**Problem Statement:-**

How does public sentiment on social media influence cryptocurrency price movements? This project analyzes and correlates sentiment from Twitter posts with historical price trends of the top 10 cryptocurrencies to identify market patterns and predictive signals.

**Approach:-**

To tackle this problem, I will develop an AI-driven sentiment analysis model that collects real-time Twitter data related to cryptocurrencies and assigns sentiment scores using Natural Language Processing (NLP) models like BERT and Vader. These sentiment scores will then be correlated with historical price data from the Kaggle dataset to identify trends and potential predictive signals.

The process begins with data collection, where tweets mentioning major cryptocurrencies (Bitcoin, Ethereum, etc.) will be fetched using Tweepy (Twitter API). These tweets will undergo preprocessing (removal of stopwords, tokenization, and lemmatization) before sentiment classification using pre-trained NLP models.

Next, machine learning models (Random Forest Regression, XGBoost, and LSTMs) will be trained using both historical price data and sentiment scores. The model’s effectiveness will be evaluated using Pearson’s correlation, RMSE, and accuracy scores to determine the impact of sentiment on price fluctuations.

The final output will provide visual insights into how positive, negative, and neutral sentiment correlate with market trends, along with predictive models for price movement. Future improvements could involve real-time deployment of this model for live market sentiment tracking.

**Tools & Technologies**

* Programming & ML: Python, TensorFlow, Scikit-learn, XGBoost
* NLP for Sentiment Analysis: BERT, Vader, LSTMs
* Data Collection: Tweepy (Twitter API), Kaggle Crypto Dataset
* Data Processing: Pandas, NumPy, Matplotlib, Seaborn
* Correlation & Predictions: Pearson’s Correlation, Random Forest Regression, LSTMs
* Deployment & Version Control: GitHub, Jupyter Notebook