Project Design Phase

Solution Architecture

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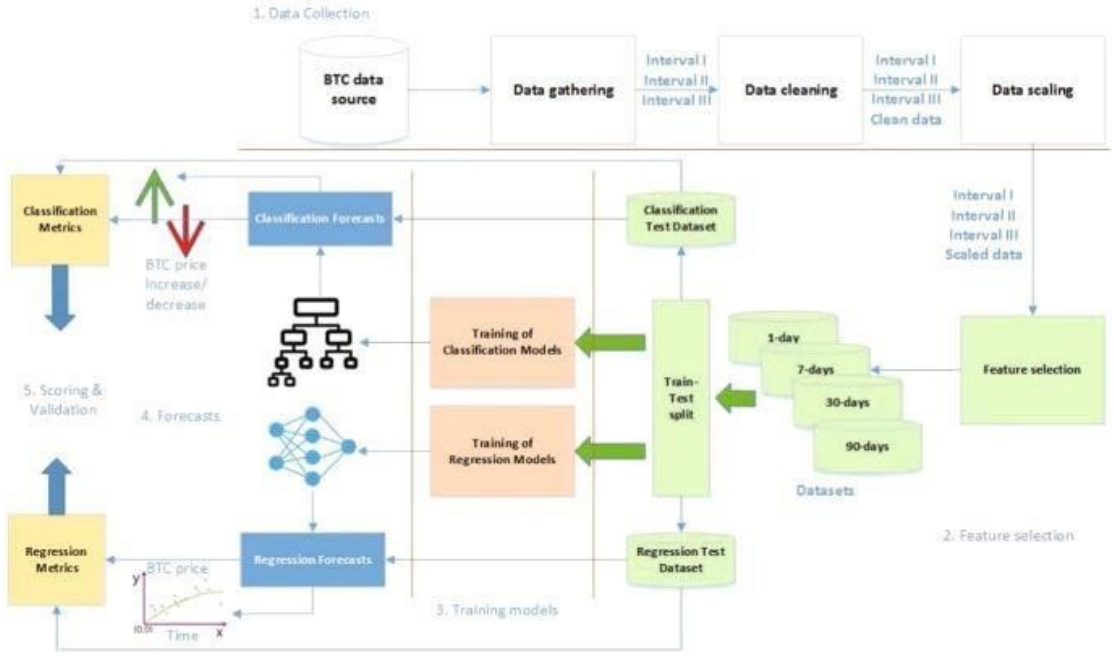
Project Name	Time Series Analysis For Bitcoin Price Prediction Using Prophet
Maximum Marks	5 Marks
Team id	593041

Solution Architecture



1. Data collection and preparation:

Data collection is the process of compiling pertinent information from a variety of sources, including weather satellites, public weather APIs, and meteorological stations. Features like temperature, humidity, wind speed, atmospheric pressure, cloud cover, and rainfall records from the past should all be included in the data.
Data preparation is the process of ensuring formatting uniformity, resolving missing values, and eliminating outliers from the acquired data. Feature engineering is another possibility. This is the process of extracting new valuable features from the raw data by combining domain expertise or aggregating data across predetermined time periods.

2. Model selection and training:

The particular challenge and the dataset's properties influence the choice of model. Neural networks, gradient boosting, decision trees, random forests, and linear regression are examples of popular machine learning algorithms for rainfall prediction. The ability to handle complicated relationships in the data, interpretability, scalability, and other criteria may all be taken into account while choosing an algorithm. The model is instantiated and trained on the prepared dataset when the algorithm has been chosen. The model is fed input features and matching measurements of rainfall during the training phase, and its internal parameters are adjusted to reduce the prediction error.

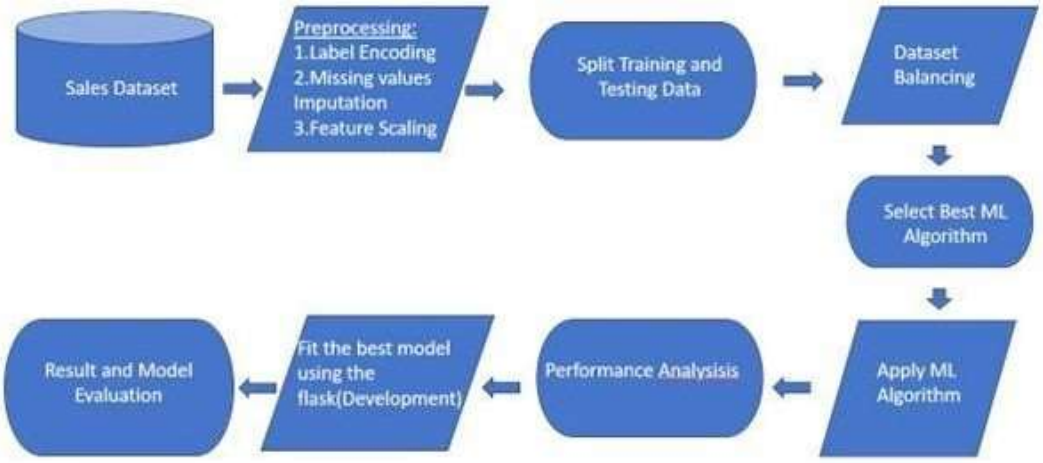
3. Model evaluation:

To evaluate the effectiveness and capacity for generalization of the trained model, model evaluation is essential. The mean squared error (MSE), correlation coefficient, mean absolute error (MAE), and root mean square error (RMSE) are examples of evaluation metrics for rainfall prediction. To offer an unbiased estimate of the model's performance, it is tested on a held-out test set that contains data that the model has not seen during training..

4. Model deployment:

Model deployment involves creating an application or system that integrates the trained model to provide real-time rainfall predictions. This can be done by developing a user interface (UI) where users can input relevant weather features, and the model generates the corresponding rainfall prediction.
The application can be deployed on a local server or a cloud computing platform to ensure accessibility and scalability. It should be designed to handle user requests efficiently and provide fast predictions based on the trained model. Regular updates and maintenance may be required to incorporate new data and improve the model's performance over time.
Solution Architecture Diagram:

5. The solution architecture diagram



depicts the components of the system and the data flow in a visual way. It offers a high-level summary of the procedures used to gather, handle, and train data for the model. Additionally, it shows how to use the trained model in a system or application for real-time rainfall prediction.

Reference link:

https://www.researchgate.net/publication/342692245_Time-series_forecasting_of_Bitcoin_prices_using_high-dimensional_features_a_machine_learning_approach