Python and Finance

Using python to make a stock ticker dashboard and the application of EDA and LSTM for the prediction of stock price

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***Abstract*—This document contains the report on the project work done for the course DSE 309, Advanced programming in python.**

***Index Terms*—Python, finance, coding, dashboard, EDA, LSTM**

I. Introduction

This project report shows few of the many ways in which python can be applied into finance.

II. Ease of Use

Python is an interpreted, object-oriented, high-level programming language with dynamic semantics. Its high-level built in data structures, combined with dynamic typing and dynamic binding, make it very attractive for Rapid Application Development, as well as for use as a scripting or glue language to connect existing components together. Python's simple, easy to learn syntax emphasizes readability and therefore reduces the cost of program maintenance. Python supports modules and packages, which encourages program modularity and code reuse. The Python interpreter and the extensive standard library are available in source or binary form without charge for all major platforms, and can be freely distributed.

A. Stock ticker dashboard

A web application was made that will fetch the data of stockprice using a web-based API (alpha vantage API), the data obtained is further processed using pandas library.

For the visualisation dash and plotly libraries were used.

In the dashboard the one day change is shown in percentage and the buttons and the plots are customized to turn green when the prices go up and red when they go down.

a) Dataset: The dataset deals with the prices obtained within the interval of around 15 minutes.

b) Limitations: Since a free version of API was used the number of call requests are limited and so is the frequency of calling for the prices also this free version of API does not provide exact real time data.

c) Further Works: Using a more professional API or the paid version of the API used in this project itself will improve the features offered by the dashboard and further can be used to make a real time trading bot that will trade on behalf of the user while predicting the momentum of the stock price.

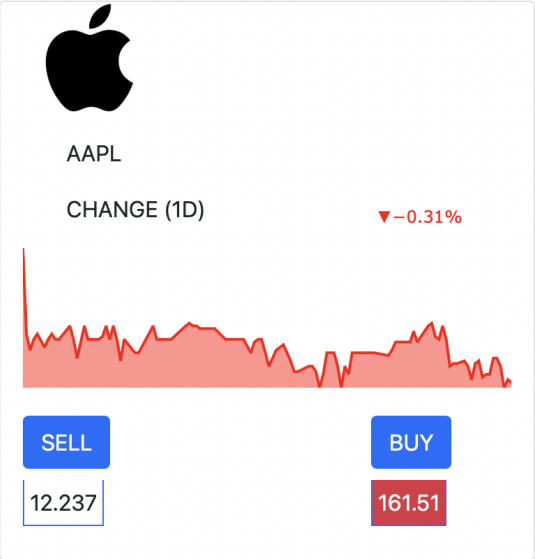

Fig. 1. Dashboard Interface

B. Price prediction using LSTM and EDA

a) Introduction: The Bombay Stock Exchange (BSE) is the first and largest securities market in India and was established in 1875 as the Native Share and Stock Brokers' Association. Based in Mumbai, India, the BSE lists close to 6,000 companies and is one of the largest exchanges in the world, along with the New York Stock Exchange (NYSE), Nasdaq, London Stock Exchange Group, Japan Exchange Group, and Shanghai Stock Exchange.

b) EDA: Exploratory Data Analysis is an approach in analyzing data sets to summarize their main characteristics, often using statistical graphics and other data visualization methods. EDA assists Data science professionals in various ways:- 1 Getting a better understanding of data. Here I have tried to predict the stock prices of TATAPOWER using EDA and LSTM.

c) LSTM: LSTM networks were designed specifically to overcome the long-term dependency problem faced by recurrent neural networks RNNs (due to the vanishing gradient problem). LSTMs have feedback connections which make them different to more traditional feedforward neural networks. This property enables LSTMs to process entire

sequences of data (e.g. time series) without treating each point in the sequence independently, but rather, retaining useful information about previous data in the sequence to help with the processing of new data points. As a result, LSTMs are particularly good at processing sequences of data such as text, speech and general time-series.

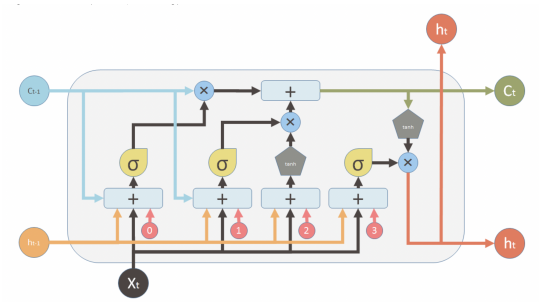

Fig. 2. LSTM Architecture

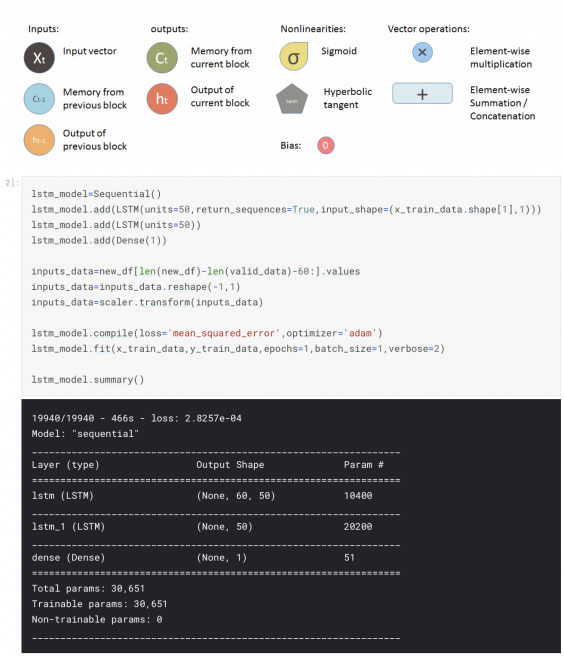

Fig. 3. LSTM Implementation Code

d) Working of the LSTM model:

e) Dataset: This dataset contains historical prices of TATAPOWER from Bombay Stock Exchange with 15 minute interval.

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