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PREDICTING STOCK MARKET TRENDS USING MACHINE LEARNING AND DEEP LEARNING

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ABSTRACT

In this research, we concentrate on comparing predicting performance of different machine learning models and deep learning approaches to prognosticate stock market movement. Numerous specialized indicators are applied as inputs to our models. Our study includes two different approaches for inputs, continuous data and binary data, to research the effect of pre-processing; the former uses stock trading data (open, close, high and low values) while the latter employs pre-processing step to convert continuous data to binary one. Each specialized indicator has its specific possibility of upward or down movement predicated on market integral properties. The performance of the mentioned models is compared for the both approaches with classification metrics, and the best tuning parameter for each is reported. All experimental tests are done with old times of historical data of four stock market groups, that are completely pivotal for investors. The future up or down trend is associated and when binary data is given as the input values to the predictors, we enter data with a recognized trend based on each feature's property.

I. INTRODUCTION

The nature of stock market movement has always been opaque for investors because of varied influential factors. This study aims to significantly reduce the threat of trend forecasting with machine learning and deep learning algorithms. Four stock market groups, namely diversified financials, petroleum,non-metallic minerals and essential matter from Tehran stock exchange, are chosen for experimental evaluations. This study compares nine machine learning models (Decision Tree, Random Forest, Adaptive Boosting (Adaboost), eXtreme Gradient Boosting (XGBoost), Support Vector Classifier (SVC), Naïve Bayes, K-Nearest Neighbors (KNN), Logistic Regression and Artificial Neural Network (ANN)) and two important deep learning approaches (Recurrent Neural Network (RNN) and Long short- term memory (LSTM). Ten specialized pointers from ten years of historical data are our input values, and two ways are supposed for employing them. Originally, calculating the indicators by stock trading values as continuous data, and secondly converting indicators to binary data before using. Each prediction model is estimated by three criteria based on the input ways. The evaluation results indicate that for the continuous data, RNN and LSTM outperform other forecasting models with a considerable difference. Also, results show that in the binary data evaluation, those deep learning approaches are the best; though, the difference becomes lesser because of the noticeable enhancement of models' performance in the successive way.

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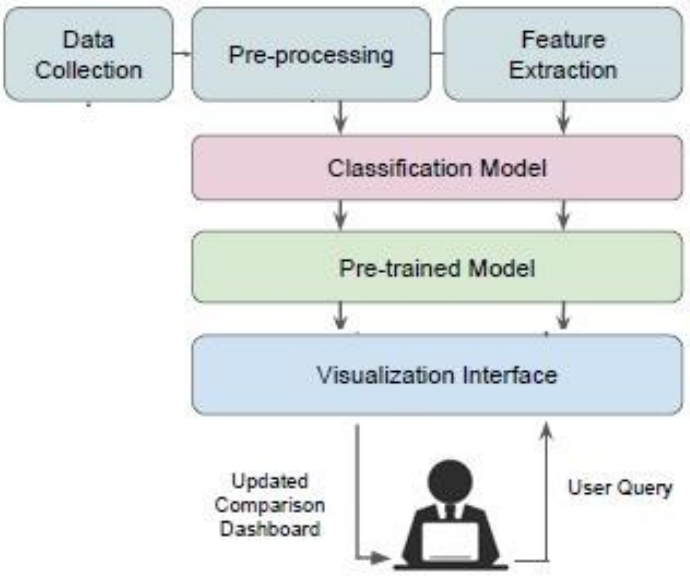
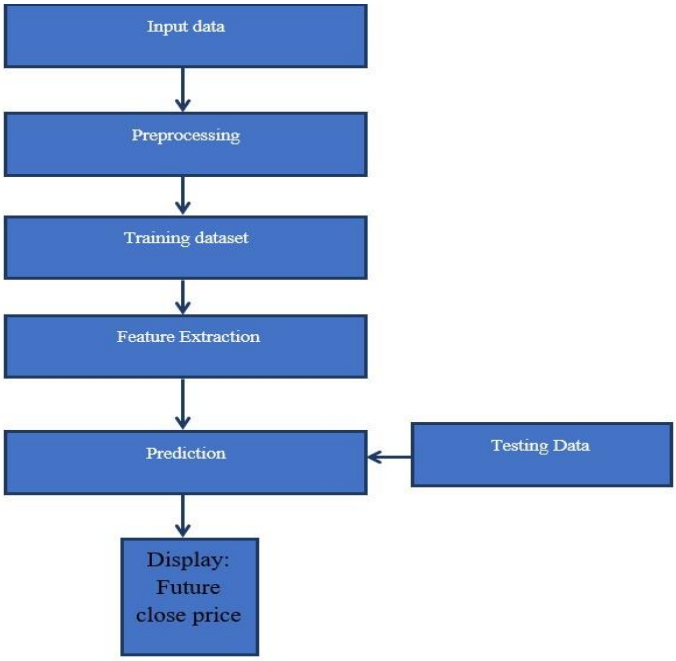
II. METHODOLOGY

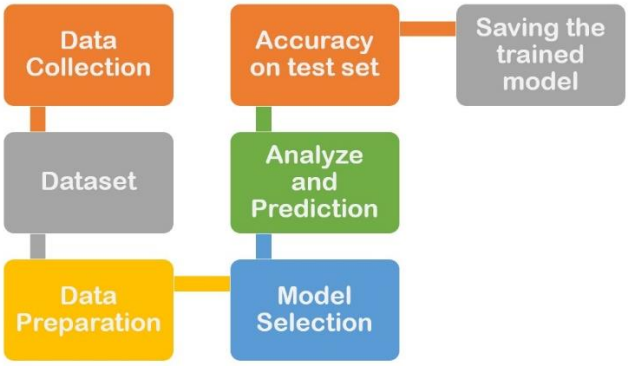
SYSTEM ARCHITECTURE



DATA FLOW DIAGRAM



IMPLEMENTATION MODULES



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1. Data collection

This is the first real step towards the real development of a machine learning model, collecting data. There are several ways to collect the data, like web scraping, automatic interventions and etc.

2. Dataset

The dataset consists of 100252 individual data. There are 8 columns in the dataset completely which have attributes are date, open, close, high, low, adj, close, volume.

3. Data Preparation

we will convert the data. By getting relieve of missing data and removing some columns. First we will produce a list of column names that we want to keep or retain. Next we drop or remove all columns except for the columns that we want to retain. Eventually we drop or remove the rows that have missing values from the data set.

4. Model Selection

While creating a machine learning model, we need two dataset, one for training and other for testing. But now we've only one. So let's split this in two with a rate of 8020. We'll also divide the data frame into feature column and label column.

5. Analyze and Prediction

Date-specifies trading date

Close-close price adjusted for splits

6. Accuracy on test set

We got a accuracy of 94.2 on test set.

7. Saving the Trained Model

Once you 're confident enough to take your trained and tested model into the production-ready atmosphere, the first step is to save it into a. pkl file using a library like pickle.

III. RESULTS

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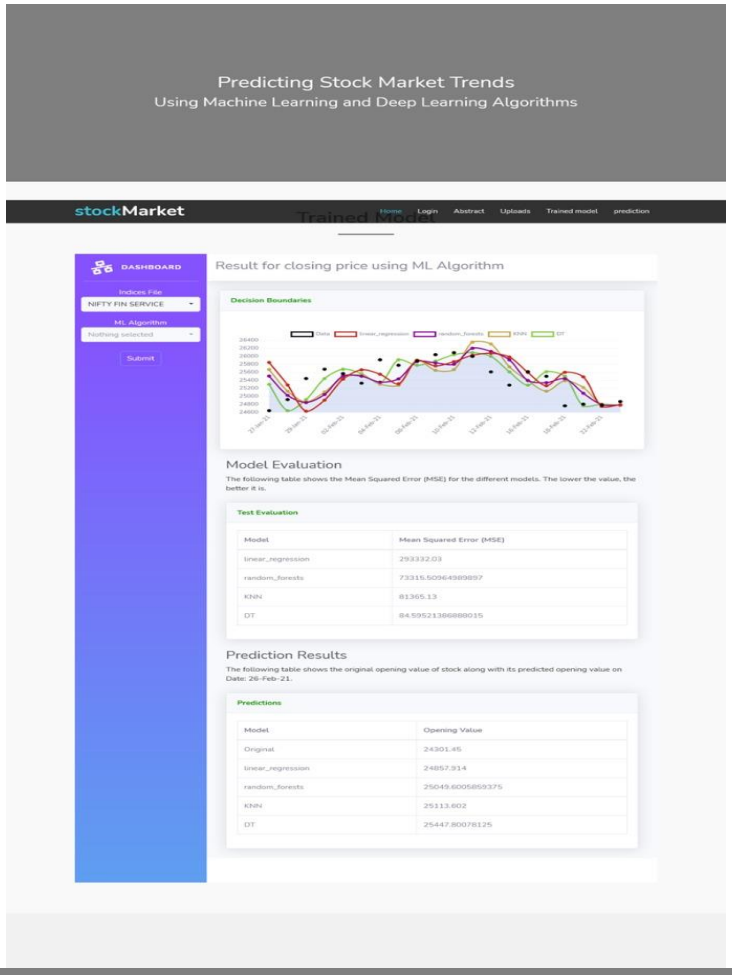

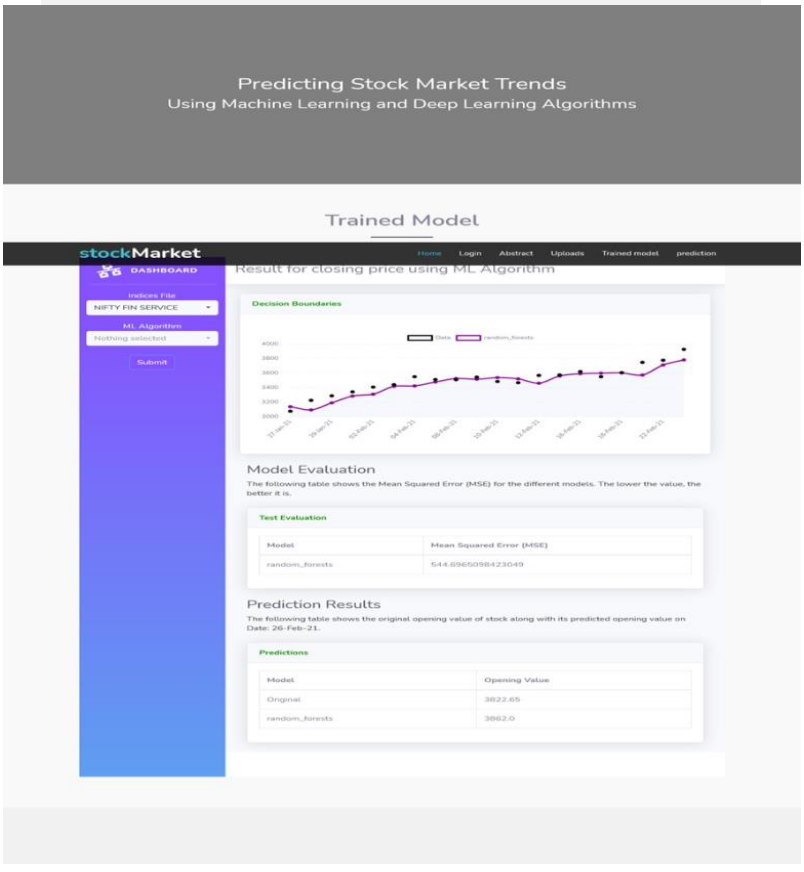

IV. FUTURE SCOPE

We believe that this study is a new study paper that incorporates multiple machine learning and deep learning approaches to enhance the forecasting task of stock groups' trend and movement. The future up or down trend is associated and when binary data is given as the input values to the predictors, we enter data with a recognized trend predicated on each characteristic's property.

V. CONCLUSION

The purpose of this study was the forecasting task of stock market movement by machine learning and deep learning algorithms. Three stock market groups, namely Nifty IT, Nifty Finance, Nifty Metal and the dataset was predicated on five years of historical records with ten technical features. Also, nine machine learning models (Decision Tree, Random Forest, Adaboost, XGBoost, SVC, Naïve Bayes, KNN, Logistic Regression and ANN) and two deep learning approaches (RNN and LSTM) were employed as predictors. We supposed two approaches for input values to models, continuous data and binary data, and we employed three classification criteria for evaluations. Our experimental workshop showed that there was a significant enhancement in the performance of models when they use binary data rather of continuous one. Indeed, deep literacy algorithms (RNN and LSTM) were our superior models in both approaches.

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