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**A Project Synopsis on**

**“Development of Bitcoin Price Predictor Using LSTM Neural Networks”**

**Submitted by:**

**SANJAY M**

**1NT22MC091**

**Under the Guidance of**

**Dr. Dileep M R**

**Associate Professor**

**Department of MCA**

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**SUBJECT: PROJECT WORK**

**CODE: 22MCA403P**

**SEMESTER: IV**

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| Title of the Project | Development of Bitcoin Price Predictor Using LSTM Neural Networks and Streamlit Visualization |
| Organization where the project is carried out | PRAGYAN AI |
| Address | Akshay Nagar, Hulimavu, Bangalore, Bangalore, Karnataka 560076 |
| External Guide Name with Designation, Email, Mobile No. | Sateesh Ambesange Co-Founder Pragyan AI  sateesh.ambesange@gmail.com  9741007422 |
| Internal Guide Name with Designation | Dr. Dileep M R  Associate Professor |

**INTRODUCTION**

The rise of cryptocurrencies, particularly Bitcoin, has revolutionized the financial landscape, drawing significant attention from investors, traders, and technologists alike. As the pioneer and most prominent digital currency, Bitcoin's price movements are closely watched and highly volatile, creating a critical need for accurate predictive models. This project, "Bitcoin Price Prediction Using LSTM Neural Networks," addresses this need by employing advanced machine learning techniques to forecast Bitcoin prices based on historical data. Leveraging the power of Long Short-Term Memory (LSTM) networks, which excel in handling time series data, the project aims to deliver reliable and actionable insights into future Bitcoin price trends. Bitcoin's inherent volatility poses a considerable challenge for traditional prediction methods. Therefore, the application of LSTM networks, a type of recurrent neural network (RNN) designed to capture temporal dependencies, becomes crucial. LSTMs are particularly effective at learning from sequences of data, making them well-suited for financial time series forecasting where past prices influence future movements. The model is trained on historical Bitcoin price data, enabling it to learn complex patterns and dependencies within the data.

In this project, historical Bitcoin price data is meticulously processed and normalized to ensure the model's effectiveness. The data is then split into training and testing sets, with the former used to train the LSTM model and the latter to evaluate its performance. The model's predictions are visualized using Streamlit, an interactive web application framework, allowing users to compare predicted prices with actual historical prices seamlessly. Furthermore, the project explores predicting future Bitcoin prices, extending its utility beyond retrospective analysis to proactive financial planning. This feature is particularly valuable for investors seeking to navigate the highly dynamic cryptocurrency market. By integrating sophisticated neural network techniques with user-friendly visualization tools, this project not only enhances the accuracy of Bitcoin price predictions but also democratizes access to advanced financial forecasting methods, empowering a broader audience to make informed investment decisions.

**Problem Statement**

The inherent volatility and complexity of Bitcoin price movements present significant challenges for traditional financial forecasting methods. Accurate prediction of Bitcoin prices is crucial for investors and traders to make informed decisions. This project aims to address this challenge by developing a predictive model using Long Short-Term Memory (LSTM) neural networks. The objective is to forecast future Bitcoin prices based on historical data, providing reliable and actionable insights. By leveraging LSTM's capabilities in handling time series data, this project seeks to enhance prediction accuracy and assist stakeholders in navigating the highly dynamic cryptocurrency market.

**Objectives**

* Develop a predictive model using Long Short-Term Memory (LSTM) neural networks to forecast Bitcoin prices.
* Preprocess historical Bitcoin price data to ensure accuracy and relevance for the model.
* Train the LSTM model on a dataset of historical Bitcoin prices to capture temporal dependencies and patterns.
* Evaluate the performance of the LSTM model using a separate test dataset to ensure predictive accuracy.
* Visualize the predicted versus actual Bitcoin prices using interactive line charts for clear comparison.
* Extend the model's utility by predicting future Bitcoin prices, aiding in proactive financial planning.
* Provide an accessible and user-friendly interface through Streamlit to democratize advanced financial forecasting methods for a broader audience.
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**Scope**

The scope of this project encompasses the development and implementation of an LSTM neural network model to predict Bitcoin prices based on historical data. It includes data collection, preprocessing, and normalization to ensure high-quality input for the model. The project involves training and evaluating the model's performance, followed by visualizing the predictions against actual prices using Streamlit. Additionally, it extends to forecasting future Bitcoin prices, providing valuable insights for investors and traders. The project aims to offer a robust, user-friendly tool for financial forecasting, facilitating informed decision-making in the volatile cryptocurrency market. And it also helps users to see their other currencies prediction.

**Methodology**

The methodology involves several key steps. First, historical Bitcoin price data is collected and pre-processed, including normalization using MinMaxScaler. The data is then split into training and testing sets. An LSTM neural network is designed and trained on the training set, capturing temporal dependencies in the price data. The trained model is evaluated using the test set, and its predictions are visualized with Streamlit, comparing them to actual prices. Finally, the model is used to forecast future Bitcoin prices, and these predictions are also visualized. This approach ensures accurate, reliable predictions and accessible insights for users.

**Flow Chart**

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