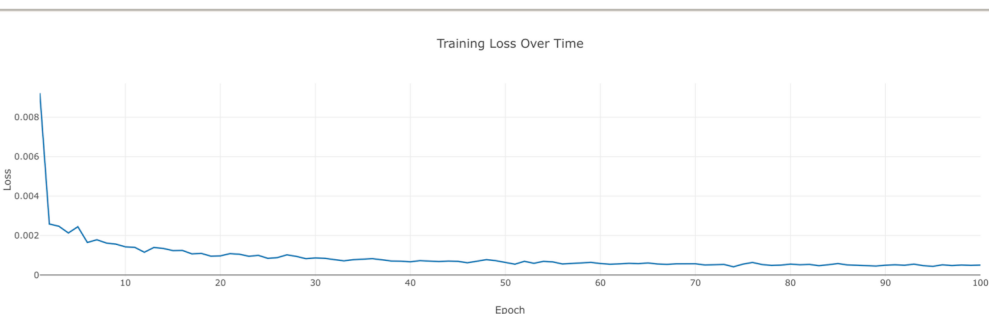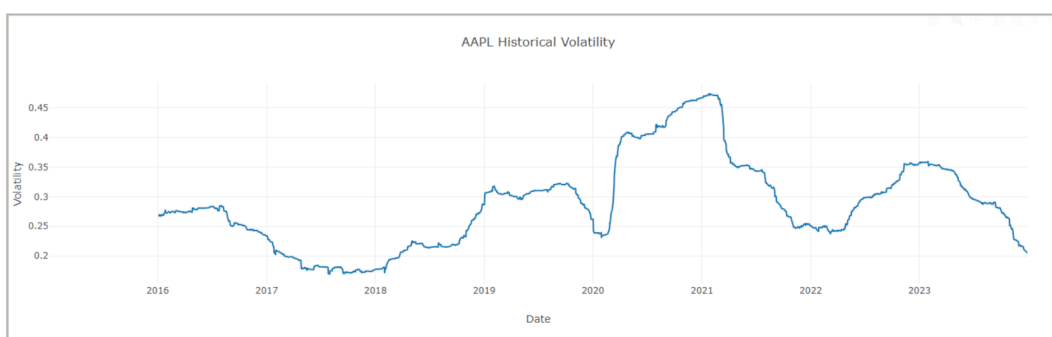# STOCK PREDICTION?

Long Short-Term Memory

- LSTM a type of recurrent neural network (RNN) that excel in learning from sequences of data like the volatile stock prices.
- Data collection- Historical stock price data from Yahoo! Finance is used to predict stock prices based on past data from 01-01-2015 to 01-01-2024.
- Training - Trained on two LSTM layers along with dropout layers (a process to prevent overfitting) whilst a single dense layer works as a final output layer for making predictions.
- The LSTM model acts as a foundation to our web application.
- Training loss over time - provides a valuable insights into the learning dynamics of our LSTM network.
- The graph below shows shows how well our model learnt and predicted stock prices compared to the actual data without any overfitting or underfitting however the learning of the network heavily relies on user parameter inputs.

Training Loss Over Time

User Interface powered by Dash

- Provides a simple interface via Dash for data visualisation (viewing our algorithmic predictions compared to the actual prices).
- Required inputs from user - Symbol, Epochs quantity, Sequence length and Batch Size then click "SEARCH" button.
- Displays a short summary and the real-time stock prices of the company according to the user input.
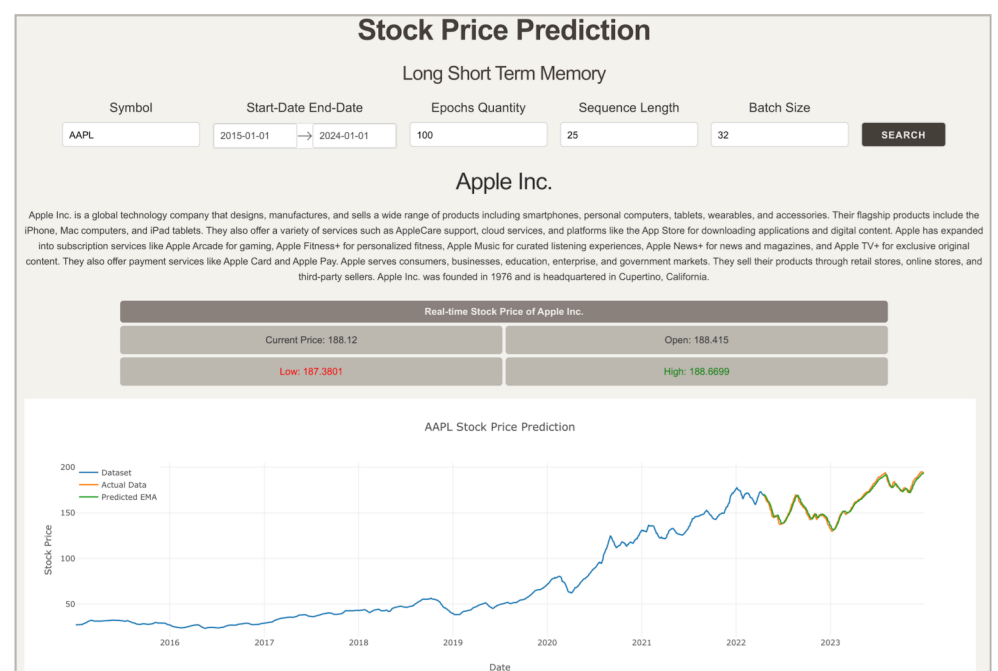

Features

- **Downloadable Graph:** Offers the option to download the prediction graph as a PNG image.
- **Real-time Updates:** Fetches and displays real-time stock information.
- **Dynamic Plotting:** Generates interactive plots for stock price predictions and the actual prices.
- **Training Loss over time:** Illustrates the model's performance over time.
- **Epochs quantity, Batch size and Sequence length Customisation:** These parameters can be customised by users based on preferences however the optimum figures are 75, 32 and 25.
- **Historical Volatility visualisation**: Shows how much a particular stock' price increase or decrease over a period of time.

AAPL Historical Volatility

Analyst Companion

- Our program uses ChatGPT turbo 3.5 for users to ask questions and get information about stock prices with our AI assistant. For example, you could ask our AI assistant questions like why the price of a particular stock decreased in a specific month?
- User-friendly and easy to use chatbot - The context for the chat is provided beforehand so users can simply ask questions and get the most relevant and accurate response.
- ChatGPT 3.5 - has a knowledge cut-off by April 2023 so it is not aware of the financial information, events or data that past the cut-off period.
- OpenAI API model can be easily changed to switch from gpt-3.5-turbo to other models such as gpt-4-turbo.

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