Comparing the Performance of Transformer Models for Cryptocurrency Price Prediction Using On-Chain Data and Technical Indicator Data

Introduction:

Cryptocurrency prices are notoriously volatile, making them difficult to predict. However, recent advances in machine learning, particularly deep learning, have shown promise for cryptocurrency price prediction. One promising deep learning architecture is the transformer neural network.

Transformers have been shown to be effective for a variety of natural language processing tasks, such as machine translation and text summarization. However, their potential for time series prediction has not been as well-studied.

This thesis proposal aims to compare the performance of transformer neural networks for cryptocurrency price prediction using on-chain data and technical indicator data.

Research Questions:

- How does the performance of transformer neural networks trained on on-chain data compare to transformer neural networks trained on technical indicator data for cryptocurrency price prediction?
- Does the use of both on-chain data and technical indicator data together improve the performance of transformer neural networks for cryptocurrency price prediction?

Methodology:

The proposed thesis will use a three-step methodology:

1. Data gathering: The first step will involve gathering the necessary data, including:
    - On-chain data for Ethereum (ETH)
    - Parsing and extracting features from the data
    - ETH price data for different time frames
    - Technical indicator data for ETH
2. Model training: The second step will involve training three separate transformer neural networks:
    - A model trained on on-chain data only
    - A model trained on technical indicator data only
    - A model trained on both on-chain data and technical indicator data together
3. Model evaluation: The third step will involve evaluating the performance of the three trained transformer neural networks on a held-out test set. The performance of the models will be compared to each other.

Expected Results:

The expected results of this thesis are to:

- Compare the performance of transformer neural networks trained on different types of data for cryptocurrency price prediction.
- Determine whether the use of both on-chain data and technical indicator data together improves the performance of transformer neural networks for cryptocurrency price prediction.

References:

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- Jagannath, Nishant, et al. "An on-chain analysis-based approach to predict ethereum prices." *IEEE Access* 9 (2021): 167972-167989.
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Conclusion:

This thesis proposal has outlined a research plan to compare the performance of transformer neural networks for cryptocurrency price prediction using on-chain data and technical indicator data. The expected results of this thesis will contribute to the growing body of knowledge on the use of machine learning for cryptocurrency price prediction.