COSE474-2024F: Final Project Proposal
"Analyzing the Impact of Social Media Sentiment on Bitcoin Prices Using the FinBERT Model"

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1. Introduction

The cryptocurrency market, particularly Bitcoin, has experienced significant fluctuations in value, driven by a variety of factors, including investor sentiment and market news. This project aims to leverage sentiment analysis of social media like Twitter(X) data using the FinBERT model to predict Bitcoin price movements. By understanding the collective mood on Twitter(X) regarding Bitcoin, we can enhance the accuracy of price predictions.

2. Problem definition & challenges

The main objective of this project is to develop a predictive model that utilizes sentiment extracted from Twitter(X) to forecast Bitcoin price changes. We will analyze tweets containing specific hashtags and keywords related to Bitcoin, correlate this sentiment with historical Bitcoin price data, and create a model capable of accurately predicting future price movements based on Twitter(X) sentiment.

Challenges:

- Sentiment Analysis Complexity: Tweets can contain sarcasm, slang, and contextual nuances that complicate sentiment extraction.
- Market Volatility: Bitcoin is known for its volatility, influenced by various external factors such as regulatory changes, technological developments, and macroeconomic trends.
- Dynamic Nature of Social Media: The rapid pace of social media can result in sentiment changing quickly. Capturing these fluctuations in real time and integrating them into a predictive model presents a unique challenge.

3. Related Works

- Omole, O., Enke, D. (2024). Deep learning for Bitcoin price direction prediction: models and trading strategies empirically compared.
- Feizian, F., Amiri, B. (2023). Cryptocurrency Price Prediction Model Based on Sentiment Analysis and Social Influence.

4. Datasets

The project will utilize the following datasets such as Bitcoin Sentiment Analysis — Twitter Data which include tweets containing relevant threads about bitcoin over a specified period to capture sentiment trends. To make a comparison, I plan on using Bitcoin Price Prediction dataset that contains comprehensive information on Bitcoin's market behavior over time, including daily prices, trading volumes, and other relevant financial indicators.

5. State-of-the-art methods and baselines

For predicting Bitcoin prices using social media sentiment, I will be using advanced models like BERT and its financial version, FinBERT, are effective for sentiment analysis. These models can understand the context and subtle details in social media posts, which is crucial for analyzing sentiment. While for the comparison, the baseline models such as ARIMA and LSTM model will be applied to see how well it predicts Bitcoin prices based on Twitter(X) sentiment.

6. Schedule

Week 1: Literature Review
Week 2-3: Data Collection and Preprocessing
Week 4: Sentiment Analysis Implementation
Week 5: Model Development and Training
Week 6: Model Evaluation and Fine-tuning
Week 7-8: Results Analysis, Reporting and Submission

References