Middlesex University London

CST3130 Advanced Web Development with Big Data Coursework2

Crypto Spy

Data Visualization

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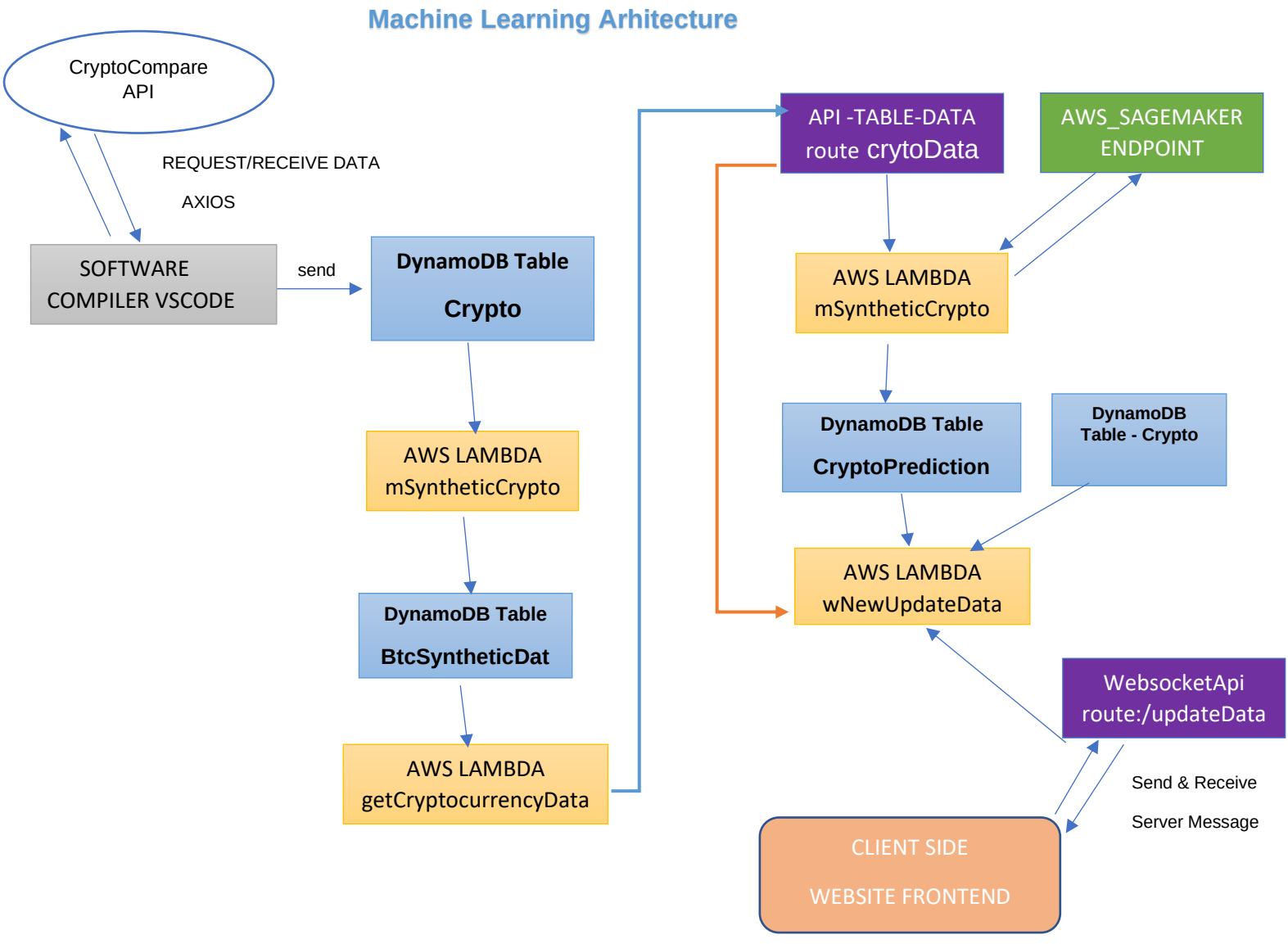
Project Description

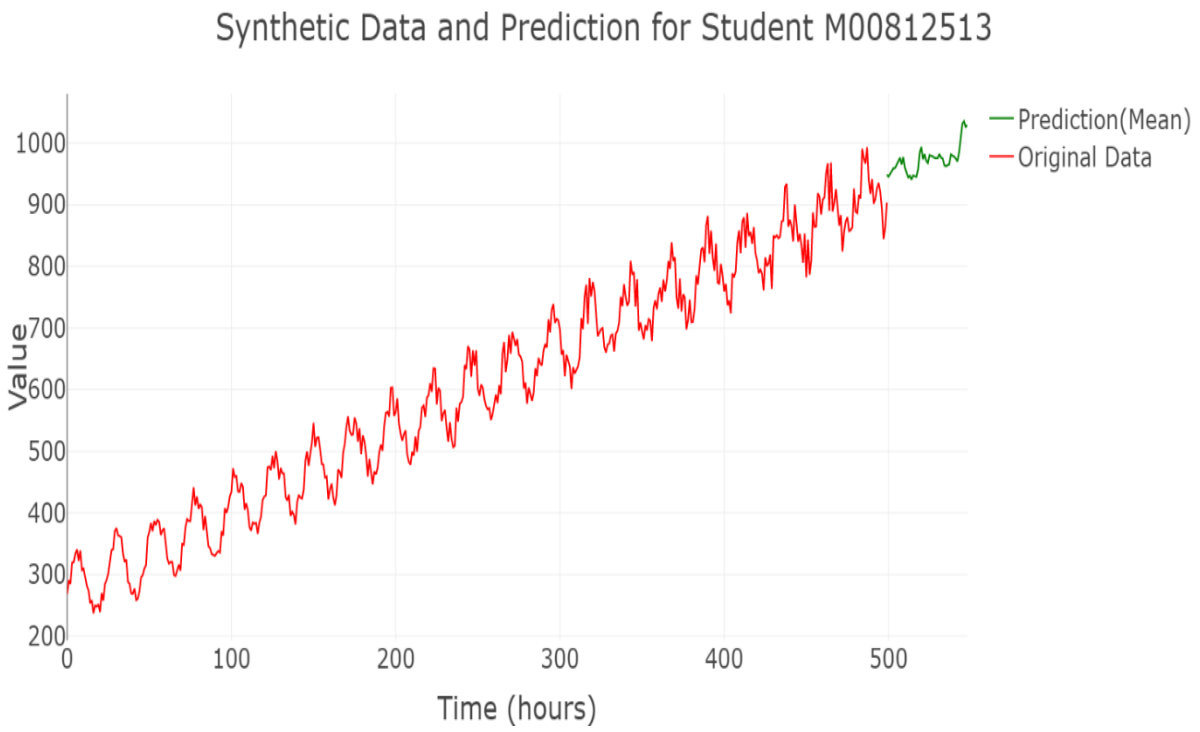
Crypto Spy is a data visualisation website for crypto coins that provides an interactive display of the price history, the actual price and different predictions related to the cryptocurrency market. The graphic representations of the website allow users to explore the price of the coins for a specific date or time. In addition, some predictions about the coin value are displayed and will help the user identify trends in the cryptocurrency market. The website also contains a feature that shows the sentiment analyses of the data displayed over time, allowing the user to understand the relationship between public sentiment and cryptocurrency prices.

The predictions displayed on the website are generated using data collected through APIs, trained with cloud machine learning provided by AWS SageMaker and shown in graphical pictures with Plotly software. In this case, the data is collected from CrymptoCompare APIs using Axios and uploaded to the AWS DynamoDB table named Cryptocurrency. The data from the database table is processed with the Lambda Aws function in the correct format for the AWS Sagemaker. Therefore synthetic data is trained with Aws Deep AR built-in algorithm – Times Series Forecast. The results from the training job will be mean, quantiles 0_1, quantiles 0_9, and samples. After that, the AWS lambda function will pin the endpoint and APi synthetic data link and will save the predictions in the Plotly Line Graph.



Machine learning predictions

The first figure represents the predictions based on the provided by the Middlesex MyUnihub website. The red line represents the synthetic data in JSON time series format, and it's displayed in the Y axis of the line chart. The green line is the mean generated with AWS Sagemaker. The process involves two datasets original data of 500 points and the last 50 points of the initial data with the new start date after 450 points.The results are generated by using the AWS algorithm – Times Series Forecast.

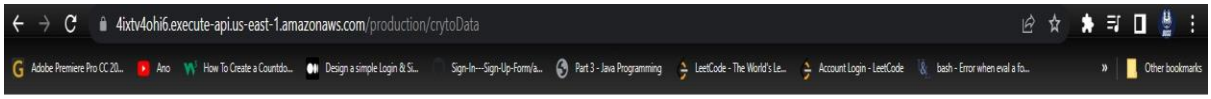


The next 5 figures display the predictions for the following 5 cryptocurrencies and respectively:

- Bitcoin
- Dogecoin
- Ethereum
- BitcoinUSD
- XRP

The formatted data is retrieved from the DynamoDB table Crypto and the serverless endpoint from AWS Sagemaker with AWS lambda function. The Lambda function that formats the data like Student data is called getCryptoCurrencyData.The using Table-Data HTTP API gateway will generate a route link "/cryptoData" as shown below.

https://4ixtv4ohi6.execute-api.us-east-1.amazonaws.com/production/crytoData



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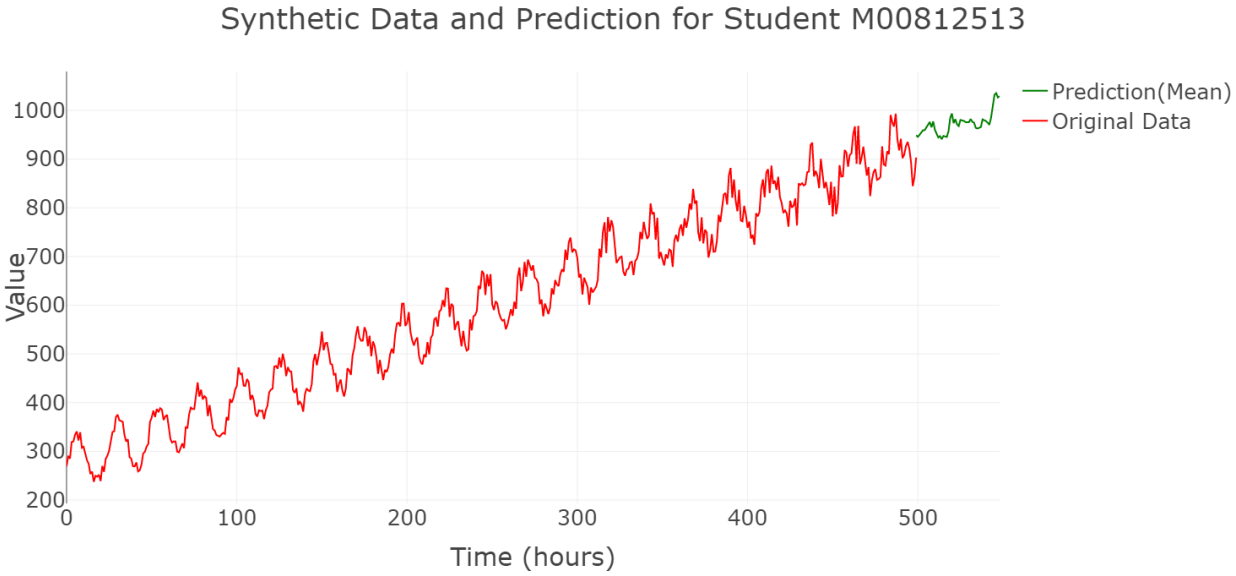
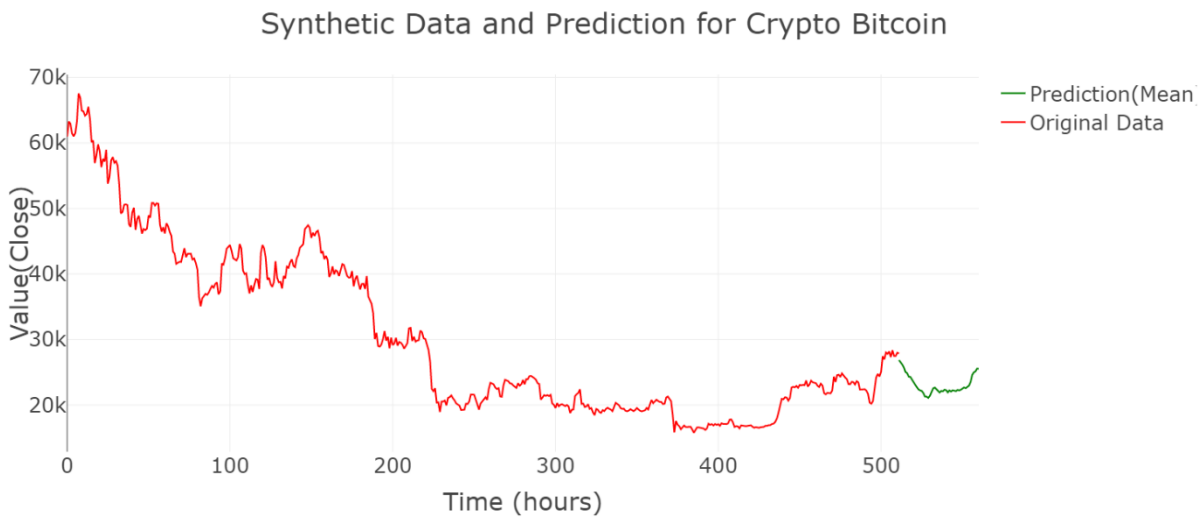
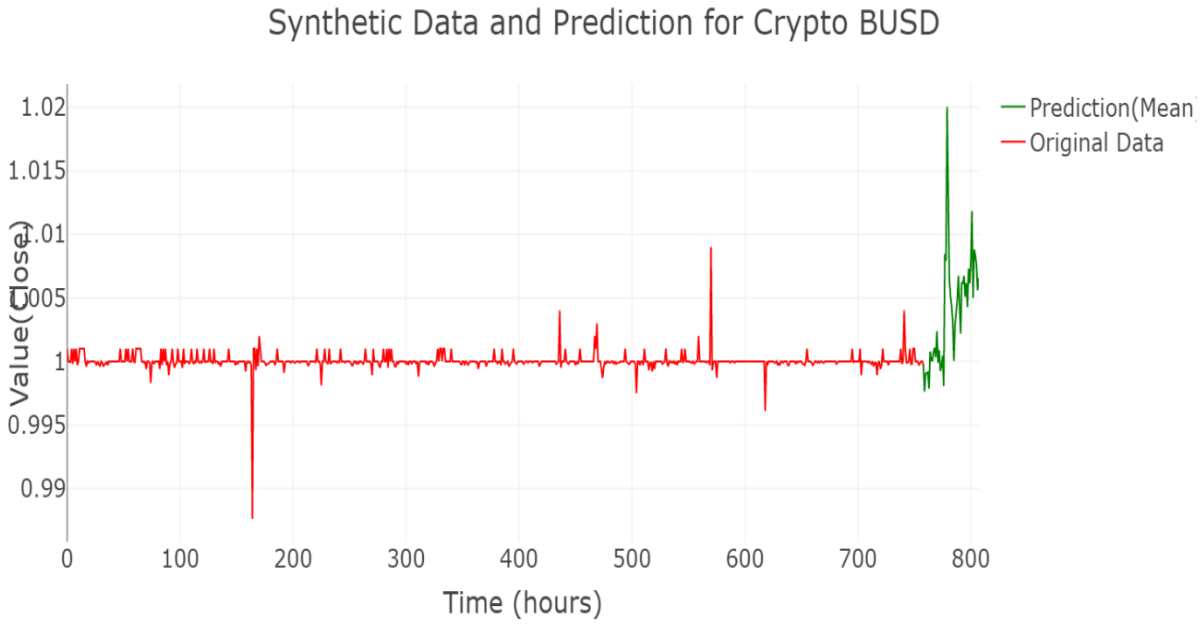
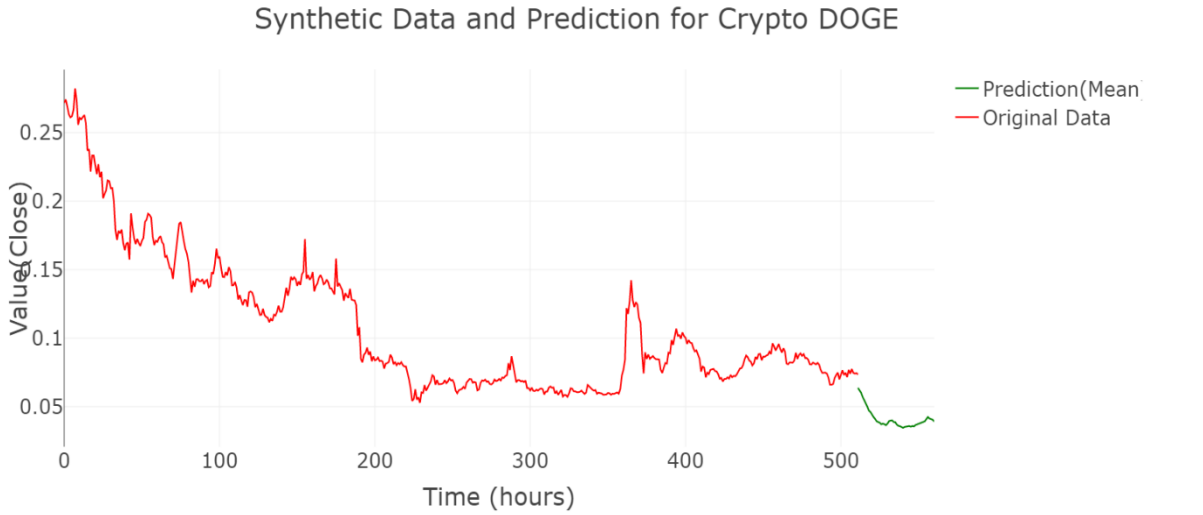



Synthetic Data and Prediction for Crypto Bitcoin
Prediction(Mean
Original Data
Value(Close)
70k
60k
50k
40k
30k
20k
0
100
200
300
400
500
Time (hours)


Synthetic Data and Prediction for Crypto BUSD
Prediction(Mean
Original Data
Value(Close)
1.02
1.015
1.01
1.005
1
0.995
0.99
0
100
200
300
400
500
600
700
800
Time (hours)


Synthetic Data and Prediction for Crypto DOGE
Prediction(Mean
Original Data
Value(Close)
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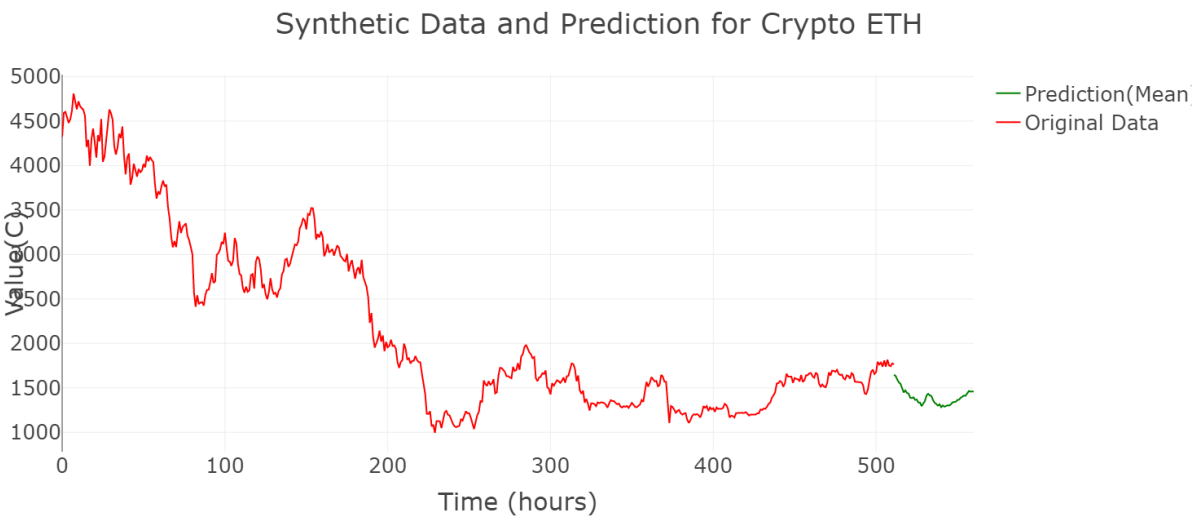
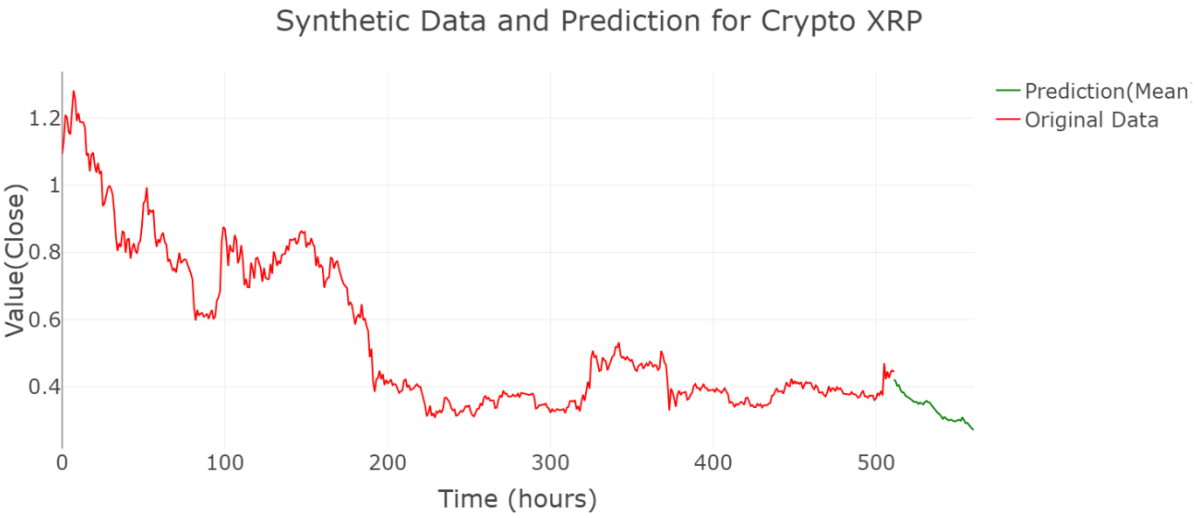
0.2
0.15
0.1
0.05
0
100
200
300
400
500
Time (hours)





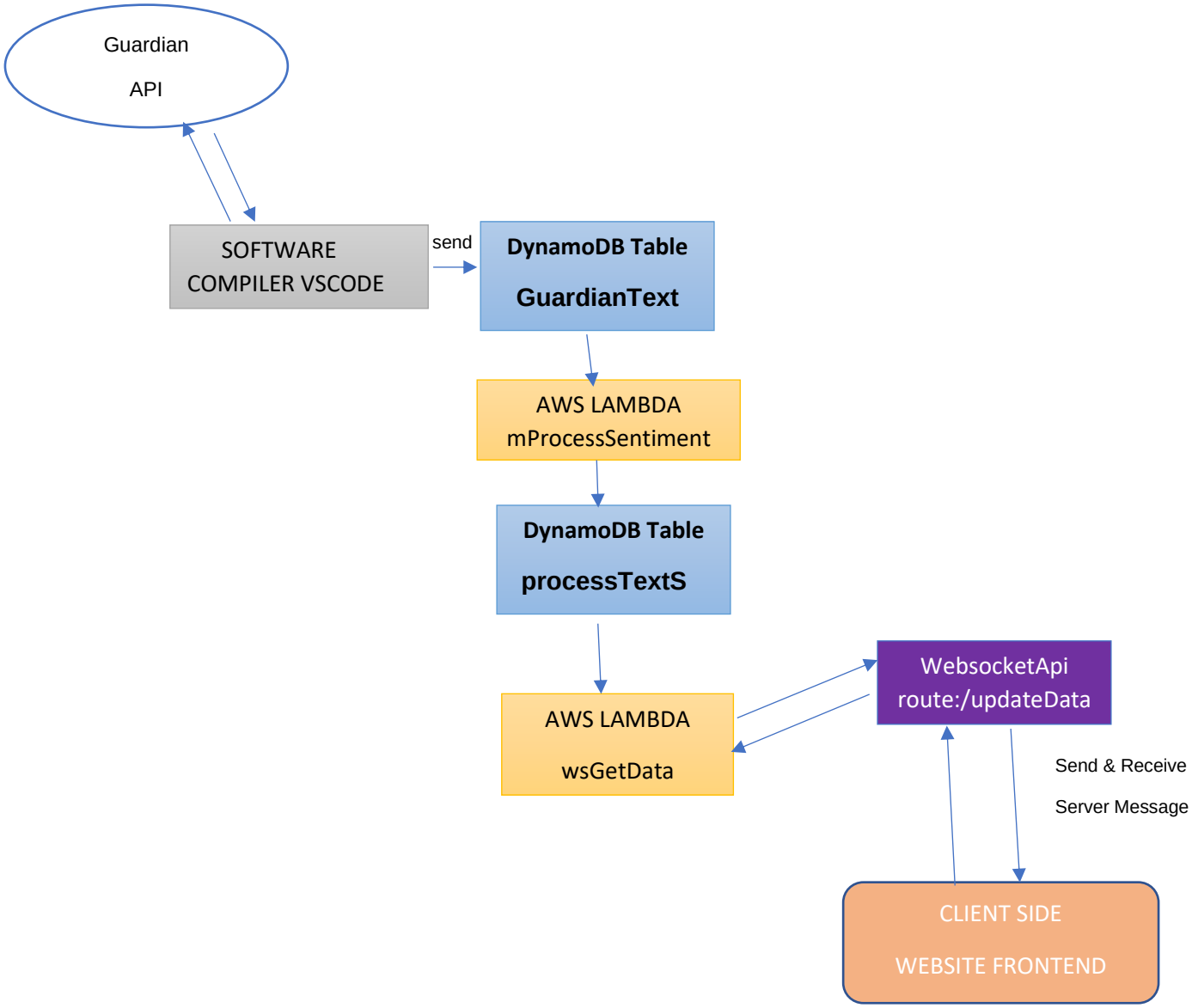
The second page of the website displays the sentiment analysis of each selected cryptocurrency by the user. This analysis will be presented in the form of a pie chart, which will reflect the percentage of four text analysis categories:

- neutral
- negative
- positive
- mixed

The process of sentiment analysis involves requesting text titles from Guardian API, uploading them to a DynamoDB table (GuardianText), and then using an AWS

Lambda function to process the text, which is then saved to the processTextS database table. The Lambda function will process the text by using ComprehendClient and DetectSentimentCommand from the AWS client-comprehend.After this step, they analysis is deployed to the client side with AWS websocketAPI.The process is illustrated in the following diagram.

Sentiment analysis architecture

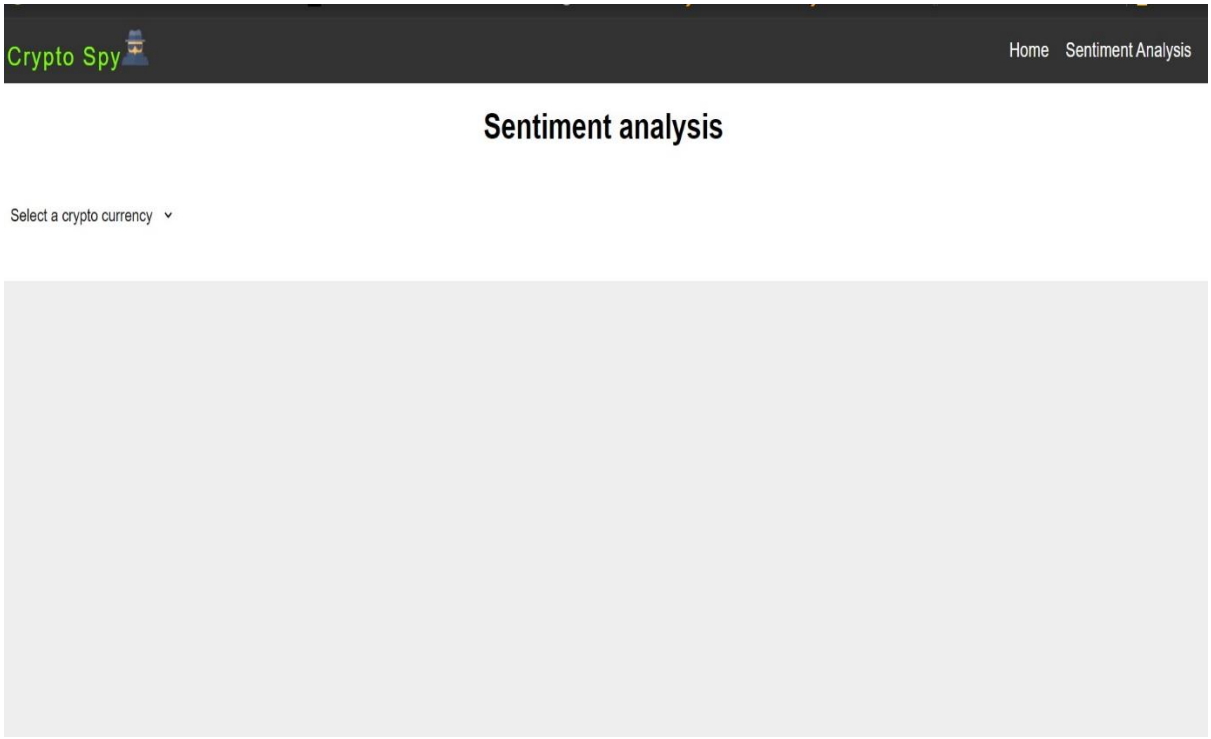


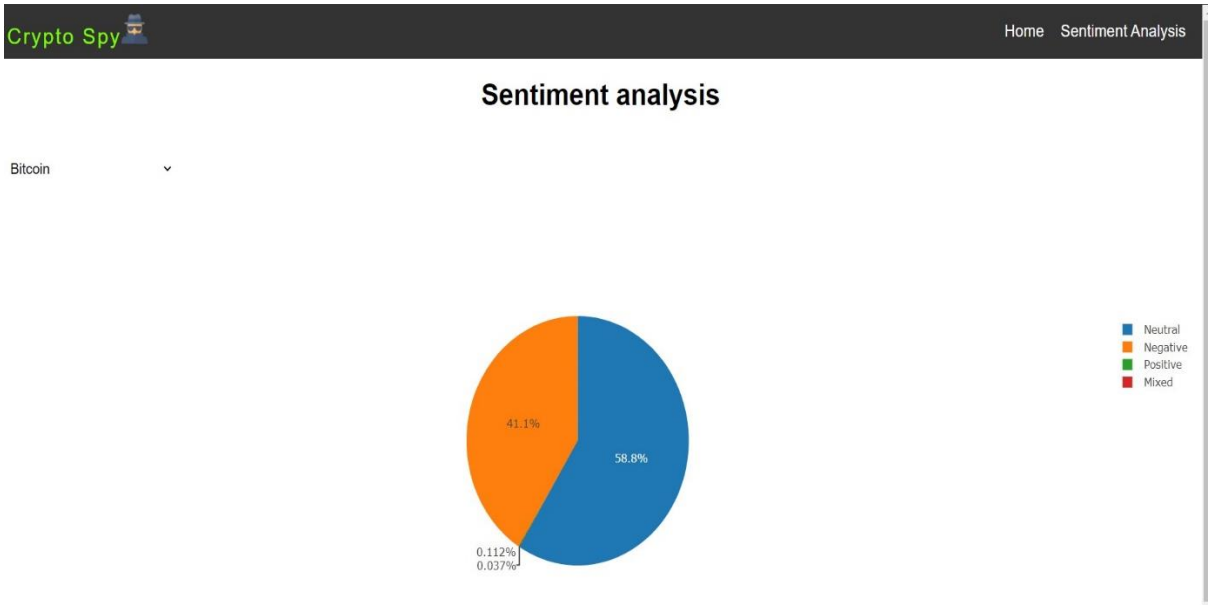
Front-end website screenshots

The following screenshot will show the website's home page and sentiment analysis page.

Home

Sentiment Analysis before and after the client’s request





Architecture diagram