# Project Initialization and Planning Phase

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| Date | 01 October 2024 |
| Team ID | LTVIP2024TMID24963 |
| Project Title | Time Series Analysis For Bitcoin Price Pridiction |
| Maximum Marks | 3 Marks |

**Project Proposal (Proposed Solution) report**

Develop a time series prediction system using machine learning models to forecast Bitcoin prices, aiming to improve trading insights and help users navigate cryptocurrency market volatility.

| **Project Overview** | |
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| Objective | Develop a time series prediction system using machine learning models to forecast Bitcoin prices, aiming to improve trading insights and help users navigate cryptocurrency market volatility. |
| **Problem Statement** | |
| Description | The project uses historical Bitcoin price data with additional external factors (e.g., volume, economic indicators) to train and test predictive models. The primary model, Prophet, is tuned to capture trends, seasonality, and sudden shifts in Bitcoin prices. Data quality challenges, including missing values, outliers, and inconsistent date ranges, must be addressed to ensure accurate and reliable forecasts. |
| Impact | Accurate predictions of Bitcoin prices can benefit investors by providing insights into potential future price movements, reducing the risk associated with high volatility. Improved forecast accuracy could also aid in developing trading strategies, financial planning, and risk management for stakeholders in cryptocurrency markets. Addressing data quality issues is essential to maintain model reliability and predictive power. |
| **Proposed Solution** | |
| Approach | The approach for this Bitcoin price prediction project begins with data collection and preprocessing, where historical Bitcoin price data—including "Open," "High," "Low," "Close," "Adj Close," and "Volume"—is gathered from reliable sources, cleaned for missing values, and formatted consistently. Outliers are addressed using statistical methods, and additional features are engineered to enhance predictive power. Next, exploratory data analysis (EDA) is performed to identify trends, seasonality, and patterns in Bitcoin prices, helping inform the model setup. The Prophet model is selected for its suitability in handling time series data with trends and seasonality, and it is optimized by tuning key hyperparameters (e.g., changepoint and seasonality priors). After training, the model is evaluated on |

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| | unseen data using metrics like Mean Squared Error (MSE), Mean Absolute Error (MAE), and R-squared ($R^2$) to assess accuracy. The model is then used to forecast future Bitcoin prices, providing insights into potential price trends and confidence intervals to quantify uncertainty. Finally, the process and results are documented thoroughly, with potential for deployment as a dashboard or API for real-time predictions, making it a valuable tool for investors and stakeholders interested in cryptocurrency markets. |
| Key Features | - Implementation of a machine learning-based bit assessment model. |

**Resource Requirements**

| Resource Type | Description | Specification/Allocation |
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| **Hardware** | | |
| Computing Resources | CPU/GPU specifications, number of cores | T4 GPU |
| Memory | RAM specifications | 8 GB |
| Storage | Disk space for data, models, and logs | 1 TB SSD |
| **Software** | | |
| Frameworks | Python frameworks | Flask |
| Libraries | Additional libraries | , pandas, numpy, matplotlib, seaborn |
| Development Environment | IDE | Google colab Notebook, vscode,anaconda |
| **Data** | | |
| Data | Source, size, format | Kaggle dataset, , |