**Paper Title:**

**Sentiment Analysis and Emotion Detection on Cryptocurrency Related Tweets Using Ensemble LSTM-GRU Model**

**Paper Link:**

<https://ieeexplore.ieee.org/document/9751065>

**1 Summary:**

**1.1 Motivation**

Cryptocurrency is still in its infancy and there have been serious concerns raised regarding its use, it uses cryptographic techniques to ensure transactions that are unique and legitimate.

**1.2 Contribution**

This study uses tweets about cryptocurrencies, which are commonly used to predict their market prices, to perform sentiment analysis and emotion detection.

**1.3 Methodology**

A deep learning ensemble model called LSTM-GRU is proposed to improve the analysis's efficacy. It combines two recurrent neural network applications, namely GRU and LSTM. When the GRU is trained using the features that the LSTM has extracted, LSTM and GRU are stacked. A few machine learning and deep learning techniques are examined, along with a suggested ensemble model, using term frequency-inverse document frequency, word2vec, and bag of words features. Additionally, TextBlob and Text2Emotion are investigated for the purpose of analyzing emotions using the chosen models. In contrast, a higher percentage of users express happiness when using cryptocurrencies, with surprise and fear coming in second.

**1.4 Conclusion**

Sentiment analysis and emotion detection are applied to cryptocurrency-related tweets in this study.

**2 Limitation**

**2.1 First Limitation**

The utilization of random under sampling for dataset balancing implies that a decrease in training data leads to a decrease in LSTM-GRU performance.

**2.2 Second Limitation**

This study examines the sentiment analysis of tweets pertaining to cryptocurrencies; it does not go so far as to forecast the price of cryptocurrencies on the basis of the sentiment analysis.

**3 Synthesis**

With a 0.99 accuracy score, the highest precision and recall of 0.99 and 0.98, respectively, and the highest sentiment analysis performance, the suggested model comes in first. Similarly, for sentiment analysis and emotion detection, LSTM-GRU performs better than all other models in terms of right and incorrect predictions.