Abstract-Fast food business is the fastest growing business recently in Pakistan and the people need to know the sales forecasting because of the business is totally based on the sales factor sales will tell us how to invest and how to expand the expanse and how to reduce the expanse and the growth of the business is measure in term of sales. We get collected the data form the Lahori fast food chain business and use the base model and find the error MSE rate and then we use the machine learning mode which is ARIMA to find the MSE error rate and compare their results and finally we found that the base model having the error lower than ARIMA.

Keywords: Sales prediction, sales forecasting, ARIMA, MSE.

I. INTRODUCTION

Sales forecasting is the processes you have to know the what will be the sales in the next session, day, month or year [1-3]. This is the most frequent tools used by advance organizations to reduce the risk factor and increase the growth and spend the investments on the business they do or day do not mostly of the firms used the sales prediction or forecasting for only sales growth and some are used for whole business this is more over can be used on the inventory forecasting.

Sales forecasting have many factor dependency price of the SKU's and need and demand and inventory and marketing expanse and also based on the market expanse organization are today not to spend on the business until unless they get the prediction almost 90% and based on the this prediction the marketing expanse will obviously effect the sales it's all about the sales forecasting benefits [4-6]. Sales forecasting helps the managers to support the next upcoming events implementation of the events and the materials that will be demands in future and what will be the infrastructure should be more beneficial for us [7].

There are two main points here we must consider.

i. In the event that you overestimate deals, you could go through cash that you won't make.

ii. In the event that you disparage deals, you're left badly ready for the coming quarter.

From the 31% of the business are rely the sales forecasting this will support the sales and marketing companies’ leaders and these leaders will make some decisions for the growth of the organization shown in Fig. 1. Organization prepare post-sales and for success factor and management for the upcoming challenges for faster growth of the business [8-10].

ADVANTAGES:
Gauge approaching income and better comprehend future open doors dependent on past data.

DISADVANTAGES:
The singular attributes of a given arrangement are not considered.

When sales reps leave your organization either on the grounds that they quit or were ended. Income will diminish except if you have a pipeline of expected recruits. On the off chance that a noteworthy number of reps went ahead load up at once, your business conjecture ought to foresee a major bounce in business when they've inclined [11]. The major factor the will effect if the sales are not improved, they policy makers will announce the new policies and based on these policies people are hire and also can be fire because you spend the time and cost and discount policy and sales promotions cast and other expenses are bared on the basis of sales forecast and if the targets are not achieved the policy will show after effects [12].
II. LITERATURE REVIEW

Sales forecasting are used from many years but with the IT and computer sciences this process now become very fast before this the algorithms are processed manually and it take a lot of time and chance of mistake is possibly maximum now today the based on the machine learning algorithms we are able to auto find the sales forecast and sales predictions and inventory predictions [13].

People are use the user index value to see the purchases power and the other business effected by sales in the Turkey the organization build a model for sales forecasting that is helping and supporting the organization to make more investment. His business was furniture and based on the construction projects the what will be sales of the furniture they used the Artificial Neural Network using the Tool MATLAB and based on the mode the deployment is on for one day, one week and one month and one year [14-15].

Chines auto mobiles and their relation with other factor and made by study and the about the sales forecasting they perform the 4 tests which are unite root test, weak exogeneity test and the cointegration test and granger test. The study shows the results that the root mean square error is 0.1243 and the mean absolute percentage error is 10.2015 by vector error correlation model the whole year [15].

Sales prediction is also productive in B2B business and the model was introduced for flexible business this intelligent model call the Black box model this is influence the organization and help and support to solve the decision making problems faced in B2B environment [6].

Now the retail industries also to adopt the sales forecasting strategies and try to grownup the retail business the study is about the fashion industry use the deep learning algorithm to predict the next session sales for the new products and the future plans are made by the leaders the deep learning model was built with the features of physical characteristics and the historical set of variables for the SKU’s the study shows that the DT, RF , SVM and ANN and Linear Regression model the deep learning model is more effective than others all algorithms and outperform the result are more batter of Prof ARIMA the Genetic algorithms [11].

III. METHODOLOGY & RESULTS

We have a simple and clean method we collect the dataset shown in Fig. 2.

![FIGURE 2: Dataset](image)

<table>
<thead>
<tr>
<th>id</th>
<th>name</th>
<th>category</th>
<th>quantity</th>
<th>amount</th>
<th>order</th>
<th>date</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>7</td>
<td>2- N/MD</td>
<td>chads</td>
<td>1</td>
<td>70</td>
<td>3/0/10/2019 19:17</td>
</tr>
<tr>
<td>1</td>
<td>8</td>
<td>1- N/D</td>
<td>chads</td>
<td>2</td>
<td>140</td>
<td>3/0/10/2019 19:17</td>
</tr>
<tr>
<td>2</td>
<td>9</td>
<td>1- N/D</td>
<td>chads</td>
<td>2</td>
<td>140</td>
<td>3/0/10/2019 19:17</td>
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<tr>
<td>3</td>
<td>10</td>
<td>1- N/D</td>
<td>chads</td>
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<td>140</td>
<td>3/0/10/2019 19:17</td>
</tr>
<tr>
<td>4</td>
<td>11</td>
<td>5- F/C</td>
<td>chads</td>
<td>1</td>
<td>90</td>
<td>3/0/10/2019 19:17</td>
</tr>
</tbody>
</table>

Here the attributes are transaction id name of the product / SKU’s and Category and Quantity this is sold and amount of the transaction or sales and order clear and data of the sales. Our processed model as shown in the figure

![FIGURE 3: Process model](image)

Online business is the also demanding domain and their sales forecasting is performed in the study the online store sales prediction model is designed which is ENORA and the regression model random forest model is also used to predict the sales from the novel approach ENORA and the NSGA-II and the LR, RF are also so productive and helpful for us they use the novel features extracted from the data and we use the classic strategy RFE used to support in the prediction of online business [10].

ProfARMA was new technique in the 2017 and use this techniques as compare to traditional methodology this was used to get the seasonal sales of the Coca-Cola company this help the company to build a financial profit function with the help and support of ProfARMA model and outperform the result are more batter of Prof ARIMA the Genetic algorithms [11].
FIGURE 4: Fast food graph

We see here the sales gap in the fast food is so small and the sales window we set equal to 10 days and based on the 10 days the graph is normalized as shown in the Fig. 4.

FIGURE 5.0

As for the base model we preprocess the data shown in Fig. 5 and sales values and use the 1 shift value and get the sales forecast in term based on the last sales or sales history or previous sales shown in the Fig 6.

FIGURE 6: Sample sales and forecast sales

Now for this we are ready to find the mean squared error using the sklearn scikit library and the values was received is 4596.22 which much different than the values in the dataset we just use the squared root function to normalize the values after the normalization of the values the mean squared error rate is 67.79.

Now the time to use the statistics model ACF and PACF.

Here are the results shown in Fig. 7 and Fig. 8.

FIGURE 7: Autocorrelation

Now the PACF results shown in Fig. 9 and Fig. 10.

FIGURE 9: PACF Partial autocorrelation

We notice that the auto correlational and partial correlation the values from the top to downward at the 3rd values the vales so smooth and this is the d values is
equal to 3 and the how much the auto regressive terms is 2 and the number of lagged forecast error in the prediction we use the q=1 at the initial stage and test the order is fit for ARIMA model. We divide the data into

After the running the model the ARIMA at order P = 2, Q=1 , D=3 , this is fit for ARIMA acceptance and processing after the running the algorithm we received the mean squared value is 100.33 which is bigger than the base model. Now we use the hyper parameter processes to check may be the other argument order will give us better results. The ARIMA Error Rate = 69.72

Base model Error Rate = 67.97

**FIGURE 11: ARIMA error rate comparison**

This is clearly showing in Fig. 11 that the base model is still better than ARIMA in our case.

**IV. CONCLUSION**

We proposed two models’ base model and statistical model ARIMA and the after performing experiments we find that the in the case of Fast food the base model is more accurate then ARIMA. The model will help the retails business to improve their sales and make the productive decisions.

**REFERENCES**


