Stock Price Prediction Using LSTM

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Abstract

Stock market is the widely used investments scheme promising high returns but having little bit risk involvement. stock market can be simply derived as variation-demand and supply strategy .An intelligent prediction model is generated which is quite essential. The deep neural network is integrated with famous and employed LSTM model for predicting the adequate future value of stock market by forecasting and exploring the stock compared predictions (results). There is a production of an instantaneous visualisation of the market index. User's requirements are satisfied when the data sets of corporations are stored in the project.

Introduction:

The project named as stock price prediction, which does a great job at predicting the stock price by imparting the act of trying the approach to determine the value of a company stock or other financial instrument's gains based on trade and financial exchange. Generally this paper purposes a defined machine learning model to predict stock market price. The investor's gain is fully dependent and even also fluctuates whether the price is incremented or decremented. Relatively accurate predictions brings maximum profit to investors like when market contributors and participants spend much time and money to collect and even analyse relevant information just before making the actual investment decision. By using neural networks for the fully employed model which is based on historical data including stock min terms. Stock market is a very volatile market and profit and loss is rapid. Because of advancing technology and machine learning, one can easily understand functioning of stock market and minimize loss and take smart decisions.

Long short term Memory (LSTM) networks are a type of Recurrent Neural Network capable of learning Order dependence in sequence prediction problems.

LSTM includes a memory cell that conducts the computations and acts like neurons. These memory cells help in remembering historical data and inputs and forgets irrelevant data. Hence networks are able to predict the required value. LSTM networks are used to handle situations where Recurrent neural networks fail.

Here in this project we have used the data of Tata Beverages Global Ltd and we have used LSTM to make predictions based on the data. The next section will be methodology section where the explanation of each process will be provided in detail.

METHODOLOGY:

As to execute the proposed system we will specify, Long Short-Term memory and Recurrent Neural Networks for this project that cause us to comprehend the structure of the proposed network.

In this section, the methodology of the project is discussed. The project consists of several stages which are
as follows:

- **Stage 1:** Extraction Of Raw Data: The stock data is retrieved from National Stock Exchange and future prediction of this data is done.
- **Stage 2:** Data Pre-Processing: The raw facts of this project comprised of two parts, first is about historical component stock and second one is financial domain which in turn collected from stock data. Thoroughly it further illustrates relationship between sentiments of data and the stock price. After data pre-processing, data is transformed or normalized then the redundant data is removed, missing values are filled and at last data is integrated. After all the processes are conducted, the dataset is partitioned so that training and testing can be performed.
- **Stage 3:** Feature Extraction: In this stage only the features required by the neural network. The required features are date, open, high, low, last, close, total trade quantity, turnover.
- **Stage 4:** Training: The LSTM model has 6 layers followed by an LSTM layer, a dropout layer, again one LSTM layer, third LSTM layer, second dropout layer, a dense layer respectively. The overfitting in the required network is just prevented by dropout layers with adequate dropout rate. Here is the sample of code for implementation of neural network in Keras:

```
model = Sequential()
model.add(Dense(12, input_dim=8, activation='relu'))
model.add(Dense(8, activation='relu'))
model.add(Dense(1, activation='sigmoid'))
# compile the keras model
model.compile(loss='binary_crossentropy', optimizer='adam',
metrics=['accuracy'])
# fit the keras model on the dataset
model.fit(X, y, epochs=150, batch_size=10)
# evaluate the keras model
_, accuracy = model.evaluate(X, y)
print('Accuracy: %.2f' % (accuracy*100))
```

- **Stage 5:** Output Generation: The output value is generated by Recurrent Neural Network (RNN).

The output graph will be of closed v/s predictions.

PERFORMANCE EVALUATION:

- Dataset Description: The data has been acquired from data-flair.com released by National stock exchange (NSE). Data ranges from year 2012 to 2019.
- Sequence Data: We have got 1236 sequences from the data ranging from 2012 to 2019.
- Training Detail: We integrated neural network with famous LSTM model to identify and extract the combining stock adjust closed price and predicted price.
  We have used google collab, that allow us to create and execute python based tools which also imparts Keras (frontend) and LSTM (backend).

We have a set of parameters to present historical component stock with the same time period as stock data.

ANALYSIS:

The comparison comes under existence when we predicted the stock price by enhancing and evaluating our historical stock component which further includes dataset value comparison of stock data of two or more companies (Facebook, Apple, Tesla, Microsoft).
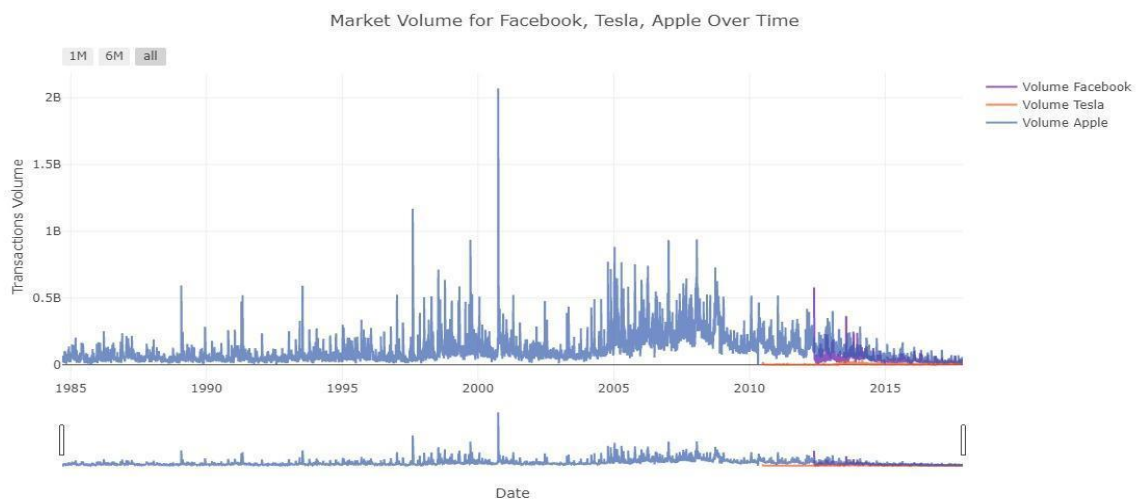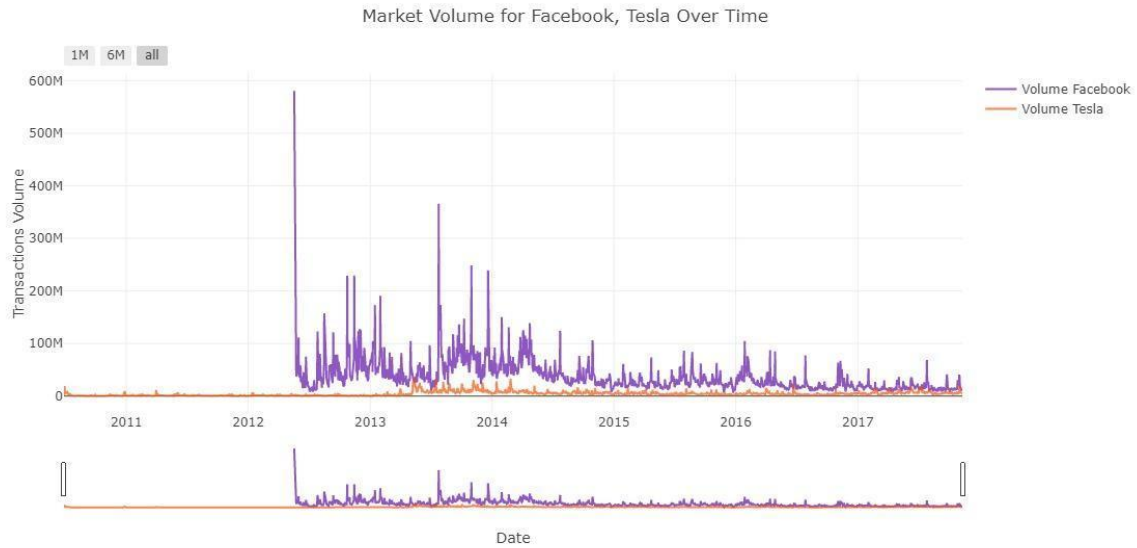
EXPERIMENTAL RESULTS:

	Date	Open	High	Low	Last	Close	Total Trade Quantity	Turnover (Lacs)
0	2018-10-08	208.00	222.25	206.85	216.00	215.15	4642146.0	10062.83
1	2018-10-05	217.00	218.60	205.90	210.25	209.20	3519515.0	7407.06
2	2018-10-04	223.50	227.80	216.15	217.25	218.20	1728786.0	3815.79
3	2018-10-03	230.00	237.50	225.75	226.45	227.60	1708590.0	3960.27
4	2018-10-01	234.55	234.60	221.05	230.30	230.90	1534749.0	3486.05

fig. different parameters
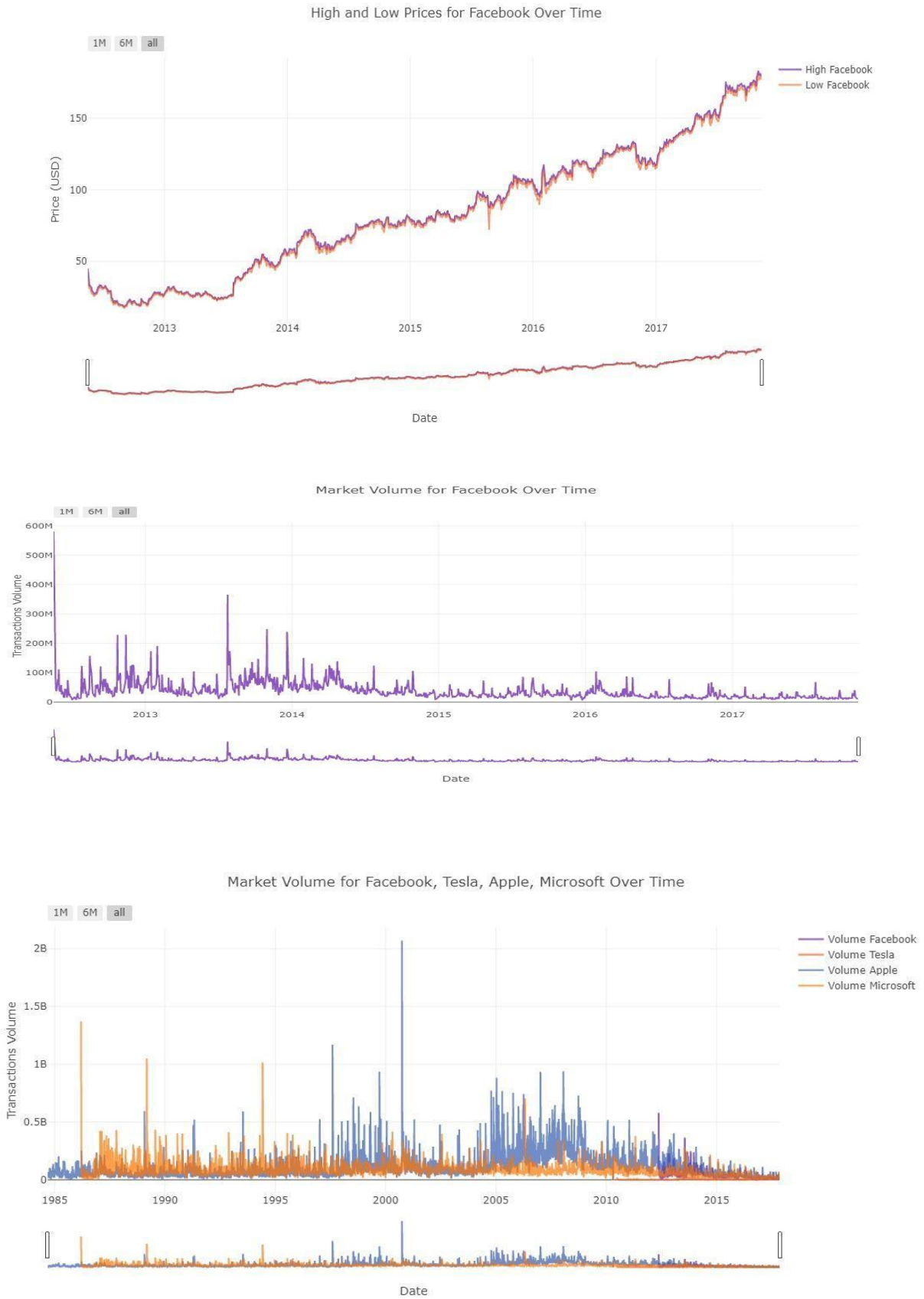
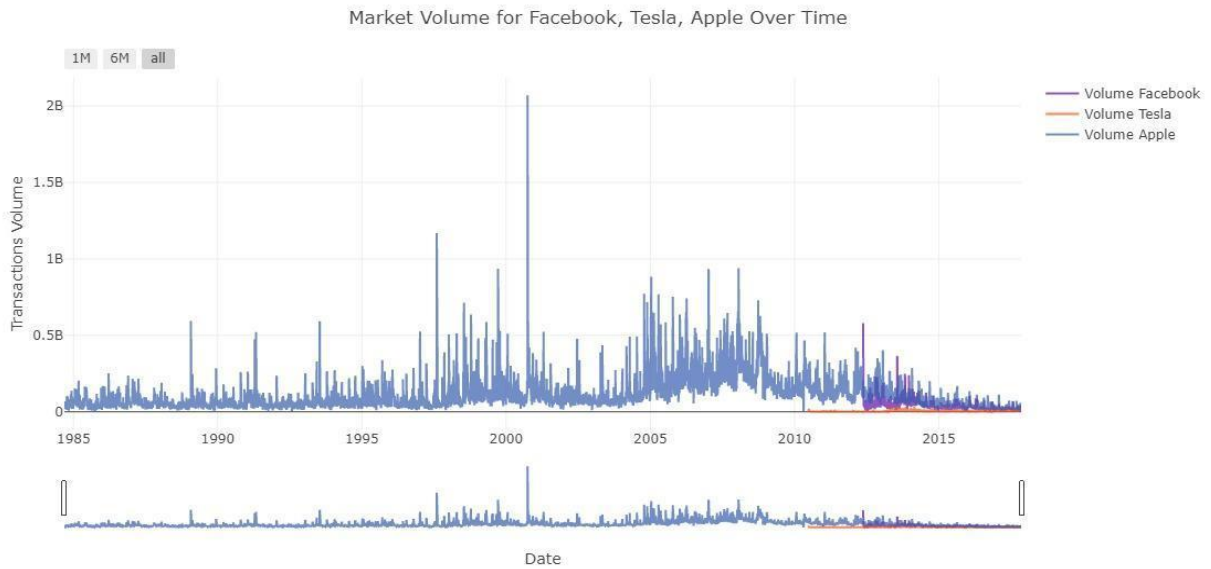fig. comparing facebook apple tesla and microsoft

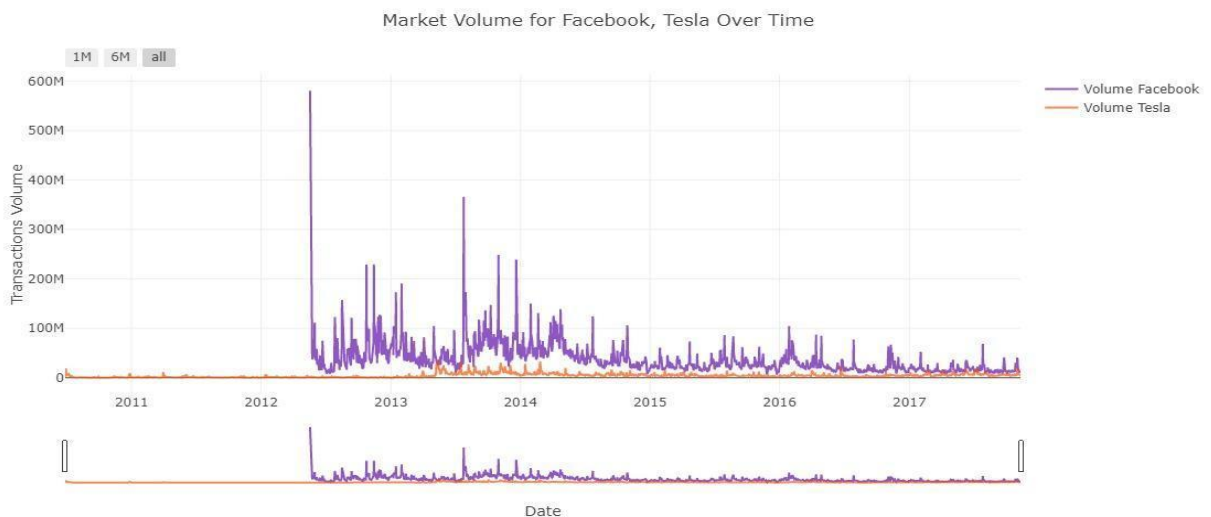**fig. comparison btw facebook ,apple and tesla**

fig.comparison btw facebook and tesla

CONCLUSION

To identify and extract opinions we integrated the deep neural network with the famous employed LSTM model. Combining the stock adjust close price and compound score to reduce the investments risk. in stock market various data sets of different corporations in the stock market are available. The project successfully compared the accuracy by distinguishing various company's stock rates graphically .

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