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Exploration of the Exhibition Evaluation of Artificial intelligent Methods in Commercial Predicting

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ABSTRACT

Previously executive judgment is the only choice for commercial Predicting. It is a time consuming and disposed to error process. Gradually the interest is shifted from executive opinion to pure statistical based Predicting models. Any commercial organization uses statistics to formulate suitable policies and plans. Statistics is also useful in Predicting determination. As statistical theories become more difficult, it is difficult to do calculations. Also statistical methods cannot be learned, nor can the logic of technique be assimilated. As long as there is no multiple features in the data set and relationship among the variables are linear it is simple and desirable to use statistical based Predicting model. But if the underlying relationship among the variables is unidentified or not linear, artificial intelligent based methods are liked enhanced. So the interest of developing Predicting model has been shifted from statistical field to computer field. Artificial intelligent provides us with automated methods for data Exploration. It is a set of Methods that use past information in order to make exact predictions. Designing well-organized and accurate prediction algorithms is the main objective of Artificial intelligent. It consists of the designing of well-organized and robust algorithms that make exact predictions for undetected items. In this research the focus is on short term Predicting Methods that are fed with time series data be appropriate to commercial activities.

Keywords: Artificial intelligent, Commercial Predicting, Connectionist expert systems, intelligent system, algorithms, statistical.

I.INTRODUCTION

An introduction of using computer as a problem solving tool. An universal introduction on Artificial intelligent which embraces a simple evaluation to reveal how Artificial intelligent is better that human learning, basic models of Artificial intelligent, learning based program and aims of Artificial intelligent research has been discussed. An idea about how Predicting is a crucial tool in today's commercial world is also given. The explanation to develop the Predicting system which includes several approaches for predicting uncertain events is also given. Objectives of the research given below are also discussed in this Research. This Research has also discussed about the commercial Predicting. Classification of Predicting models is given in this part. Commercial Predicting models are classified into qualitative and quantitative methods.

Qualitative models are based on human decision and usually non mathematical in nature e.g.

Market Research, Delphi Method and Executive Opinion. Quantitative models are based on mathematical equations. All of our research models are quantitative in nature. Predicting problems are frequently classified as short term, medium term and long term. The other aspects covered in this Research are basic principles of Predicting, various steps in Predicting process, importance of Predicting and time horizon of Predicting model.

Supervised and unsupervised methods are two major classifications of an artificial intelligent methods. In unsupervised methods there is no target or label in the given data. These methods are mainly used to summarize the key features of the data. Prediction using unsupervised artificial intelligent algorithm is very difficult. In this research the main focus is on supervised artificial intelligent Methods. In supervised Artificial intelligent algorithms are supported by pairs of input and target output called training data. From the training data set, algorithm infers a mathematical function that maps every element in the input to the output. After successful completion of training, that algorithm is used for prediction purpose.

Predicting helps in valuable and proficient planning. It is an art and science of predicting upcoming events. The term commercial Predicting refers to Predicting in commercial activities. It acts as a planning gizmo that aids management to deal with the uncertainty of the future events. It relies mainly on statistics from the past, present and Exploration of trends. Generally the information belonging to commercial field are time series in nature. Anything that is observed chronologically at regular interval over time is called time series data. In time series predicting, the goal is to find out how the sequence of observation will carry on into the future. Predicting problems that use time series data are classified as quantitative Predicting problems. The two basic conditions for using quantitative Predicting are:

(a) Availability of numerical information about the past.

(b) Some aspects of the past patterns will continue into the future.

Depending on specific applications, Predicting can be categorized as short term, medium term and long term. The time horizon for short term is 1 to 30 days, medium term is 1 month to 1 year and long term is more than one year. In commercial organization Predicting of production, supply, demand and sale etc. are short term, Predicting of

purchase of raw material, buying machines and equipment etc. are medium term and Predicting of market opportunity, environmental factors etc. are long term in nature. In this research the focus is on short term Predicting Methods that are fed with time series data belongs to commercial activities.

Some crucial objectives of this research are:

1. To endow with a strategic framework for the execution of different artificial intelligent Methods in commercial Predicting.
2. To determine and compare the Exhibition of Artificial intelligent Methods in commercial Predicting.
3. To present the finding and facts in the form of a book as thesis for the accomplishment of research work.

1.1 How Artificial intelligent is better than Human Learning

Artificial intelligent is the understanding of nature of learning, and to build learning capability in computers. Artificial intelligent makes the computers smarter and more intelligence. The more direct objective in this aspect is to develop systems (programs) for specific practical learning task in application domains. Artificial intelligent also develops computational models of human learning process and performs computer simulations. Artificial intelligent also involves to explores new learning methods and develop general learning algorithm independent of applications. Present day computer applications require the representation of huge amount of complex knowledge and data in programs and thus require tremendous amount of work. Our ability to code the computers falls short of the demand for applications. If the computers are endowed with the learning ability, then our burden of coding the machine is eased (or at least reduced). This is particularly true for developing expert systems where the "bottle-neck" is to extract the expert's knowledge and feed the knowledge to computers. Artificial intelligent will produce smarter computers capable of all the above intelligent behaviour. Following table illustrate the comparison between human learning and Artificial intelligent [1.9].

Table 1: Comparison between Human learning and Artificial intelligent

Aspect	Human Learning	Machine Learning
Speed	time-consuming process	Currently Slow but hope to find tricks for machine to learn quick
Ability to transfer	There is no mean to copy human intelligence	simple to copy
Require repetition	Yes	Yes/No

Error-prone	Yes	Yes
Noise-tolerant	Yes	No
When amount of data is very large	Not Efficiently	Efficiently handle large amount of data

Thus any development in the field of Artificial intelligent, will improve the capability of computers, thus have an impact on human civilization.

Applications Areas

Various application areas where Artificial intelligent based commercial Predicting is currently applicable [1.19]

(i) Natural gas load Predicting (ii) Stock return prediction

(iii) Customer churn prediction (iv) Capital flow risks prediction

(v) Bankruptcy prediction (vi) Profitability prediction

(vii) Sales Predicting (viii) Gross domestic product Predicting

(ix) Demand Predicting (x) Fuel consumption prediction of aircraft

(xi) Manpower predicting (xii) Text mining of commercial news

(xiii) Tourism demand Predicting (xiv) Cash Predicting

(xv) Product predicting (xvi) Inflation Predicting

1.2 Objectives of the research

1. To justify that the Artificial intelligent Methods does more accurate commercial predicting as compared to traditional statistical approaches.

2. To evaluate the prediction capability of various artificial intelligent algorithms applied on the commercial Predicting datasets.

3. To provide a framework for the implementation and appropriate use of various artificial intelligent Methods in commercial Predicting.

4. The last but not least objective of this research is to present the finding and facts in the form of a book as thesis for the completion of research work.

II.RESEARCH METHODOLOGY

In this Research the main goal is to study and analyze some crucial artificial intelligent models and statistical approaches used for Predicting purpose. Some important methods that are considered in this study are Simple Moving Average, Exponential Moving Average, Naïve Bayesian Regression, K Nearest Neighbour, and

Connectionist expert systems/Intelligent system. These methods are extensively studied and then a computer program is proposed for each technique. The details of each method is as under

2.1 Predicting through Simple Moving Average:

It is a sort of mathematical convolution. It is a Simple short-run Predicting tools based on some underlying pattern to the data. A moving average can be calculated for the purpose of smoothing the original series, or to obtain a Prediction. Simply put Moving Averages are a math calculation that averages out a series of numeric values. A moving average series can be calculated for any time series. In finance it is most often applied to stock and derivative prices, percentage returns etc. Moving averages are used to track the current trend. Simple moving average is purely a statistical method used for Predicting purpose. The moving average for time period k is the mean of the "k" most current observations. The constant number k is specified at the start. The lesser the number k, the more weight is given to current periods. The larger the number k, the less weight is given to more current periods. Moving average is also called "rolling average", "rolling mean" or "running average". A moving average is usually used with time series. Time series is a collection of data recorded over a period of time i.e. weekly, monthly, and quarterly.

Historic time series data is used by the management to make recent decisions and plans, based on long term predicting. The basic assumption of time series data is that it assumes past pattern to carry on into the future.

Simple moving average is calculated by taking the mean of a given set of values. For instances, to calculate a basic 5-day moving average we would add up the closing prices from the past 5 days and then divide the result by 5. Mathematically, simple moving average of order k is denoted by MA (k), is the value of k consecutive observations and is calculated by the following

Formula:

$$f_{t+1} = \frac{(y_t + y_{t-1} + y_{t-2} + \ldots\ldots + y_{t-k+1})}{k}$$

2.2 Exponential Moving Average

It is a method, conceived by Robert Macaulay in 1931 and developed by Robert G. Brown during World War II, for Extrapolative Predicting from time series data. It is a type of weighted moving average. Exponential moving average calculates Prediction s by giving more weight to recent values than to earlier values. This is one of the most frequently used methods because it is often easier to calculated than weighted moving average and requires less data. The initial calculation for the first few Prediction s is a bit more difficult, but after that exponential smoothing requires less data and less computation than simple moving average. The information required for exponential smoothing includes the last period's Prediction value, the last period's value and the smoothing parameter alpha (α).

Formally, the exponential smoothing equation is

$$F_{t+1} = \alpha\, y_t + (1-\alpha) F_t$$

III.RESULT AND FINDINGS

When researcher comparatively analyzes the results of algorithms by using various commercial domain data sets considered in this research, it is found that artificial intelligent algorithms are more efficient than traditional statistical trend Exploration methods for time series data related to commercial domains used for Predicting purpose. Connectionist expert systems/Intelligent system based Predicting model is efficient in all the data sets. It can be easily analyzed from the tabulated information of Exhibition criteria of these artificial intelligent algorithms created with the help of customized software developed in this research. Graphical results that are obtained by this software are also helpful to find best algorithm for Predicting purpose in faster manner i.e. just by looking wave graph. The detail of key findings with respect to the research queries are summarized and general conclusions based on the findings of the studies presented. The emphasis is on the Exploration of tabular results of various Exhibition metric and graphical representations of observed and actual value of targeted variable. All the values of Exhibition metrics are computed through the tabular form interface of the software designed for this research purpose. Following figure shows the interface.

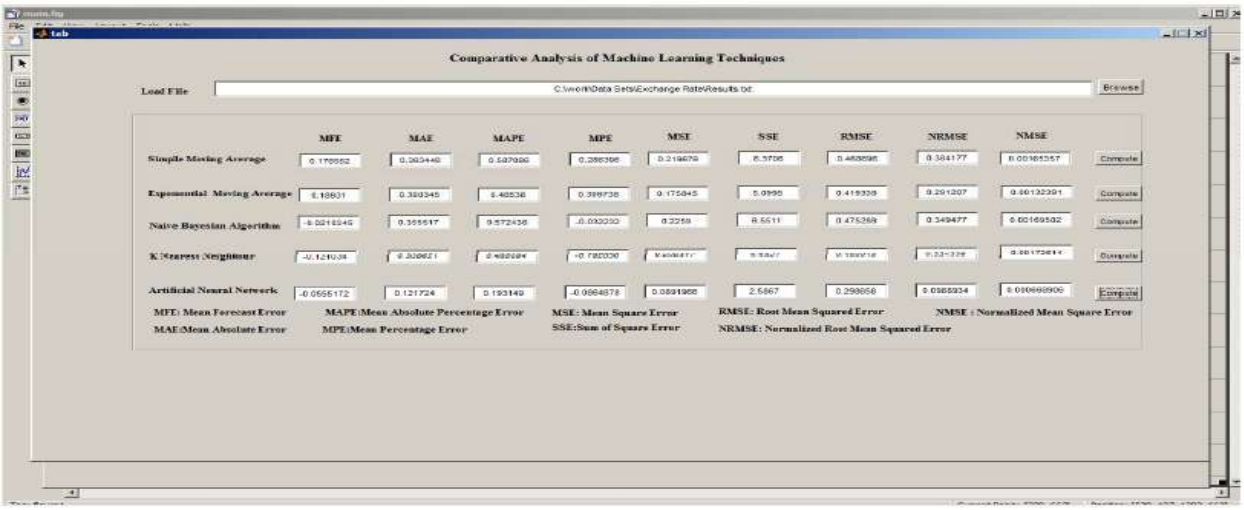


Figure 1. Interface Shows Comparison Exploration of various Predicting Methods in terms of Values of Exhibition metrics

By using this interface, user simply loads the file that contains actual value of target variable and Prediction ed value of that variable through considered algorithm. There is a Browse button to load that file. Separate text boxes for each Exhibition metric are embedded for each algorithm.

There is also a Compute button for each algorithm. User simple click on that button and the Exhibition metric values are calculated automatically by this interface for each algorithm.

Following is the Exploration of the Exhibition metric for each data set that are considered in this Research

3.1 Comparative Exploration of Algorithms

While comparing the Exhibition of algorithms used for Predicting purpose there are some Exhibition metrics such as mean Prediction error, mean absolute error, mean absolute percentage error, mean square error, and sum square error and so on. Smaller the values of these metrics better the Exhibition of the Predicting algorithm. The comparative Exploration for all the data sets considered in this research is as follow:

CASE 1: Foreign Exchange Rate Prediction Exploration

Following table shows values of Exhibition metrics when data set belongs to Foreign exchange rate is used for Predicting purpose

TABLE 2: Value of various Exhibition metrics for Foreign Exchange Rate Prediction.

PERFORMANCE METRIC → / ALGORITHM ↓	MFE	MAE	MAPE	MPE	MSE	SSE	RMSE	NRMSE	NMSE
Simple Moving Average	0.176552	0.36344	0.587086	0.286396	0.219676	6.3706	0.468696	0.384177	0.0016535
Exponential Moving Average	0.18931	0.30034	0.48538	0.306738	0.175845	5.0995	0.419339	0.291207	0.0013239
Naïve Bayesian Regression	-0.021034	0.35551	0.572436	-0.032232	0.2259	6.5511	0.475289	0.349477	0.0016950
K-Nearest Neighbour	-0.12103	0.30862	0.495094	-0.192836	0.230417	6.6821	0.480018	0.324336	0.0017261
Artificial Neural Network	-0.055517	0.12172	0.193149	-0.086487	0.089196	2.5867	0.298658	0.098893	0.0006689

CASE 2: Gold Price Prediction Exploration

Following table shows values of Exhibition metrics when Gold Price data is used for predicting purpose.

TABLE 3: Value of various Exhibition metrics for Gold Price Prediction.

PERFORMANCE METRIC → / ALGORITHM ↓	MFE	MAE	MAPE	MPE	MSE	SSE	RMSE	NRMSE	NMSE
Simple Moving Average	14.076	22	0.744077	0.474722	834.76	21704	28.8924	0.33991	0.0024622
Exponential Moving Average	11.615	21	0.709045	0.391166	718.38	18678	26.8027	0.282134	0.0021172
Naïve Bayesian Regression	11.615	24.7692	0.837895	0.392217	964.76	25084	31.0607	0.42549	0.0028433
K-Nearest Neighbour	10.115	22.5	0.759772	0.340722	688.19	17893	26.2334	0.279079	0.0020272
Artificial Neural Network	6.3846	10.5385	0.356131	0.215055	309.46	8046	17.5915	0.141867	0.0009104

CASE 3: Exploration of Prediction of Sale of Hardware Items

Following table shows values of Exhibition metrics of predicting algorithms in case sale of Hardware item is involved.

TABLE 4: Value of Exhibition metrics for Prediction of Sale of Hardware Items.

PERFORMANCE METRIC → / ALGORITHM ↓	MFE	MAE	MAPE	MPE	MSE	SSE	RMSE	NRMSE	NMSE
Simple Moving Average	5.86207	63.8621	10.6378	-1.57279	5627.52	163198	75.0168	0.117214	0.33094
Exponential Moving Average	10.8276	53.3793	9.10788	-0.776407	4309.45	124974	65.6464	0.0999184	0.25524
Naïve Bayesian Regression	7.62069	72.2414	11.7815	-1.16488	7839.97	227359	88.5436	0.147082	0.46221
K-Nearest Neighbour	12.5862	61	10.263	-0.552695	5919.97	171679	76.9413	0.121167	0.35151
Artificial Neural Network	-0.31034	17.6897	3.36677	-1.17447	526.862	15279	22.9535	0.0324202	0.03071

CASE 4: Exploration of Prediction of Sale of Cold Drinks

Table that shows the values of various Exhibition metrics when prediction of sale of cold drink involved is as follow:

TABLE 5: Value of various Exhibition metrics for Prediction of Sale of Cold Drinks

PERFORMANCE METRIC → / ALGORITHM ↓	MFE	MAE	MAPE	MPE	MSE	SSE	RMSE	NRMSE	NMSE
Simple Moving Average	5.03448	19.7241	8.65376	1.71962	547.724	15884	23.4035	0.0554585	0.239931
Exponential Moving Average	-0.3448	14.3448	5.51811	-0.575787	300.621	8718	17.3384	0.0404159	0.128965
Naïve Bayesian Regression	1.86207	22.4138	9.32574	1.02683	715.241	20742	26.744	0.0638282	0.309459
K-Nearest Neighbour	5.82759	14.0345	6.39156	3.32283	235.345	6825	15.341	0.0393358	0.103415
Artificial Neural Network	0.48275	7.10345	3.18122	0.470011	78.2069	2268	8.84347	0.0218898	0.033657

CASE 5: Exploration of Prediction of Sale of Grocery items

Following Table Shows the Values of Various Exhibition Metrics along with the Algorithms used.

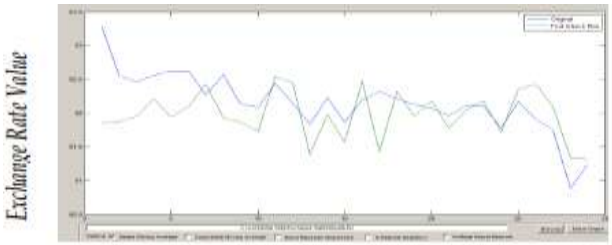
TABLE 6: Value of various Exhibition metrics for Prediction of Sale of Grocery item

PERFORMANCE METRIC → / ALGORITHM ↓	MFE	MAE	MAPE	MPE	MSE	SSE	RMSE	NRMSE	NMSE
Simple Moving Average	2.33333	9.4	3.89956	1.00911	118.067	1771	10.8658	0.72439	0.0300669
Exponential Moving Average	1.66667	7.8	3.2238	0.700187	81.4	1221	9.02219	0.563887	0.0206723
Naïve Bayesian Regression	-2.46667	20.2	8.38274	-0.17831	474.467	7117	21.7823	0.382145	0.118474
K-Nearest Neighbour	-1	10.0667	4.31587	-0.02694	178.867	2683	13.3741	0.215711	0.0449302
Artificial Neural Network	1.66667	4.6	1.90556	0.704143	31	465	5.56776	0.191992	0.0078727

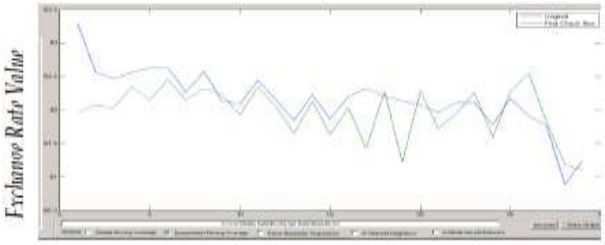
3.2 Graphical Results Exploration

This software also contains an interface that performs graphical Exploration of the results. A wave form graph is drawn between the actual value of the target variable and the calculated value by all the algorithms for the testing part of the data set. Through these wave form graphs user can very easily compare the Predicting algorithms and identify the better algorithm. Following is the discussion on the graphical Exploration of the results.

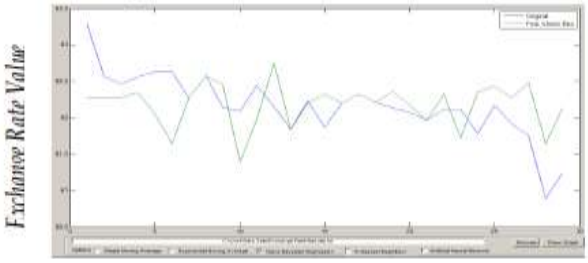
CASE 1: Foreign Exchange Rate Prediction Graphical Representation:-



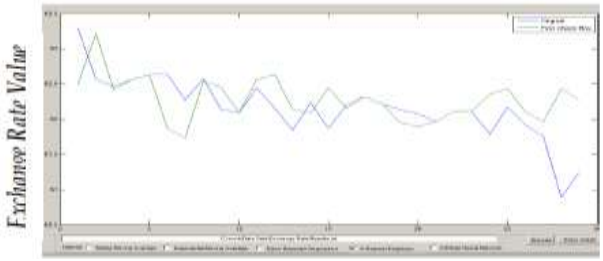
Days Figure 2. Actual Vs SMA



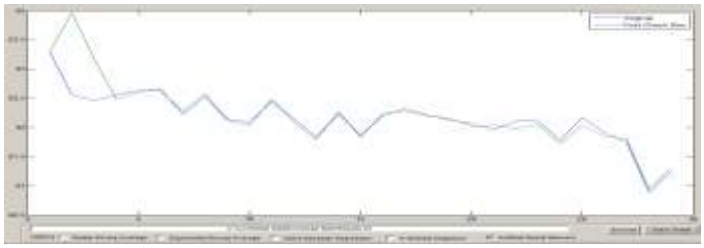
Days Figure 3. Actual Vs EMA



Days Figure 4. Actual Vs NVR



Days Figure 5. Actual Vs KNN



Days Figure 6. Actual Vs ANN

These graphical results belong to foreign exchange rate data set. Figure 2 illustrates the wave form graph between the actual values of the target variable and the calculated values of the target variable though Simple moving average. Days are represented by x-axis and values of exchange rate are represented by y axis. Blue line denotes actual values and green line denotes calculated value. Figure 3 shows graph between actual values and values calculated through Exponential moving average method. Figure 4 shows graph between actual values and Naïve Bayesian regression algorithm's Values. Figure 5 shows this graph between actual and K-nearest neighbour algorithm's values. Values calculated through Connectionist expert systems/Intelligent system and actual values of the target variable are presented in wave form graph in Figure 6 By analyzing all the graphs, it is concluded that Connectionist expert systems/Intelligent system's wave is closer to actual wave than any other Predicting algorithm.

CASE 2: Gold Price Prediction Graphical Representation

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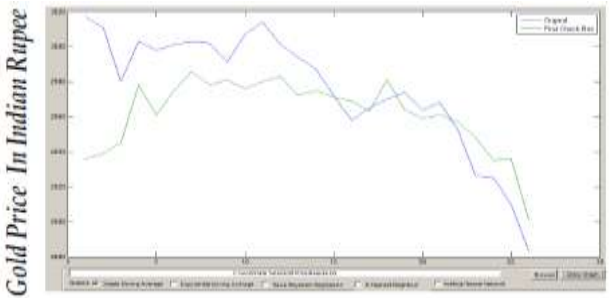
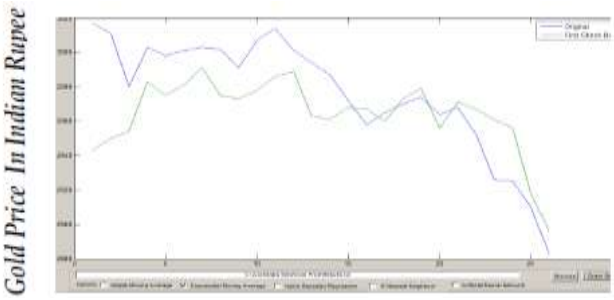
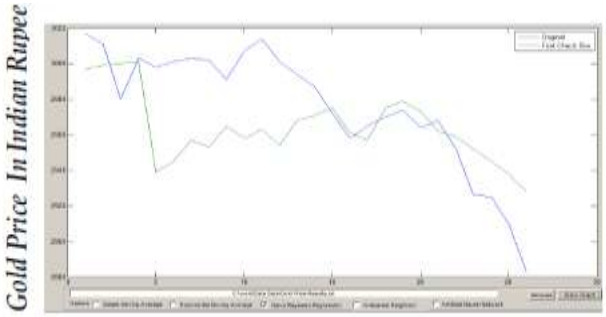


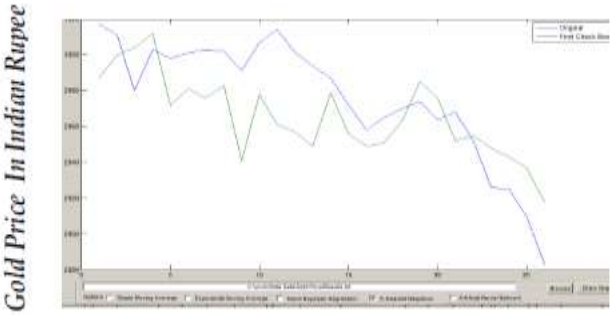
Days Figure 7. Actual Vs SMA



Days Figure 8. Actual Vs EMA



Days Figure 9 Actual Vs NVR



Days Figure 10 Actual Vs KNN

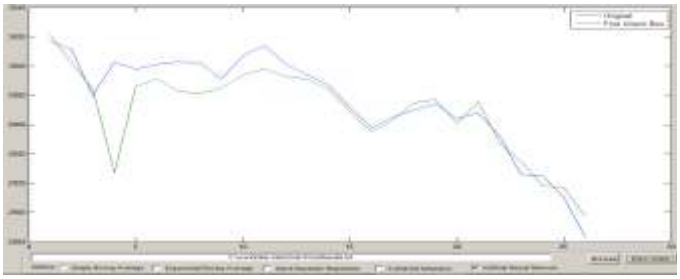


Figure 11 Actual Vs ANN

This data set belongs to prediction of Gold price in Indian rupee. Figure 7 shows the graph between Actual and Simple moving averages values. Figure 8 shows graph between Actual and exponential moving average. Figure 9 depicts graph between Actual and Naïve Bayesian Regression Values. Figure10 draws graph between actual and K-Nearest Neighbour Algorithm.

Figure 11 illustrates graph between actual and Connectionist expert systems/Intelligent system values. Here by analyzing graphs it is found that Connectionist expert systems/Intelligent system predicts values that are closer that actual values.

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CASE 3: Graphical Representation of Prediction of Sale of Hardware Item

In this case researcher uses sale of hardware item data set. By analyzing graphs it is found that Connectionist expert systems/Intelligent system gives better results.

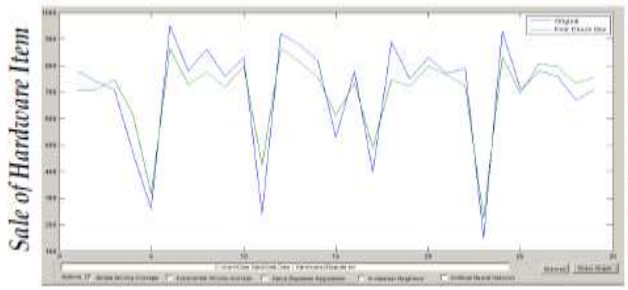


Figure 12 Actual Vs SMA

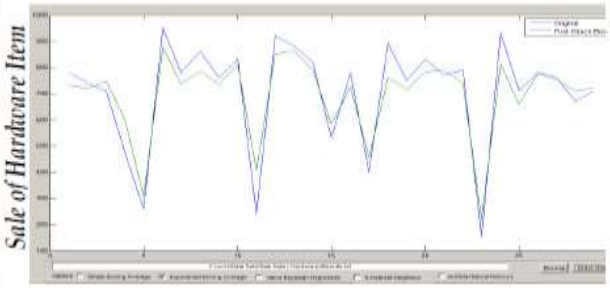
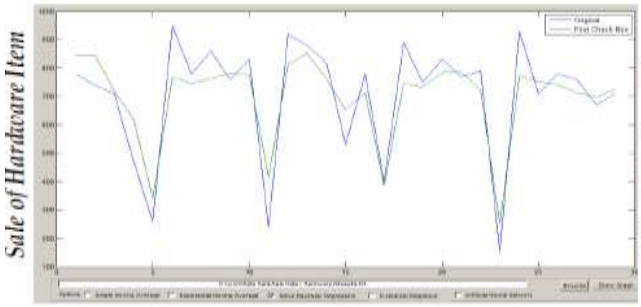
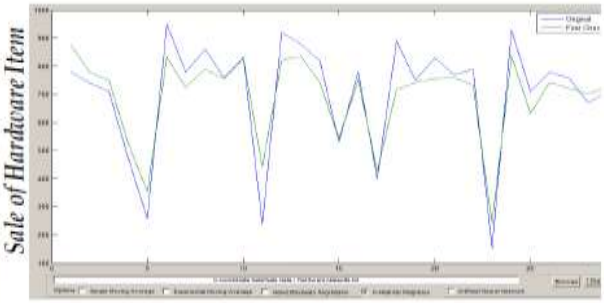


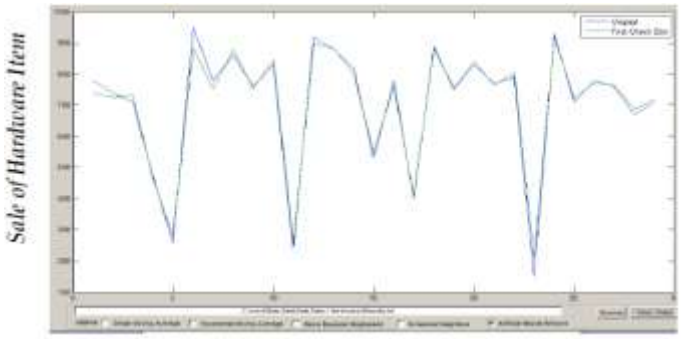
Figure 13 Actual Vs EMA



Days Figure 14 Actual Vs NVR

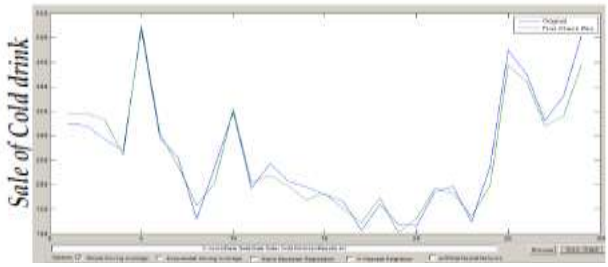


Days Figure 15 Actual Vs KNN

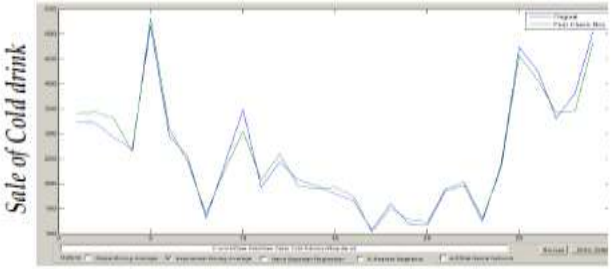


Days Figure 16 Actual Vs ANN

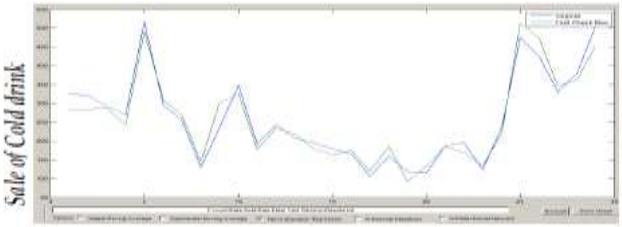
CASE 4: Graphical Representation of Prediction of Sale of Cold Drink



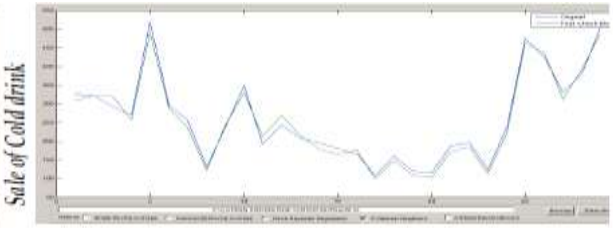
Days Figure 17 Actual Vs SMA



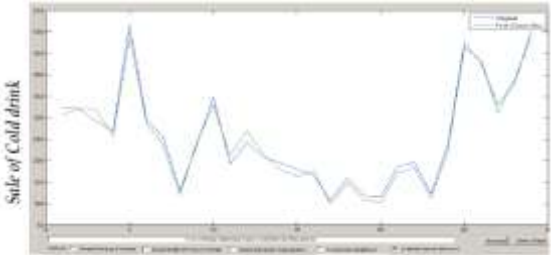
Days Figure 18 Actual Vs EMA



Days Figure 19 Actual Vs NVR



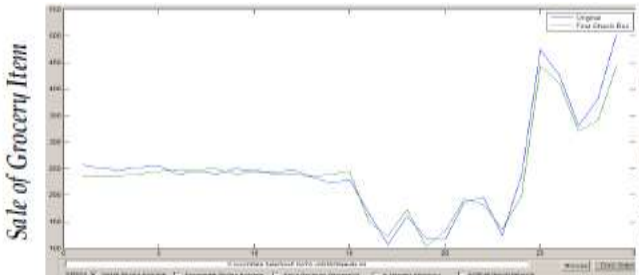
Days Figure 20 Actual Vs KNN



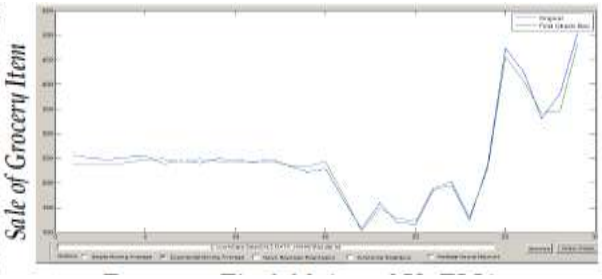
Days Figure 21 Actual Vs ANN

In case of sale of cold drink, from the graphs it is concluded that Connectionist expert systems/Intelligent system is a better Predicting algorithm.

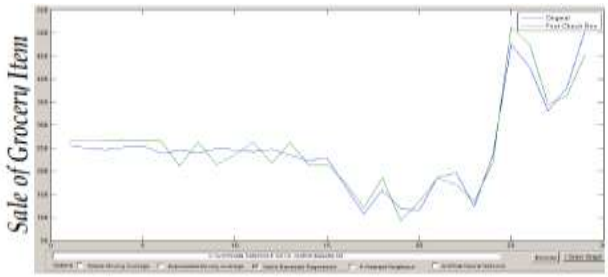
CASE 5: Graphical Representation of Prediction of Sale of Grocery Item



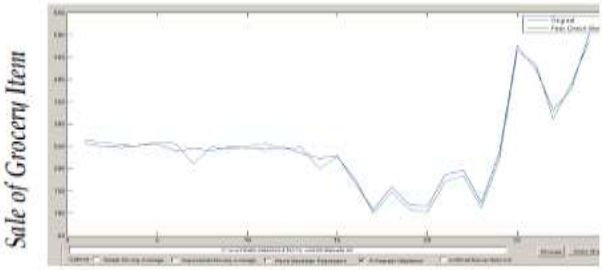
Days Figure 22 Actual Vs SMA



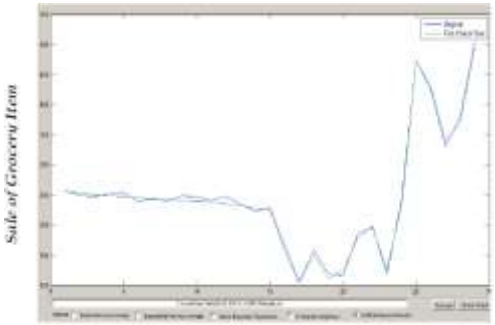
Days Figure 23Actual Vs EMA



Days Figure 24 Actual Vs NVR



Days Figure 25 Actual Vs KNN



Days Figure 26 Actual Vs ANN

From the above graphs it is found that Connectionist expert systems/Intelligent system gives better results than any other Predicting algorithm in case of sale of grocery item.

IV.CONCLUSION AND DISCUSION

In this research the focus is on commercial predicting with the help of artificial intelligent algorithms.

For this purpose historic time series data from various commercial domains including foreign exchange rate of US Dollar in term of Indian rupee, Gold Price in Indian rupee, Sale data sets viz. Sale of Hardware item, sale of cold drink, sale of grocery item are collected from authenticated sources. Researcher uses two pure statistical time series Predicting methods viz. simple moving average and exponential moving average and various crucial Artificial intelligent algorithms which include Naïve Bayesian regression, K-nearest neighbour and Connectionist expert systems/Intelligent system for Predicting purpose. Researcher applies these algorithms to Prediction the value of target variable of all the data sets used in this research. The various Exhibition metrics used for measuring Predicting error are Mean Prediction, Mean Absolute Error, Mean absolute percentage Mean Percentage Mean Square sum square error Root Mean Square error Normalized Root mean Square error and Normalized Mean Square error are calculated for each algorithm for each dataset.

In foreign exchange rate Predicting dataset, when values of Exhibition metric for various algorithms are compared it is found that Minimum value of Mean Prediction Error is -0.121034 for K-Nearest Neighbour, Minimum value of Mean Absolute Error is 0.121724 for Connectionist expert systems/Intelligent system , Minimum value of Mean

absolute percentage error is 0.193149 for Connectionist expert systems/Intelligent system , Minimum Value of Mean Percentage Error is -0.192836 for K-nearest neighbour , Minimum value of Mean Square Error is 0.0891966 for Connectionist expert systems/Intelligent system ,

Minimum value of sum square error is 2.5867 for Connectionist expert systems/Intelligent system, Minimum value of Root Mean Square error is 0.298658 for Connectionist expert systems/Intelligent system, minimum value of Normalized Root mean Square error is 0.0988934 for Connectionist expert systems/Intelligent system and minimum value of Normalized Mean Square Error is 0.000668906 For Connectionist expert systems/Intelligent system.

For Gold price dataset, it is found that Minimum value of Mean Prediction Error is 6.38462 Connectionist expert systems/Intelligent system , Minimum value of Mean Absolute Error is 10.5385 for Connectionist expert systems/Intelligent system , Minimum value of Mean absolute percentage error is 0.356131 for Connectionist expert systems/Intelligent system , Minimum Value of Mean Percentage Error is 0.215055 for Connectionist expert systems/Intelligent system , Minimum value of Mean Square Error is 309.462 for Connectionist expert systems/Intelligent system , Minimum value of sum square error is 8046 for Connectionist expert systems/Intelligent system , Minimum value of Root Mean Square error is 17.5915 for Connectionist expert systems/Intelligent system, minimum value of Normalized Root mean Square error is 0.141867 for Connectionist expert systems/Intelligent system and minimum value of Normalized Mean Square Error is 0.00091043.

For Sale of Hardware Item dataset it is found that Minimum value of Mean Prediction Error is - 0.310345 Connectionist expert systems/Intelligent system , Minimum value of Mean Absolute Error is 17.6897 for Connectionist expert systems/Intelligent system , Minimum value of Mean absolute percentage error is 3.36677 for Connectionist expert systems/Intelligent system , Minimum Value of Mean Percentage Error is -1.17447 for Connectionist expert systems/Intelligent system , Minimum value of Mean Square Error is 526.862 for Connectionist expert systems/Intelligent system , Minimum value of sum square error is 15279 for Connectionist expert systems/Intelligent system, Minimum value of Root Mean Square error is 22.9535 for Connectionist expert systems/Intelligent system, minimum value of Normalized Root mean Square error is 0.0324202 for Connectionist expert systems/Intelligent system and minimum value of Normalized Mean Square Error is 0.0307124 For Connectionist expert systems/Intelligent system.

For Sale of Cold Drinks dataset it is found that Minimum value of Mean Prediction Error is - 0.344828 for exponential moving average, Minimum value of Mean Absolute Error is 7.10345 for Connectionist expert systems/Intelligent system , Minimum value of Mean absolute percentage error is 3.18122 for Connectionist expert systems/Intelligent system , Minimum Value of Mean Percentage Error is -0.575787 for Exponential Moving Average, Minimum value of Mean Square Error is 78.2069 for Connectionist expert systems/Intelligent system , Minimum value of sum square error is 2268 for Connectionist expert systems/Intelligent system,

Minimum value of Root Mean Square error is 8.84347 for Connectionist expert systems/Intelligent system, minimum value of Normalized Root mean Square error is 0.0218898 for Connectionist expert systems/Intelligent

system and minimum value of Normalized Mean Square Error is 0.0336574 For Connectionist expert systems/Intelligent system.

In case of prediction of Sale of Grocery Item it is found that Minimum value of Mean Prediction Error is -2.46667 for Naïve Bayesian Regression, Minimum value of Mean Absolute Error is 4.6 for Connectionist expert systems/Intelligent system , Minimum value of Mean absolute percentage error is 1.90556 for Connectionist expert systems/Intelligent system , Minimum Value of Mean Percentage Error is -0.178317 for Naïve Bayesian Regression, Minimum value of Mean Square Error is 31 for Connectionist expert systems/Intelligent system , Minimum value of sum square error is 465 for Connectionist expert systems/Intelligent system , Minimum value of Root Mean Square error is 5.56776 for Connectionist expert systems/Intelligent system , minimum value of Normalized Root mean Square error is 0.191992for Connectionist expert systems/Intelligent system and minimum value of Normalized Mean Square Error is 0.00787275 for Connectionist expert systems/Intelligent system By examining the values of these Exhibition metric values of each algorithm for different datasets considered in this research it is concluded that Connectionist expert systems/Intelligent system algorithm has minimum values for most of the Exhibition metrics. From graphical results, the sine wave of Prediction values of target variable for Connectionist expert systems/Intelligent system algorithm is always closer to the actual values of target variable than other Methods for each data set. Hence Connectionist expert systems/Intelligent system gives better Predicting Exhibition than any other algorithm considered in this research.

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