



CRYPTOCURRENCY PRICE CHANGE PREDICTOR

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Abstract

The aim of "Cryptocurrency Price Change Predictor" project is to design an application which can predict decrease and increase on cryptocurrency by using candlestick, technical indicators and machine learning algorithms. Different machine learning algorithms and hybrid models will be studied to develop an accurate prediction algorithm. Afterwards, a mobile and/or a web application will be developed to provide prediction information by means of data visualization. Application user will be able to see the time-based prediction graph of a selected cryptocurrency as well as the prediction's accuracy. As a result, this project aims to yield a cryptocurrency price increase and decrease prediction application which can help users make more informed decisions concerning the market.

Key Words: Cryptocurrency, Bitcoin, Technical Indicators, Machine Learning.

Introduction

In this project, machine learning algorithms will be tested and compared using Yahoofinance and Kaggle Cryptocurrency datasets using libraries such as Scikit-learn, Pandas and Keras. Ensemble methods, which is a machine learning technique that aims to utilize numerous base models to obtain an optimal prediction model, will also be studied. After determining their advantages and disadvantages in a volatile market such as the cryptocurrency market, an application will be developed using Flutter and React.js tools which have powerful data visualization capabilities. This mobile and/or web application will allow user to see cryptocurrency price predictions and estimated prediction accuracy. Proposed methods and system will be tested using evaluation methods such as precision parameter, confusion matrix, leave-one-out cross validation for machine learning algorithms and usability testing methods for the developed application. As a result, proposed system will help users make more informed decisions concerning the volatile cryptocurrency market.

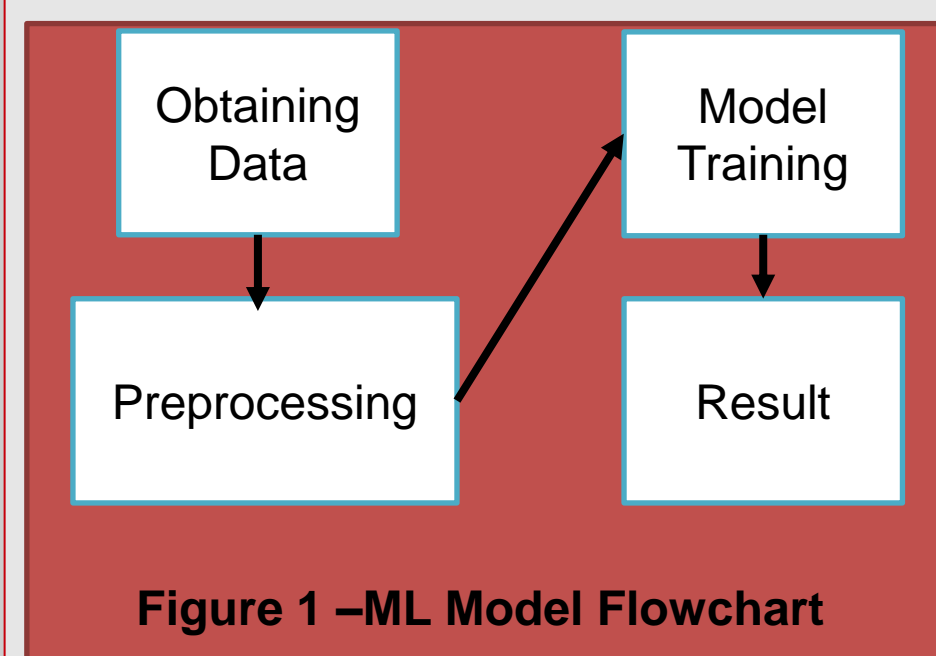


Figure 1 –ML Model Flowchart

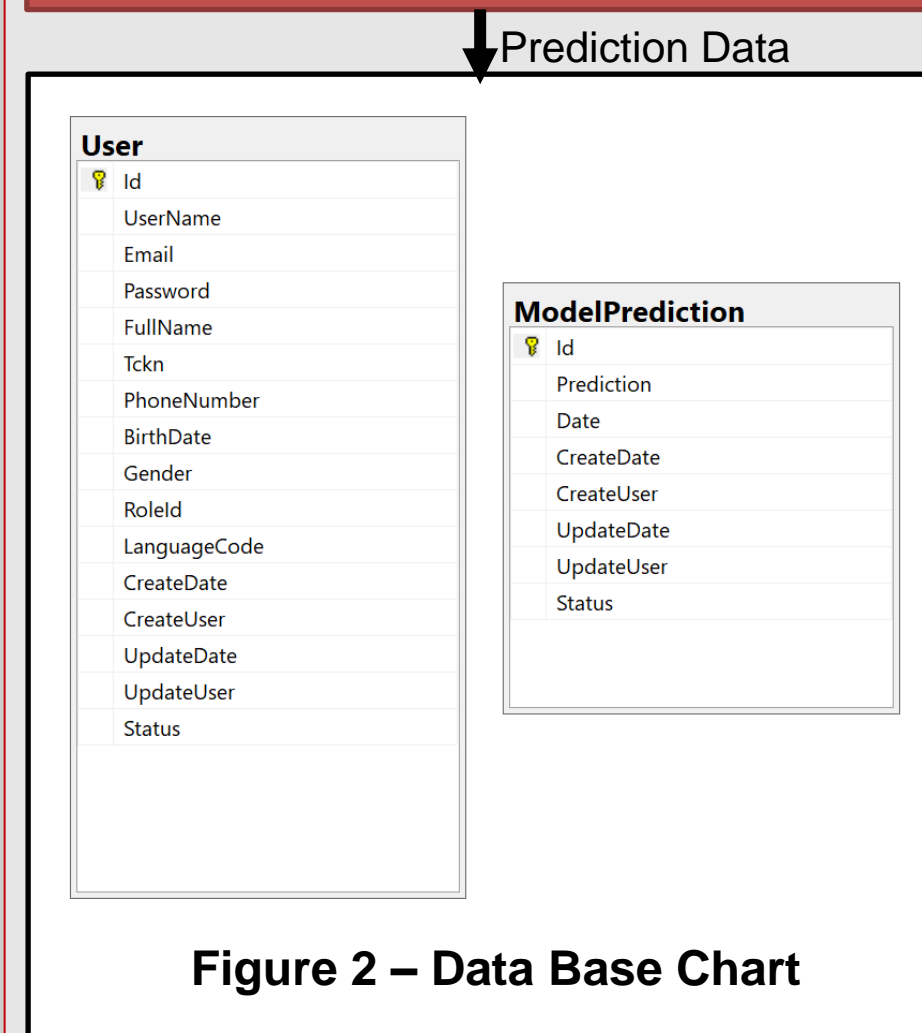


Figure 2 – Data Base Chart

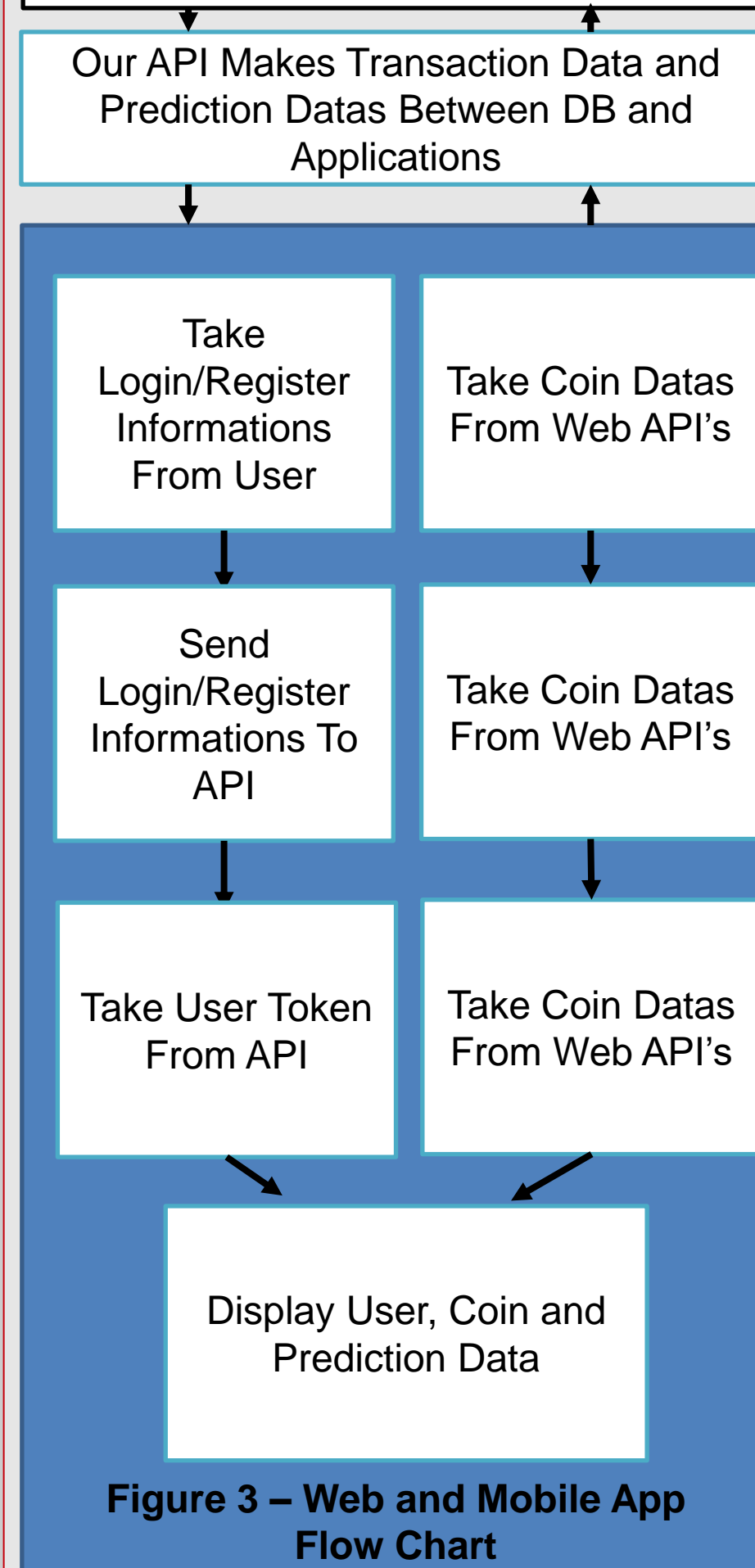


Figure 3 – Web and Mobile App Flow Chart

Solution

Price direction prediction is achieved in terms of increase, decrease and stability shall be predicted therefore research is considered to be a classification problem. Thus, a novel approach is taken to predict Bitcoin price change directions. Different machine learning algorithms such as Support Vector Machine (SVM), Extreme Gradient Boosting (XGB) and Adaptive Boosting(ADB) are tested and compared using Yahoo Finance and Kaggle Cryptocurrency datasets. Candlestick which holds daily open, high, low and close values of currency and momentum technical indicator data of Bitcoin obtained from Kaggle and YahooFinance are used as features. Features are given to the model in a window traversal manner where each window shall provide predictions on following days' increase/decrease status.

Results & Conclusion

Three different classification algorithms are tested for seven different window sizes and five different technical indicators. Combinations of each experiment was recorded and it has been found that XGB with window size 50 using Candlestick data and momentum indicators yields the best accuracy of 63%. This model is used in the application where it will generate daily predictions at 3:00 AM Istanbul Time (GMT+03).

State what you learned from your work. Summarize what you did. State what you learned. State future work and directions, and then list any open problems.

