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PROGRESSION FORECASTING FOR STOCKS USING DEEP LEARNING AND CLASSIFICATION ALGORITHMS

Mohammed Abdul Nayeem[1] Mr. Abdul Rais[2]

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Abstract

The potential of using the intact skin as port of drug Administration has been recognized for several decades. Transdermal therapeutic systems have been designed to provide controlled continuous delivery of drugs via the skin to the systemic circulation. Griseofulvin (GSF) loaded polyvinylpyrrolidone (PVP k-90) composite electro spun nanofiber (NF) was developed, and hybridized as a transdermal patch. The Formulation was optimized by factorial design (design expert software). There are 8 batches are prepared and evaluated. The nanofiber was prepared by using 0.56% w/w PVP and loaded with 3 % wt. GSF. The prepared NF was characterized by scanning electron microscopy (SEM), Fourier transform infrared spectroscopy (FT-IR), ultraviolet–visible spectroscopy, differential scanning calorimetry (DSC), and X-ray diffraction (XRD). The NF mat was hybridized in to transdermal patches then its physical-chemical parameters and in vitro diffusion of GSF were also evaluated. The prepared formulation ideally followed the Zero-order kinetics (r2 = 0.973).) considered very high and fall under the accepted range. The Optimized formulation containing diameter of nanofiber 84.03 nm Cumulative drug release of NF is 88.3% for 5 hr.

Keywords: Nanofiber, Nanoscale, Life- threatening, Regression.

[1]Research Scholar, Dept. of Computer Science and Engineering, Lords Institute of Engineering & Technology, Hyderabad, Telangana

[2]Asst Professor, Dept. of Computer Science and Engineering, Lords Institute of Engineering & Technology, Hyderabad, Telangana

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I. INTRODUCTION

Forecasting stock exchange prices is one of the complex problems that can be solved by machine learning and deep learning techniques. The stock data is always nonlinear and does not follow any particular pattern and is governed by multiple factors such as nature of markets, investor ideology, performance of various public companies, politics etc., which need complex mathematical calculations to understand and predict it. It is essential that the stock market information should be effectively and efficiently processed before it is fed to various machine learning models. Using this mechanism the stock and index values can be predicted with greater accuracy. Stock market prediction system will help immensely to stop losses that might incur due to sudden falling up stock prices can benefit the traders traders and stockholders. The machine learning models have the capabilities to automatically identify and learn the patterns within the start data and hence are suitable for predicting stock trends.

In this project, we propose to compare the performance of various machine learning models like XGBoost, Adaboost, Linear regression etc and deep learning mechanisms like RNN and LSTM to forecast the stock trends. 10 different technical indicators for the past 10 years serves as the input to our system. Two different approaches for productions are also employed. They are non discrete approach and discrete approach to understand the impact of preprocessing before feeding the data to the machine learning models. The discrete approach utilizes data such as open, close, high and low values of the stocks. The non discrete approach utilizes pre-processing to convert non discrete data into discrete data and then feed it to the model for stock prediction. The performances thoroughly evaluated for three classification metrics and identify the best tuning parameter foreach model. We strongly believe that this model can pave a way and help in building a real time system that can predict stock market trends in live environments

II. SYSTEM ANALYSIS

Problem statement:

The stock data is always nonlinear and does not follow any particular pattern and is governed by multiple factors such as nature of markets, investor ideology, performance of various public companies, politics etc., which need complex mathematical calculations to understand and predict it. It is essential that the stock market information should be effectively and efficiently processed before it is fed to various machine learning models. Using this mechanism the stock and index values can be predicted with greater accuracy. Stock market prediction system will help immensely to stop losses that might incur due to sudden falling up stock prices can benefit the traders traders and stockholders.

The machine learning models have the capabilities to automatically identify and learn the patterns within the start data and hence are suitable for predicting stock trends. This system will help the stockholders and traders to make appropriate decisions and help in the process of stock trading. As the stock market information would contain multiple patterns, machine learning models are the best way to predict the stock trends and price these models can learn the patterns by themselves. This would be of immense help as the traders can keep up with the fluctuating prices and improvise the trading decisions.

We aim to predict the trends with respect to this data and build a web application using which users can input the technical indicators of their choice and get predictions about the trend. Maintaining

user history or working with live environments does not fall under the purview of this project.

Objective:

In this project, our objective is to come up with effective and efficient machine learning models that can predict the movement of prices in stock exchange accurately. This system will help the stockholders and traders to make appropriate decisions and help in the process of stock trading. As the stock market information would contain multiple patterns, machine learning models are the best way to predict the stock trends and price these models can learn the patterns by themselves. This would be of immense help as the traders can keep up with the fluctuating prices and improvise the trading decisions.

Aim of the project:

In this project, we aim to come up with effective and efficient machine learning models that can predict the movement of prices in stock exchange accurately. This system will help the stockholders and traders to make appropriate decisions and help in the process of stock trading. As the stock market information would contain multiple patterns, machine learning models are the best way to predict the stock trends and prices these models can learn the patterns by themselves. This would be of immense help as the traders can keep up with the fluctuating prices and improvise the trading decisions.

Scope of the project:

We have initially done the data analysis for these IT companies using past one year data from Yfinance. The evaluatioionn of algorithms and creation of model uses 10 years of stock data from Yfinance. We have truncated the last 60 days of data and used it for testing and prediction.The remaning data of 9 years and 10 months has been used for training the LSTM model. When the predictions are made on the test data which is the last 60 days data and compared with the actual stock values of the last 60 days, we observed that the LSTM model that we have developed has given high accuracy with very minimal deviation. The application is hosted as a web application where the admin of the system can analyze the stock data, compare multiple algorithms on the dataset and create the final model for predicting the stock values. The application is hosted as a web application for users to utilize the services of making future predictions for stock data.

Proposed System:

In this project, we emphasize over evaluation process on prediction performance of five machine learning models (Decision Tree, Random Forest, Adaboost, SVC, Logistic Regression) and deep learning methods (LSTM) towards forecasting stock market trends. We have initially done the data analysis using past one year data of Microsoft corporation from Yfinance. However, the evaluation of algorithms and creation of model uses 10 years of stock data from Yfinance. We have truncated the last 60 days of data and used it for testing and prediction. The remaining data of 9 years and 10 months has been used for training the LSTM model. When the predictions are made on the test data which is the last 60 days data and compared with the actual stock values of the last 60 days, we observed that the LSTM model that we have developed has given high accuracy with very minimal deviation. The application is hosted as a web application where the admin of the system can analyze the stock data,

compare multiple algorithms on the dataset and create the final model for predicting the stock values. The application is hosted as a web application for users to utilize the services of making future predictions for stock data. The application has been developed to predict the stock values for 4 top IT companies from such as Apple, Google, Amazon, Nvidia corporation, but the system is capable of forecasting the stock values for the next 60 days for any given ticker symbol.

Advantages:

- Able to predict the stock market trends accurately.
- Minimize loss and maximize profits

III. PROPOSED MODULAR IMPLEMENTATION

Algorithm/ Technique Used:

The dataset is fit a model after performing Data Pre-processing and Feature Transformation. The training set is fed into the algorithm in order to learn how to predict values. Testing data is given as input after Model Building a target variable to predict. The models are build using:

Decision Tree
Random Forest
Adaptive Boosting (Adaboost)
eXtreme Support Vector Classifier (SVC)
Logistic Regression
Deep learning methods such as Long short-term memory (LSTM)

Below is the proposed modular implementation of the project. It consists of two modules:

1. Admin
2. User

Admin Module:

The admin of the system is responsible for the activities like:

1. Get stock data from yahoo finance
2. Data Analysis of the dataset
3. Splitting the dataset for training and testing
4. Training the model for multiple algorithms
5. Review the performance of the algorithms on the given dataset
6. Create the model using LSTM algorithm.

User Module:

The user of the system can utilize the machine learning services that are offered like:

1. Logging into the system
2. Enter stock details to predict future trends
3. Receive prediction for future trend

IV. PROJECT EXECUTION

Upload Dataset:

On this page, the administrator of the system can upload datasets that are used for training the machine learning models. The admin has to select the file by clicking on the Choose file button and click on the upload button to upload the file to the server. Once the upload is complete, a success message would be displayed that the file is successfully

uploaded. For this project we are using MSFT.csv as a dataset.

Exploratory Data Analysis:

Exploratory Data Analysis is performed on the dataset in order to clean the dataset for any missing data, identify patterns, identify the relationships of various parameters of the outputs with the help of graphs, statistics etc.

Price Analysis:

The below graph shows the Price analysis graph of past one year Stock Data for Microsoft company from MSFT.csv File.

Sales Volume Analysis:

The below graph shows the Sales Volume Analysis graph for past one year Stock Data of Microsoft company from MSFT.csv File.

Daily Return Analysis:

The below graph shows the Daily Return Analysis graph for past one year Stock Data of Microsoft company from MSFT.csv File.

Moving Average Analysis:

The below graph shows the Moving Average Analysis graph for Adjustment close of every day, Moving Average of 10 days, 20 days & 50 days of past one year Stock Data of Microsoft company from MSFT.csv File.

Compare Algorithms:

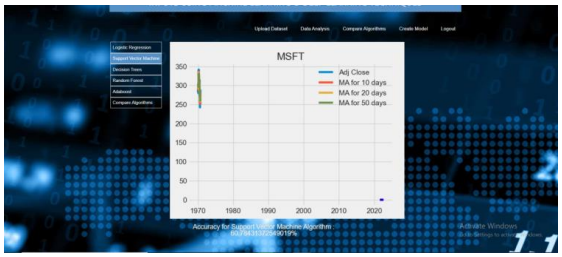
On this page, the admin can feed the dataset to various Algorithms to train them and get the test accuracy for each algorithm.

Logistic Regression:

When the dataset is feed to Logistic regression algorithm we observe that the test accuracy is 56.8627%.

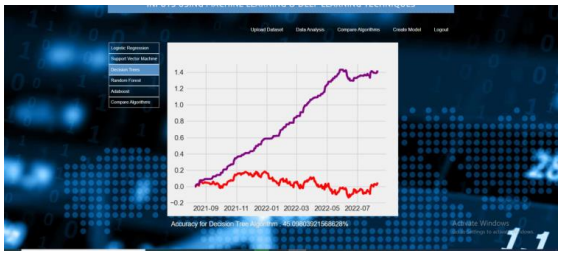
Support Vector Machine:

When the dataset is feed to Support Vector Machine algorithm we observe that the test accuracy is 60.7843%.



Decision Trees:

When the dataset is feed to Decision Trees algorithm we observe that the test accuracy is 45.0980%.

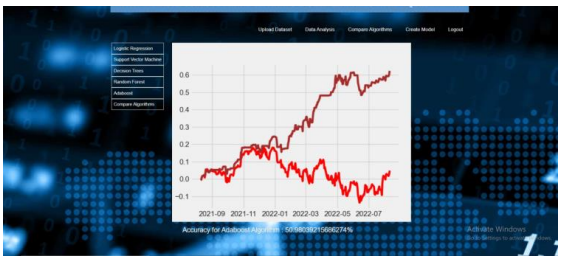


Random Forest:

When the dataset is feed to Random Forest algorithm we observe that the test accuracy is 54.9019%.

Adaboost:

When the dataset is feed to Adaboost algorithm we observe that the test accuracy is 50.9803%.

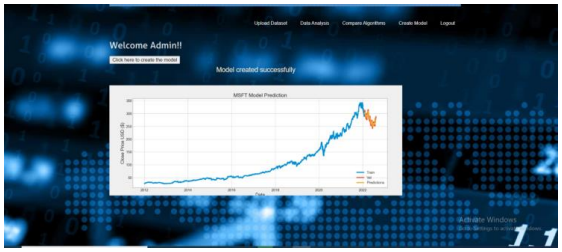


Compare Algorithms:

This screen shows the comparison of various test accuracies of the Algorithms.

Create Model:

This screen shows the creation of Model for better optimized of system.



User Home Page:

This is the User Home Page for the user module. The user need to login into the system with his credentials in order to facilitate data analysis and prediction over a of company's stock data.

Data analysis at user side:

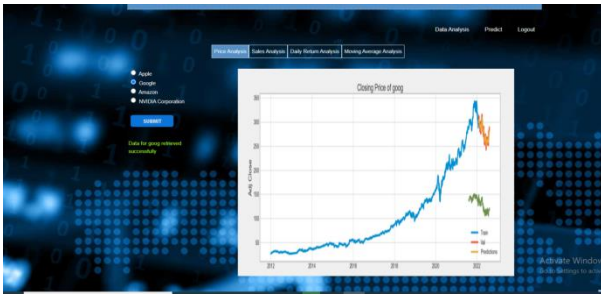
Exploratory Data Analysis is performed on a selected company Stock data got from yfinace with the operations like Price Analysis, Sales Volume Analysis, Daily Return Analysis and Moving Average Analysis over stock data of a selected company. Analysis process will be driven for 60 days and evaluated results with existing data, observed that both the values are nearby and contributed well.

User Side Data Analysis:

Exploratory Data Analysis is performed on a selected company Stock data got from yfinace in order to clean the dataset for any missing data, identify patterns, identify the relationships of various parameters of the outputs with the help of graphs, statistics etc.

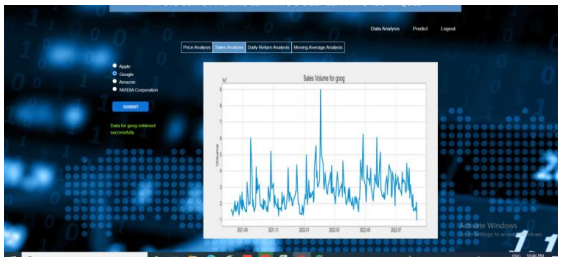
Price Analysis over User-side Data:

The below graph shows the Price analysis graph performed on a selected company Stock data i.e. Google here, got from yfinace of past one year.



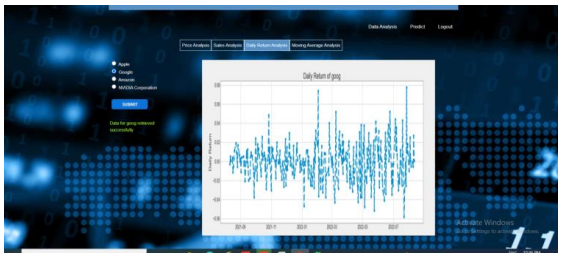
Sales Volume Analysis over User-side Data:

The below graph shows the Sales Volume analysis graph performed on a selected company Stock data i.e. Google here, got from yfinace of past one year.



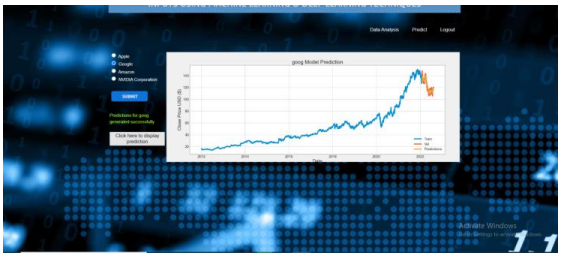
Daily Return Analysis over User-side Data:

The below graph shows the Daily Return analysis graph performed on a selected company Stock data i.e. Google here, got from yfinace of past one year.



Moving Average Analysis over User-side Data:

The below graph shows the Moving Average Analysis graph for Adjustment close of every day, Moving Average of 10 days, 20 days & 50 days of past one year Stock Data of Google company that we chosen.



CONCLUSION

In this project we successfully predicted the stock market trends using deep learning and machine learning techniques. To achieve, we have taken 10 years of stock data of top IT companies listed on NASDAQ from Yfinance such as Microsoft. We worked on a process that compares five machine learning models (Decision Tree, Random Forest, Adaptive

Boosting (Adaboost), eXtreme Support Vector Classifier (SVC), Logistic Regression and deep learning methods such as Long short-term memory (LSTM). Thus, we have taken 10 years of stock data of top IT companies listed on NASDAQ from Yfinance such as Microsoft. With the above data we compares five machine learning models (Decision Tree, Random Forest, Adaptive Boosting (Adaboost), eXtreme Support Vector Classifier (SVC), Logistic Regression and deep learning methods such as Long short-term memory (LSTM).

We have initially done the data analysis for these IT companies using past one year data from Yfinance. The evaluatioionn of algorithms and creation of model uses 10 years of stock data from Yfinance. We have truncated the last 60 days of data and used it for testing and prediction.The remaning data of 9 years and 10 months has been used for training the LSTM model. When the predictions are made on the test data which is the last 60 days data and compared with the actual stock values of the last 60 days, we observed that the LSTM model that we have developed has given high accuracy with very minimal deviation. The application is hosted as a web application where the admin of the system can analyze the stock data, compare multiple algorithms on the dataset and create the final model for predicting the stock values. The application is hosted as a web application for users to utilize the services of making future predictions for stock data. The application has been developed to predict the stock values for 4 IT companies but the system is capable of forecasting the stock values for the next 60 days for any given ticker symbol and achieved about 95% of accuracy.

Future Scope:

In future, the UI of the system can further be enhanced to make stock predictions for any ticker and also predict stock values of stocks from other stock exchanges other than NASDAQ.

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