Assignment 2: Stock prediction using LSTM

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1 Questions

1. **Why is it important to choose a specific time range for stock data? How might this choice affect the analysis?**

   Is important because directly influence in the behaviour of the model. It affect the ability of the model to generalise and also to avoid the overfitting.

   The choice of a specific time interval for the stock market data is important because depending on the dates it may not capture the market conditions or the reality of the actual market, and that also affect to the results and the analysis that we want to do with the model.

2. **What are the potential limitations of using Yahoo Finance data for stock market analysis?**

   The potential limitation of Yahoo Finance data for stock market analysis can be the data quality and accuracy, also the limited frequency and granularity of the data together with delayed data that we need to do with certain types of analysis in trading strategies. Finally another limitation could be the lack of some metadata that could be interesting to have in order to fine tune the preditions.

3. **How does the choice of moving average window size (e.g., 20, 50, 100 days) impact the analysis of stock trends?**

   The size of the moving average window sizes have an important impact in the analysis, as it determines how much short term price noise is smoothed versus how quickly the moving average responds to recent changes in the market.

   The choice of a window size should be in line with your trading strategy and investment horizon. A short window may be better for active traders looking to capture quick movements, while a longer window is often more suitable for long term investors who prefer to filter the volatility of that the market can be during the course of a day.

4. **What are the key steps involved in preparing data for an LSTM model? Why are these steps necessary?**

   To preparing data for an LSTM model involves several key steps, starting with the data cleaning and the missing values, then we need to normalize or scaling the data. Once we have this steps done, we nned to restructure the data into sequences and also training the data spliting based on time (chronologically), finally we need to reshape the input in a three dimensional format (samples, timesteps and features) that LSTM layers can correctly intepret.

   Each step are important to ensuring that the model learns effectively from sequential information, ensuring robust training and meaningful predictions.

5. **After training the LSTM, evaluate its performance. How well does the model predict stock prices, and what might be causing any inaccuracies?**

   In many cases, the model may capture the general trend of the stock price, but have difficulty in accurately predicting individual fluctuations.

   There are many factors might cause inaccuracies, like the market volatility, the market noise, the limited feature set used in the model, the inadequate choice of the hyperparameters or the model architecture.

6. **Discuss the limitations of using an LSTM for stock price prediction. What other approaches could be used, and why?**

   The limitations of using an LSTM for stock price prediction can be the overfitting and the sensitivity for that LSTMs require a careful tunning of the hyperparameters, also the abrupt changes due to external factors like economic events or policy shifts limits the predictive accuracy during this volatile periods.

   We can use another approaches like tradicional time series models, transformer models or temporal convolutional networks, also hybrid models can be used.

7. **You have a friend looking to invest. How would you explain the results of your model, so that your friend can make an informed decision whether to use it or not?**

   I would explain to my friend that the model can provide valuable information on trends but he should be cautious. Especially if wants very accurate predictions, the results will not be what we need to do a good investment, but if we want to know longer term trends, it can be a useful tool. Even so this model don't take into account factors outside of the yahoo finance data neither is optimised for specific market analysis.

   However I would also explain that investing in the stock market always involves risk and is best to use multiple tools and information before making any decisions.