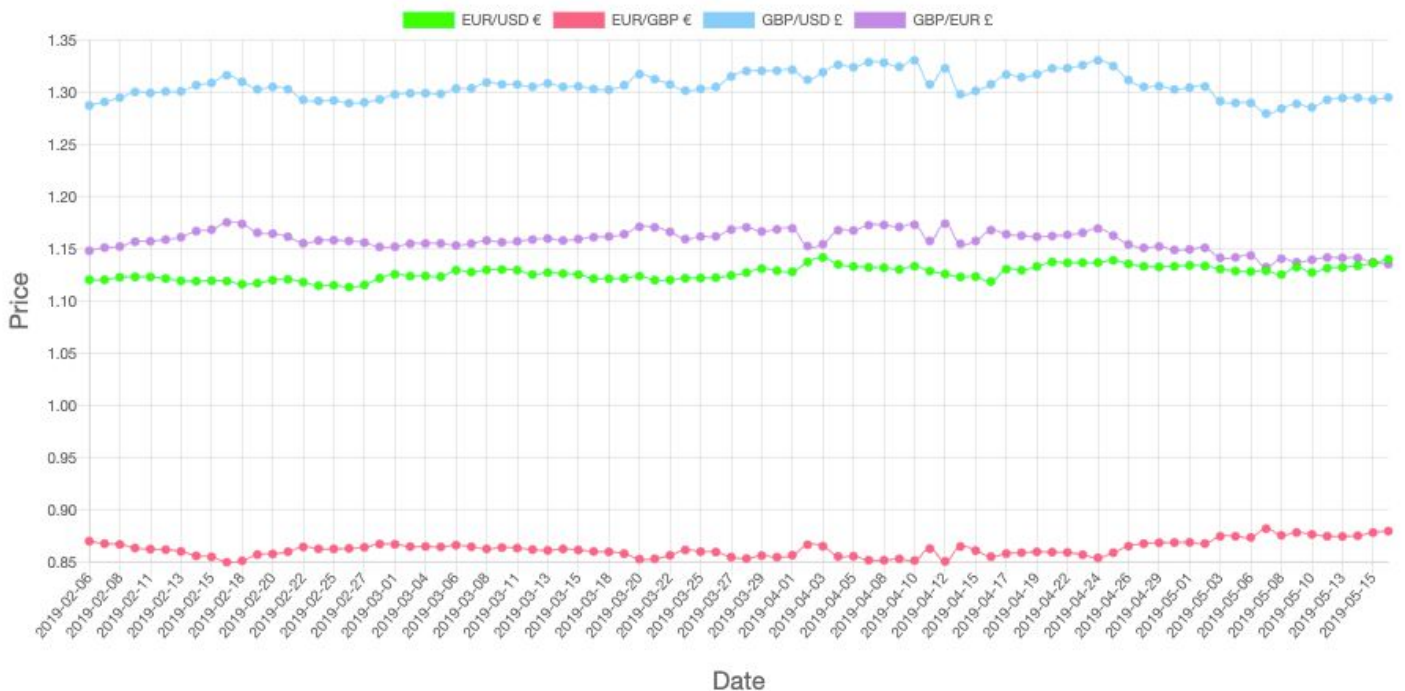
smartpredict/forexdashboard

The forex dashboard has a similar layout to the crypto dashboard. The user is again met with a table of currencies. The difference is that in foreign exchange terms we are now talking about currency pairs. The user is concurrently selling one currency while they buy the other. The user should be aware that the forex market is much more stable than the crypto market which is still extremely new and volatile. Just like the crypto dashboard the user should pay attention to the colour of some indicators, for example, the RSI in the right-most column below.



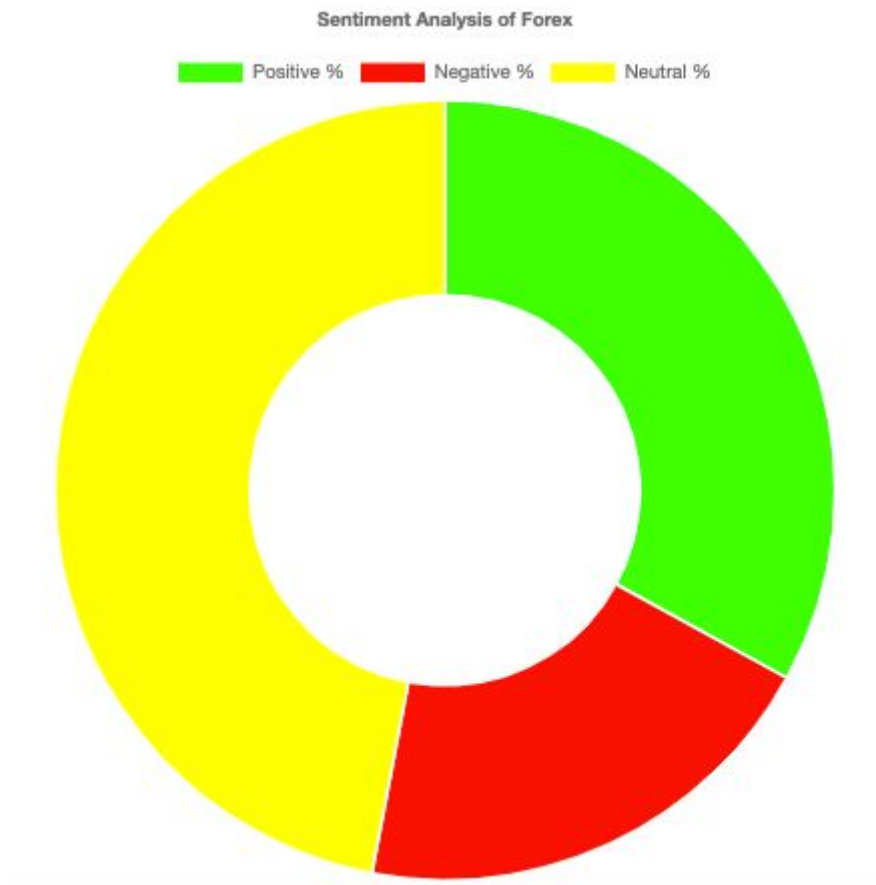
Currency Pair	Current Price	Expected Closing Price	Relative Strength Index
EUR/USD	€1.12	€1.12	61.9
GBP/USD	£1.28	£1.28	45.71
GBP/EUR	£1.15	£1.15	37.07
EUR/GBP	€0.87	€0.87	63.24

In the forex dashboard, all the currencies are graphed together but more detail can be seen upon hovering the mouse over each price point. The users should pay attention to the right-hand side of the graph as these are the most recent price points and are usually more relevant when predicting future prices.



Sentiment Analysis is performed on Forex terms and is calculated and displayed just like the crypto dashboard. Again the user should make use of as much of this data as possible as it can give an insight into the current state of the market.

Neutral Sentiment Anlaysis for Forex Market



2.7 Logout

To log out, the user need only click the 'Logout' option in the header of every page.