Research Questions

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1. **The Prediction Accuracy usually drops when predicting longer in future However the presented models achieve good accuracy for 90 days while reduced prediction for 60 days can you elaborate this behaviour.**

A: The Main reason behind this behaviour is

Dataset: The trends present in our Dataset are better captured by the model when predicting over longer time horizon. Also there could be possibility that short term prediction may be affected by noise making it challenging for the model to discern underlying patterns. While Long Term prediction may have smooth out some noise resulting in better accuracy.

Scaling of Data: we have scaled Data using MinMax Scalar which helps our Activation function this also resulted in better accuracy for 90 days rather than 60 or 30 days.

Model Training: We have used 80% of our Data for Training LSTM like other neural Network benefits from longer training duration this helped us with better prediction for 90 days rather than 60 days.

Overfitting: Even After using techniques such as dropout there is a chance that model could have got overfitting which resulted is lesser accuracy for 60 days.

Hyperparameter Tuning: The hyperparameters of our LSTM model, such as the number of layers, hidden units, learning rate, and sequence length, are better suited for longer-term predictions.

Activation Function: As we have scaled our data. The ability of TanH function to handle values between -1 to 1 which benefits in long term forecasting.

2. **Technical Indicators can help to make decisions about stock trend what about cross comparison of these technical indicators to make accurate decision? Moreover, how about building a hybrid solution based on a combination of different model?**

A Cross Comparison of different technical indicators in my opinion is good idea as this will help us in making accurate decision about stock trend Each Indicator provides unique insights into different aspects of price movement. The cross comparison of technical indicator that I would like to elaborate more are.

Moving Averages (MAE): this indicator helps us to identify overbought or oversold condition cross comparison of MAE with other indicators can validate potential trend reversal or confirm existing trends.

Moving Average Convergence Divergence (MACD): MACD helps us to identify the trend with help of two moving average of stock's price. Cross comparing MACD signal with other indicator can provide confirmation of trend strength or trend changes.

Bollinger Band: Cross comparison of this technical indicator can help identify volatility and potential price reversal points.

Building a hybrid solution that combines these technical indicators with machine learning models such as LSTM will be an effective approach. This model will have potential to learn complex patterns and relationship in the data while the technical indicators provide interpretability and insights into stock market. By combining these approaches, we can enhance the accuracy and robustness of stock price predictions.

3. **Briefly present the limitations of your research work.**

A In this Research the potential limitations we can observe are.

Model Complexity: Even though the model was complex it was able to determine complex patterns, but I have seen that there was problem of Overfitting for 60 days.

Assumption and Generalization: Research often involves making assumption about the data. Some of the results might have got affected by data.

Resource Constraint: if the Model was build on a high end processor this could have resulted in better and faster training this could have helped me with more trail and I could have bought accuracy close to 1.

Temporal Constraints: Research was conducted within specific timeframe and due to this I could not explore more with different combination of optimizers and activation functions.

4. **Justify why you have decided to analyse tenforflow2 and keras for stock market analysis.**

A.

Community Support: Whenever I got stuck with some part of code or implementation because of clear documentation and more people using it I got my doubt solved with 1 or 2 days

Ease of Use: As Keras is a high-level API running on Tensorflow 2 and it provides with user friendly interface. Tensorflow 2 and it's integration with Keras enhances it's accessibility.

Flexibility and Customization: TensorFlow 2 and Keras offer vital flexibility in customizing neural network architectures, a critical aspect in stock market analysis. The financial domain demands tailored models capable of capturing intricate patterns and dependencies within time series data. These frameworks not only provide a user-friendly interface for rapid prototyping but also support a diverse range of neural network architectures, including Recurrent Neural Networks (RNNs) and Long Short-Term Memory networks (LSTMs).

Scalibility: TensorFlow's scalability extends model deployment across CPUs, GPUs, and TPUs, a crucial advantage in handling substantial stock market datasets and accommodating future scaling needs. Its seamless adaptation to diverse hardware environments ensures efficient processing of extensive financial data, enhancing model performance and positioning TensorFlow as a versatile framework for evolving computational requirements.

Pre-Trained Models: Resources like TensorFlow Hub offer pre-trained models that can be leveraged for transfer learning. In financial markets, where labeled data may be limited, transfer learning becomes a powerful tool to enhance model performance by leveraging knowledge from pre-existing models.

Thankyou