Model Comparison for the Prediction of Stock Prices in the National Stock Exchange by Data Science Techniques

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ABSTRACT
One of the most intricate machine learning techniques is the share value prediction. It depends on a variety of factors that affect supply and demand. This paper analyses different strategies for forecasting future stock price and provides an example using a pre-built model that is adapted to the Indian stock market. This research work explains the systematics of machine learning-based approaches for stock market prediction based on the deployment of a generic framework. The aim of this work is to explore and identify the models and compare them for five National Stock Exchange (NSE) Index, 50 listed Indian companies and also analysed the best prediction model for each company accordingly.

Keywords: Machine Learning, Deep Learning, Regression Techniques, Evaluation Metrics.

INTRODUCTION

Predicting stock prices is a critical task in financial markets, and it has garnered significant attention from researchers and practitioners alike. In the context of the National Stock Exchange (NSE), which is one of the largest and most liquid stock exchanges globally, accurate stock price prediction can offer substantial advantages for investors and traders. This introduction outlines the importance of model comparison in stock price prediction and the methodologies typically employed to evaluate and compare these predictive models.

The NSE holds the fourteenth (14^{th}) position in the top forty (40) future exchanges in the world. The stock market index of NSE was launched in 1996 by the name of S&P CNX Nifty (Nifty= national 50) which represents 50 stocks of 25 different economic sectors and is largely a diversified index. The NSE set the standards for many other exchanges by bringing innovative changes in products, trading, clearing, settlement, and regulations. All these made the NSE a market leader which helped set international standards for the Indian stock markets. A majority of the developments in Indian stock markets like the 19 corporatized, demutualized and fully automated Indian stock exchanges owe their origin to NSE. Thus the establishment of the NSE was a landmark in the Indian stock market scenario. Another feather to its cap is that NSE was the first stock exchange in the world to use satellite communication technology for trading. All these collectively resulted in better transparency and efficiency of Indian stock markets. Here in this report, we are going to use.

Objectives

1. To investigate the best prediction model for stocks of five companies in the National Stock Exchange Index 50 through machine learning techniques
2. To analyse the efficiency of each model evaluation metrics and features.
3. To model comparison of stock prices of five companies like TATA Steels, TCS, TATA Motors, SUN Pharma.

Motivation

Financial gain is the most fundamental motivation for predicting stock market prices. The ability to uncover a mathematical model that can consistently predict the direction of future stock prices would

make the owner of the model very wealthy. Thus, researchers, investors, and investment professionals always attempt to find a stock market model that would yield higher returns than their counterparts.
Stock market prediction using modelling is done for the purpose of turning a profit by analysing and extracting information from historical stock market data to predict the future value of stocks. The goal is to understand the deep learning models and adapt them to the Indian market. The stock market has always seemed to people outside the domain of finance and statistics as a dangerous playground. Some, failing to grasp its inherent complexity, even consider it to be similar to gambling. This is obviously not a pure game of chance, and the importance of this capstone lies in giving your average trader normal citizen an informed insight into the stock market to at least make better choices than random decisions.

METHODOLOGY

The proposed model built different machine and deep learning algorithms to predict the stock returns of the NIFTY 50 for 5 companies. Our goal is to forecast the stock price of the NIFTY 50 index through time series prediction models by using following methods.

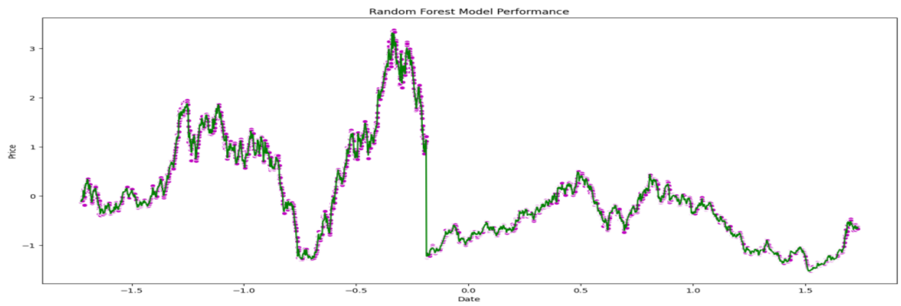
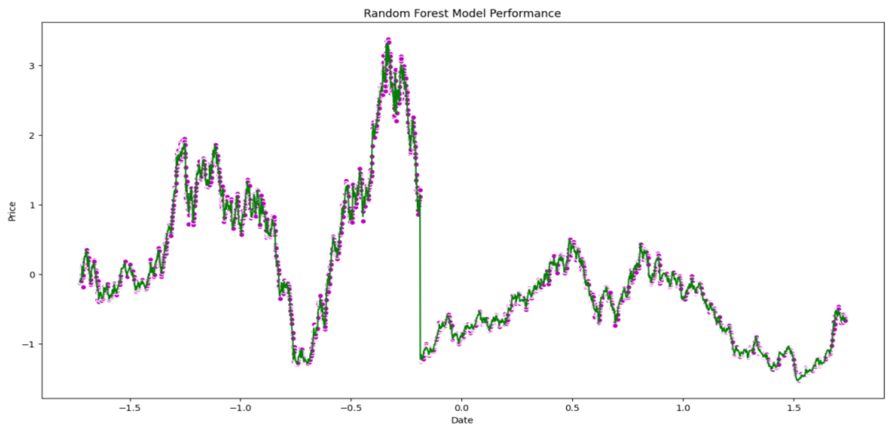
Machine Learning Models

1.Simple Linear regression, 2.Polynomial Regression, 3.Support Vector Regression, 4.Random Forest Regressor, 5.Decision Tree Regressor, 6.XG Boost Regressor, 7.Gaussian Naive Bayes, 8.Lazy Predict Regressor

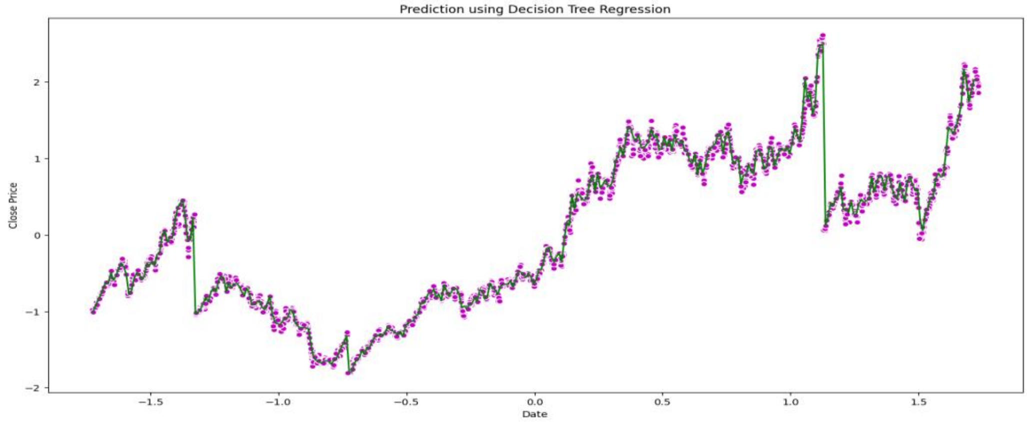
Evaluation Metrics

Evaluation metrics are attached to the tasks of machine learning and since we are trying to predict future stock prices using deep learning approaches we need to use multiple evaluation metrics to examine and determine our model's performance. We established a set of the most commonly used metrics which are (1) Accuracy, (2) the root mean square error (RMSE), (3) mean absolute error (MAE), (4) the mean square error (MSE) and (5) coefficient of determination (R^2) for comparing and optimizing our prediction models. These criteria are preferred to be smaller since they indicate the prediction error of the models.

Empirical Investigation

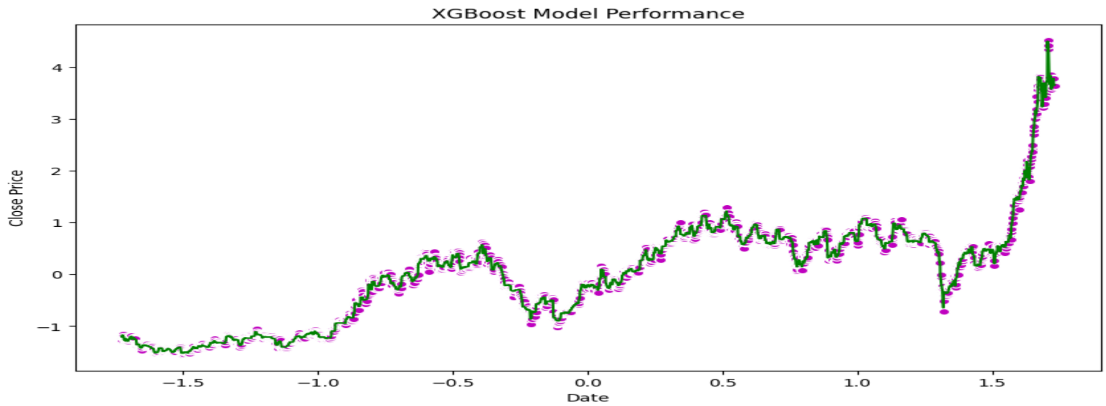
1.	**TATA STEELS**  **Fitting of predicted values (green) on actual values (lilac) in the Random Forest Regressor Model**
2	**TATA MOTERS**  **Fitting of predicted values (green) on actual values (lilac) in the Random Forest Regressor.**

3 **TATA CONSULTANCY SERVICES (TCS)**



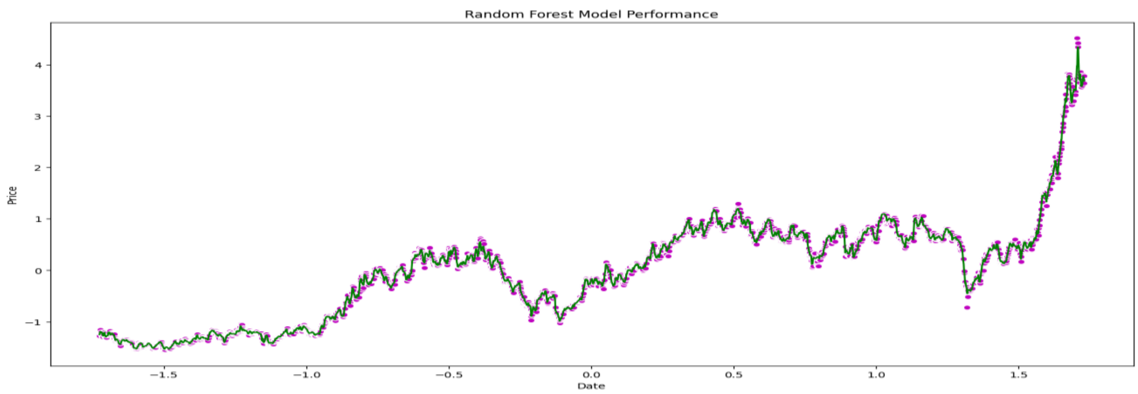
Fitting of predicted values (green) on actual values (lilac) in the Decision Tree Regressor.

4 **ADANI PORTS**



Fitting of predicted values (green) on actual values (lilac) in the XG Boost Regressor.

5 **SUN PHARMA**



Fitting of predicted values (green) on actual values (lilac) in the Random Forest Regressor

Table(1a). Here, in this table 1(a) we get Random Forest Regressor with the lowest RMSE so it's the best model for Tata Steels.

Tata - Steel Stocks				
Model Name	**R^2 Score**	**MAE**	**MSE**	**RMSE**
Linear Regression	0.01533	121.2278	22976.7	151.581
Polynomial Regression	0.07529	117.1852	21534.9	146.748
SVR	0.2027	0.6216	0.8192	0.9051
Random Forest Regressor	0.9942	0.05258	0.00591	0.07688
Decision Tree Regressor	0.9902	0.06287	0.00916	0.09569
XG Boost Regressor	0.9921	0.06189	0.00787	0.08871
Naive Bayes	0.3955	80.2863	14289.4	119.538

Table 1(b). Here, in Table 1(b) through lazy predict we have ranked the model's according to their accuracy, R-Square and MSE. Among models, we can see here also Random Forest is among the best-fitted model after Extra Tree Regressor

Lazy Predict - Regressors - Tata Steel				
Model	**Adjusted R-Squared**	**R-Squared**	**RMSE**	**Time Taken**
Extra Trees Regressor	0.9948	0.9948	0.0707	0.3587
Random Forest Regressor	0.9932	0.9932	0.0806	0.5006
Bagging Regressor	0.9927	0.9927	0.0834	0.0603
K Neighbours Regressor	0.9916	0.9916	0.0894	0.0257
XGB Regressor	0.9916	0.9916	0.0895	0.1613
Decision Tree Regressor	0.9913	0.9913	0.0910	0.0139
Hist Gradient boosting Regressor	0.9752	0.9752	0.1537	0.3603
LGBM Regressor	0.9749	0.9749	0.1547	0.0769
Gradient Boosting Regressor	0.9584	0.9584	0.1991	0.2246
Gaussian Process Regressor	0.6923	0.6926	0.5415	1.6192
Ada Boost Regressor	0.5408	0.5412	0.6616	0.0617
MLP Regressor	0.3195	0.3201	0.8053	3.8624
Nu SVR	0.2620	0.2626	0.8387	0.8394
SVR	0.2315	0.2322	0.8558	0.4735
Huber Regressor	0.0235	0.0243	0.9647	0.0159
Kernel Ridge	0.0227	0.0235	0.9651	0.5132
Lars CV	0.0222	0.0231	0.9653	0.0200
Lasso Lars CV	0.0222	0.0231	0.9653	0.0138
Lasso Lars IC	0.0222	0.0231	0.9653	0.0106
Linear Regression	0.0222	0.0231	0.9653	0.0091
Lars	0.0222	0.0231	0.9653	0.0277
Orthogonal Matching Pursuit	0.0222	0.0231	0.9653	0.0131
Transformed Target Regressor	0.0222	0.0231	0.9653	0.0139
Ridge	0.0222	0.0231	0.9653	0.0121
Lasso CV	0.0222	0.0231	0.9654	0.0801
Elastic Net CV	0.0222	0.0230	0.9654	0.0896
Ridge CV	0.0222	0.0230	0.9654	0.0095
Bayesian Ridge	0.0220	0.0228	0.9655	0.0144
SGD Regressor	0.0215	0.0223	0.9657	0.0105
Linear SVR	0.0191	0.0200	0.9669	0.0146
Tweedie Regressor	0.0139	0.0148	0.9694	0.0106
Lasso Lars	-0.0018	-0.0009	0.9771	0.0134
Dummy Regressor	-0.0018	-0.0009	0.9771	0.0088
Lasso	-0.0018	-0.0009	0.9771	0.0127
Elastic Net	-0.0018	-0.0009	0.9771	0.0097
Quantile Regressor	-0.0026	-0.0018	0.9775	506.3521
RANSAC Regressor	-0.0211	-0.0203	0.9865	0.0432
Passive Aggressive Regressor	-0.1181	-0.1171	1.0323	0.0165

2.Tata Motors

Table 2(a). Here, in this table 2(a) we get Random Forest Regressor with the lowest RMSE so it's the best model for Tata Motor

Tata – Motor's Stocks				
Model Name	**R^2Score**	**MAE**	**MSE**	**RMSE**
Linear Regression	0.2756	176.7341	51000.0537	225.8319
Polynomial Regression	0.3240	158.3552	44493.7503	210.9354
SVR	0.3036	0.4910	0.6683	0.8175
Random Forest Regressor	0.9977	0.0315	0.0021	0.0467
Decision Tree Regressor	0.9973	0.0363	0.0027	0.0523
XG Boost Regressor	0.9974	0.0353	0.0026	0.0510
Naive Bayes	0.7673	76.4671	16886.2892	129.9472

Table 2(b). Here, in Table 2(b) through lazy predict we have ranked the model's according to their accuracy, R-Square, and MSE. Among models, we can see here also Random Forest is among the best-fitted model after Extra Tree Regressor.

Model	**Adjusted R-Squared**	**R-Squared**	**RMSE**	**Time Taken**
Extra Trees Regressor	0.9984	0.9984	0.0393	0.4031
Random Forest Regressor	0.9977	0.9977	0.0466	0.8320
Bagging Regressor	0.9975	0.9975	0.0489	0.1034
K Neighbours Regressor	0.9973	0.9973	0.0508	0.0166
XG B Regressor	0.9973	0.9973	0.0510	0.8657
Decision Tree Regressor	0.9969	0.9969	0.0545	0.0146
Extra Tree Regressor	0.9968	0.9968	0.0553	0.0200
LGBM Regressor	0.9916	0.9916	0.0897	0.1321
Gradient Boosting Regressor	0.9893	0.9893	0.1013	0.2804
Hist Gradient Boosting Regressor	0.9881	0.9881	0.1071	0.3629
Ada Boost Regressor	0.7853	0.7855	0.4544	0.1071
Gaussian Process Regressor	0.7715	0.7717	0.4687	2.2282
MLP Regressor	0.5559	0.5562	0.6535	3.5471
Nu SVR	0.3892	0.3897	0.7664	0.6670
SVR	0.3575	0.3580	0.7860	0.9787
Huber Regressor	0.2442	0.2448	0.8525	0.0212
Kernel Ridge	0.2438	0.2443	0.8528	0.6910
Elastic Net CV	0.2432	0.2438	0.8531	0.0690
Lasso CV	0.2432	0.2438	0.8531	0.1008
Bayesian Ridge	0.2432	0.2438	0.8531	0.0209
Ridge CV	0.2432	0.2438	0.8531	0.0169
Ridge	0.2432	0.2438	0.8531	0.0178
Lars	0.2432	0.2437	0.8531	0.0163
Orthogonal Matching Pursuit	0.2432	0.2437	0.8531	0.0123
Lasso Lars IC	0.2432	0.2437	0.8531	0.0103
Lasso Lars CV	0.2432	0.2437	0.8531	0.0140
Lars CV	0.2432	0.2437	0.8531	0.0234
Linear Regression	0.2432	0.2437	0.8531	0.0086
Transformed Target Regressor	0.2432	0.2437	0.8531	0.0148
Linear SVR	0.2426	0.2432	0.8534	0.0120
SGD Regressor	0.2417	0.2423	0.8539	0.0153
Tweedie Regressor	0.1888	0.1894	0.8832	0.0176
RANSAC Regressor	0.1187	0.1194	0.9206	0.0801
Elastic Net	0.0036	0.0043	0.9789	0.0111
Dummy Regressor	-0.0011	-0.0003	0.9812	0.0094
Lasso	-0.0011	-0.0003	0.9812	0.0124

Lasso Lars	-0.0011	-0.0003	0.9812	0.0128
Quantile Regressor	-0.0281	-0.0273	0.9943	881.4672
Passive Aggressive Regressor	-0.1531	-0.1522	1.0530	0.0129

3.Tata Consultancy Services (TCS)

Table 3(a). Here, in this table 3(a) we get Decision Tree Regressor with the lowest RMSE so it's the best model for TCS.

TCS STOCKS				
Model Name	R^2Score	MAE	MSE	RMSE
Linear Regression	0.5498	424.9136	230796.8076	480.4131
Polynomial Regression	0.5823	404.7083	214688.6935	463.3451
SVR	0.8923	0.2291	0.1107	0.3327
Random Forest Regressor	0.9907	0.0315	0.0092	0.0962
Decision Tree Regressor	0.9979	0.0317	0.0020	0.0454
XG Boost Regressor	0.9964	0.0329	0.0034	0.0591
Naive Bayes	0.8907	115.5789	57099.6642	238.9553

Table 3(b). Here, in Table 3(b) through lazy predict we have ranked the model's according to their accuracy, R-Square, and MSE. Among models, we can see here also Decision Tree Regressor is the best-fitted model for TCS.

Lazy Predict - Tcs Stocks				
Model	**Adjusted R-Squared**	**R-Squared**	**RMSE**	**Time Taken**
Decision Tree Regressor	0.9980	0.9980	0.0444	0.1379
Extra Tree Regressor	0.9974	0.9974	0.0504	0.0104
Extra Trees Regressor	0.9971	0.9971	0.0532	0.2417
K Neighbours Regressor	0.9971	0.9971	0.0535	0.0277
Bagging Regressor	0.9965	0.9965	0.0589	0.0435
Random Forest Regressor	0.9963	0.9963	0.0602	0.3229
Hist Gradient Boosting Regressor	0.9934	0.9934	0.0806	4.7159
XGB Regressor	0.9929	0.9929	0.0834	0.0086
Gradient Boosting Regressor	0.9885	0.9885	0.1063	0.2548
LGBM Regressor	0.9873	0.9873	0.1113	0.0615
Ada Boost Regressor	0.9426	0.9426	0.2370	0.1249
Gaussian Process Regressor	0.9316	0.9317	0.2586	1.3541
SVR	0.9014	0.9015	0.3105	0.2660
Nu SVR	0.9002	0.9003	0.3125	0.7260
MLP Regressor	0.8772	0.8773	0.3465	4.8935
SGD Regressor	0.5804	0.5808	0.6406	0.0068
Huber Regressor	0.5804	0.5808	0.6406	0.0244
Orthogonal Matching Pursuit	0.5803	0.5806	0.6407	0.0300
Lars CV	0.5803	0.5806	0.6407	0.0430
Transformed Target Regressor	0.5803	0.5806	0.6407	0.0103
Lasso Lars CV	0.5803	0.5806	0.6407	0.0208
Lasso Lars IC	0.5803	0.5806	0.6407	0.0165
Linear Regression	0.5803	0.5806	0.6407	0.0106
Lars	0.5803	0.5806	0.6407	0.0344
Bayesian Ridge	0.5803	0.5806	0.6407	0.0080

Ridge	0.5803	0.5806	0.6407	0.0091
Ridge CV	0.5803	0.5806	0.6407	0.0061
Lasso CV	0.5803	0.5806	0.6407	0.1337
Elastic Net CV	0.5803	0.5806	0.6407	0.0437
Kernel Ridge	0.5798	0.5801	0.6411	0.7406
Linear SVR	0.5773	0.5776	0.6430	0.0200
RANSAC Regressor	0.5733	0.5736	0.6460	0.0351
Tweedie Regressor	0.4321	0.4325	0.7453	0.0071
Passive Aggressive Regressor	0.3118	0.3124	0.8204	0.0173
Elastic Net	0.2240	0.2246	0.8712	0.0057
Dummy Regressor	-0.0024	-0.0016	0.9901	0.0051
Lasso	-0.0024	-0.0016	0.9901	0.0327
Lasso Lars	-0.0024	-0.0016	0.9901	0.0129
Quantile Regressor	-0.0163	-0.0155	0.9970	261.3351

4.Adani Ports

Table 4 (a). Here, in this table 4(a) we get XG Boost Regressor with the lowest RMSE so it's the best model for Adani Ports.

Adani Port - Stocks				
Model Name	**R^2Score**	**MAE**	**MSE**	**RMSE**
Linear Regression	0.685	47.6460	4154.8293	64.4579
Polynomial Regression	0.6871	47.7759	4601.8127	67.8366
SVR	0.8406	0.2753	0.1460	0.3821
Random Forest Regressor	0.9970	0.0381	0.0032	0.0571
Decision Tree Regressor	0.9963	0.0398	0.0033	0.0580
XG Boost Regressor	0.9969	0.0396	0.0032	0.0567
Naive Bayes	0.9230	19.9492	1047.4420	32.3642

Table 4(b). Here, in Table 4(b) through lazy predict we have ranked the model's according to their accuracy, R-Square, and MSE. Among models, we can see here X G Boost Regressor is among the best-fitted model after Extra Tree Regressor.

Lazy Predict - Adani Ports Stock				
Model	**Adjusted R-Squared**	**R-Squared**	**RMSE**	**Time Taken**
Extra Trees Regressor	0.9974	0.9974	0.0509	0.1698
XG B Regressor	0.9969	0.9969	0.0557	0.2495
K Neighbours Regressor	0.9967	0.9967	0.0580	0.0081
Bagging Regressor	0.9966	0.9966	0.0581	0.0288
Random Forest Regressor	0.9965	0.9965	0.0591	0.0859
Decision Tree Regressor	0.9957	0.9957	0.0660	0.0071
Extra Tree Regressor	0.9951	0.9951	0.0700	0.0083
LGBM Regressor	0.9928	0.9928	0.0853	0.0456
Hist Gradient Boosting Regressor	0.9926	0.9926	0.0861	2.4305
Gradient Boosting Regressor	0.9914	0.9914	0.0930	0.1814
Gaussian Process Regressor	0.9662	0.9663	0.1843	0.4332
Ada Boost Regressor	0.9408	0.9408	0.2440	0.0343
SVR	0.8265	0.8268	0.4176	0.0949
Nu SVR	0.8264	0.8267	0.4177	0.1662
MLP Regressor	0.7233	0.7237	0.5273	0.9946
SGD Regressor	0.6546	0.6551	0.5892	0.0065
Elastic Net CV	0.6544	0.6549	0.5894	0.0485

Lasso CV	0.6543	0.6548	0.5894	0.0957
Ridge	0.6543	0.6548	0.5894	0.0102
Bayesian Ridge	0.6543	0.6548	0.5894	0.0062
Ridge CV	0.6543	0.6548	0.5895	0.0086
Lasso Lars IC	0.6543	0.6548	0.5895	0.0114
Linear Regression	0.6543	0.6548	0.5895	0.0094
Transformed Target Regressor	0.6543	0.6548	0.5895	0.0108
Lars CV	0.6543	0.6548	0.5895	0.0141
Lars	0.6543	0.6548	0.5895	0.0091
Orthogonal Matching Pursuit	0.6543	0.6548	0.5895	0.0059
Lasso Lars CV	0.6543	0.6548	0.5895	0.0157
Kernel Ridge	0.6539	0.6544	0.5898	0.0828
Huber Regressor	0.6536	0.6541	0.5901	0.0115
Linear SVR	0.6456	0.6461	0.5968	0.0148
RANSAC Regressor	0.6344	0.6349	0.6062	0.0287
Passive Aggressive Regressor	0.5822	0.5828	0.6480	0.0076
Tweedie Regressor	0.5000	0.5007	0.7089	0.0083
Elastic Net	0.3083	0.3093	0.8338	0.0085
Dummy Regressor	-0.0036	-0.0021	1.0043	0.0067
Lasso	-0.0036	-0.0021	1.0043	0.0451
Lasso Lars	-0.0036	-0.0021	1.0043	0.0110

5.Sun Pharma

Table 5 (a). Here, in this table 5(a) we get Random Forest Regressor with the lowest RMSE so it's the best model for Sun Pharma.

Sun Pharma - Stocks				
Model Name	R^2Score	MAE	MSE	RMSE
Linear Regression	0.0088	278.6273	144506.5291	380.1401
Polynomial Regression	0.2054	204.7373	93975.2800	306.5539
SVR	0.5135	0.3710	0.4460	0.6678
Random Forest Regressor	0.9952	0.0344	0.0051	0.0712
Decision Tree Regressor	0.9796	0.0394	0.0209	0.1447
XG Boost Regressor	0.9490	0.0455	0.0510	0.2258
Naive Bayes	0.6012	112.7557	55604.6150	235.8063

Table 5(b). Here, in Table 5(b) through lazy predict we have ranked the model's according to their accuracy, R-Square, and MSE. Among models, we can see here also Random Forest Regressor is among the best-fitted model after Extra Trees Regressor and KNN Regressor.

Lazy Predict - Sun Pharma				
Model	**Adjusted R-Squared**	**R-Squared**	**RMSE**	**Time Taken**
K Neighbours Regressor	0.9838	0.9839	0.1304	0.0124
Extra Trees Regressor	0.9817	0.9817	0.1390	0.4961
Random Forest Regressor	0.9745	0.9745	0.1639	0.4002
Bagging Regressor	0.9715	0.9715	0.1733	0.0577
XG B Regressor	0.9669	0.9669	0.1866	0.1426
Extra Tree Regressor	0.9638	0.9638	0.1952	0.0105
Decision Tree Regressor	0.9578	0.9578	0.2107	0.0096
LGB M Regressor	0.9505	0.9505	0.2283	0.0583
Gradient Boosting Regressor	0.9498	0.9498	0.2299	0.2176
Hist Gradient Boosting Regressor	0.9023	0.9024	0.3207	0.4084
Ada Boost Regressor	0.8542	0.8543	0.3918	0.1347

Gaussian Process Regressor	0.6309	0.6311	0.6234	2.2539
MLP Regressor	0.5495	0.5498	0.6886	1.9807
Nu SVR	0.4601	0.4605	0.7539	1.0179
SVR	0.4520	0.4523	0.7595	0.4585
Kernel Ridge	0.0080	0.0086	1.0219	0.6401
Lasso Lars IC	0.0079	0.0086	1.0219	0.0068
Transformed Target Regressor	0.0079	0.0086	1.0219	0.0115
Lars	0.0079	0.0086	1.0219	0.0134
Linear Regression	0.0079	0.0086	1.0219	0.0063
Orthogonal Matching Pursuit	0.0079	0.0086	1.0219	0.0099
Lasso Lars CV	0.0079	0.0086	1.0219	0.0092
Lars CV	0.0079	0.0086	1.0219	0.0188
Ridge	0.0079	0.0086	1.0219	0.0085
Ridge CV	0.0079	0.0085	1.0219	0.0060
Lasso CV	0.0079	0.0085	1.0219	0.0749
Elastic Net CV	0.0079	0.0085	1.0220	0.0454
Bayesian Ridge	0.0079	0.0085	1.0220	0.0063
SGD Regressor	0.0077	0.0083	1.0221	0.0066
Tweedie Regressor	0.0056	0.0062	1.0232	0.0224
Lasso	-0.0008	-0.0001	1.0264	0.0080
Dummy Regressor	-0.0008	-0.0001	1.0264	0.0051
Elastic Net	-0.0008	-0.0001	1.0264	0.0055
Lasso Lars	-0.0008	-0.0001	1.0264	0.0078
A Huber Regressor	-0.0534	-0.0527	1.0530	0.0122
Quantile Regressor	-0.1337	-0.1330	1.0924	907.0397
Linear SVR	-0.1351	-0.1344	1.0931	0.0107
RANSAC Regressor	-0.1556	-0.1549	1.1030	0.0394
Passive Aggressive Regressor	-0.2286	-0.2278	1.1373	0.0189

Model Comparison of Stock Prices of Five Companies

Table 6: A low RMSE value indicates that the simulated and observed data are close to each other showing a better accuracy. Thus lower the RMSE better is the model performance. Hence, we can say on the basis of RMSE that the Random forest Regressor gives the best performance for 3 data sets of Nifty 50.

Company Name	Best Model
Tata Steels	Random Forest Regressor
Tcs	Decision Tree Regressor
Tata Motors	Random Forest Regressor
Sun Pharma	Random Forest Regressor

CONCLUSION

In the NSE, where market dynamics are fast-paced and complex, model comparison plays a pivotal role in identifying the most effective methods for stock price prediction. By leveraging various predictive models and employing rigorous comparison methodologies, investors and traders can enhance their decision-making processes and potentially gain a competitive edge in the financial markets.

Based on the comparison of stock prices prediction models for the five companies in Table (6) - Tata Steels, TCS, Tata Motors, Sun Pharma, and Adani Ports - the best model for each company was determined to be the Random Forest Regressor for Tata Steels, Tata Motors and Sun Pharma, the Decision Tree Regressor for TCS, and the XG Boost Regressor for Adani Ports.

The results of this comparison demonstrate the usefulness of machine learning models in predicting stock prices. However, it is important to note that these models are not fool proof and cannot predict future market conditions with complete accuracy.Therefore, while machine learning models can be a valuable tool for predicting stock prices, investors should also consider other factors and consult with a financial advisor before making any investment decisions. It is important to note that the choice of the "best" model may vary depending on the specific dataset, features, and evaluation metrics used. The models mentioned above have been selected based on their performance in predicting stock prices for the respective companies. However, it is crucial to understand that stock price prediction is a challenging task, and various external factors can significantly influence stock prices, making accurate predictions difficult.

REFERENCES

[1] AjinkyaRajkar ,AayushKumaria , AniketRaut , Nilima Kulkarni, (2021), Stock Market Price Prediction and Analysis, International Journal Of Engineering Research & Technology(IJERT) Volume 10, Issue 06 (June 2021),

[2] Alkhoshi, E., and B. Saeid (2018). Stable stock market prediction using narx algorithm. In Proceedings of the 2018 International Conference on Computing and Big Data, pp. 62–66.

[3] Ashfaq, R. A., W. Xi-Zhao, H. J. Zhexue, A. Haider, and H. Yu-Lin. (2017). "Fuzziness based semi-supervised learning approach for intrusion detection system. Information Sciences 378:484–97. doi:10.1016/j.ins.2016.04.019.

[4] Chang, P.C., D. Wang, and C.Zhou (2012). "A novel model by evolving partially connected neural network for stock price trend forecasting. Expert Systems with Applications 39(1), 611–620.

[5] Fama, E. F. (1995). "Random walks in stock market prices". Financial Analysts Journal 51 (1):75–80. doi:10.2469/faj.v51.n1.1861

[6] Khedr, A. E., N. Yaseen, and N. Yaseen. (2017). "Predicting stock market behaviour using data mining techniques and news sentiment analysis". International Journal of Intelligent Systems and Applications 9 (7):22. doi:10.5815/ijisa.2017.07.03.

[7] Kumar, D. A., and S. Murugan (2013). "Performance analysis of indian stock market index using neural network time series model". In 2013 International Conference on Pattern Recognition, Informatics and Mobile Engineering, pp. 72–78. IEEE.

[8] Moghaddama, A. H., M. H. Moghaddamb, and M. Esfandyari (2016). "Stock market index prediction using artificial neural network". Journal of Economic, Finance and Administrative Science 21, 89–93

[9] Madhu Sudan G., et all (2017) "The Role of Statistical Packages in Academic and Industry", An International Multidisciplinary Research Journal (IJMR), ISSN: 2249-7137 Vol. 7 Issue 10, October 2017 Impact Factor: SJIF =5.099DOI NUMBER: 10.5958/2249-7137.2017.00097.0

[10] M Ramesh, P Vishnu Priya, P Srivyshnavi, G Madhusudan, K Aswini and P Balasiddamuni., (2018) "Estimation of parameters of a multivariate time series var model":International Journal of Statistics and Applied Mathematics(IJSAM)ISSN: 2456-1452, 2018; 3(1): 442-450