LEAD SCORE CASE STUDY

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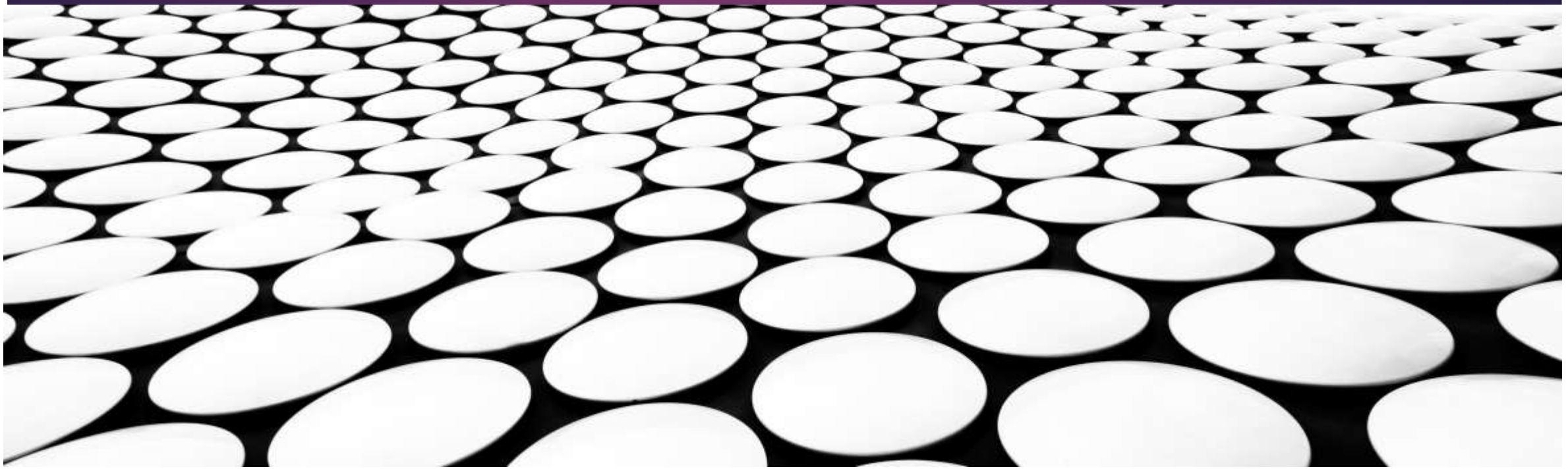

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PROBLEM STATEMENT / BUISNESS OBJECTIVE

- The data set of the Ed Tech company named X is provided to us . The company provides the online course to the industry professionals. The methodology used by the company for the advertisement is the search engine , websites etc . Those who lend to these for any query or to see the videos they have to fill a form which contains basic details including the mail id and the contact number. As the professionals who fill the application are converted as lead for the company. The lead details are than transferred to the sales team and they start contacting them via mail or by calling . Through this process some of the leads get converted .Initially the conversion rate was 30percent
- The company goals to achieve the converted rate to 80 percent . The company want to target those leads which are having a most probable chance to convert it into hot lead (i.e. those who will get converted for the course) so that they can curtail the amount on sales and can incur more profit from it .
- It is given the target variable as “Converted” where “0” means not converted and “1” means converted .
- We will finally determine the lead score between 0 to 100 .

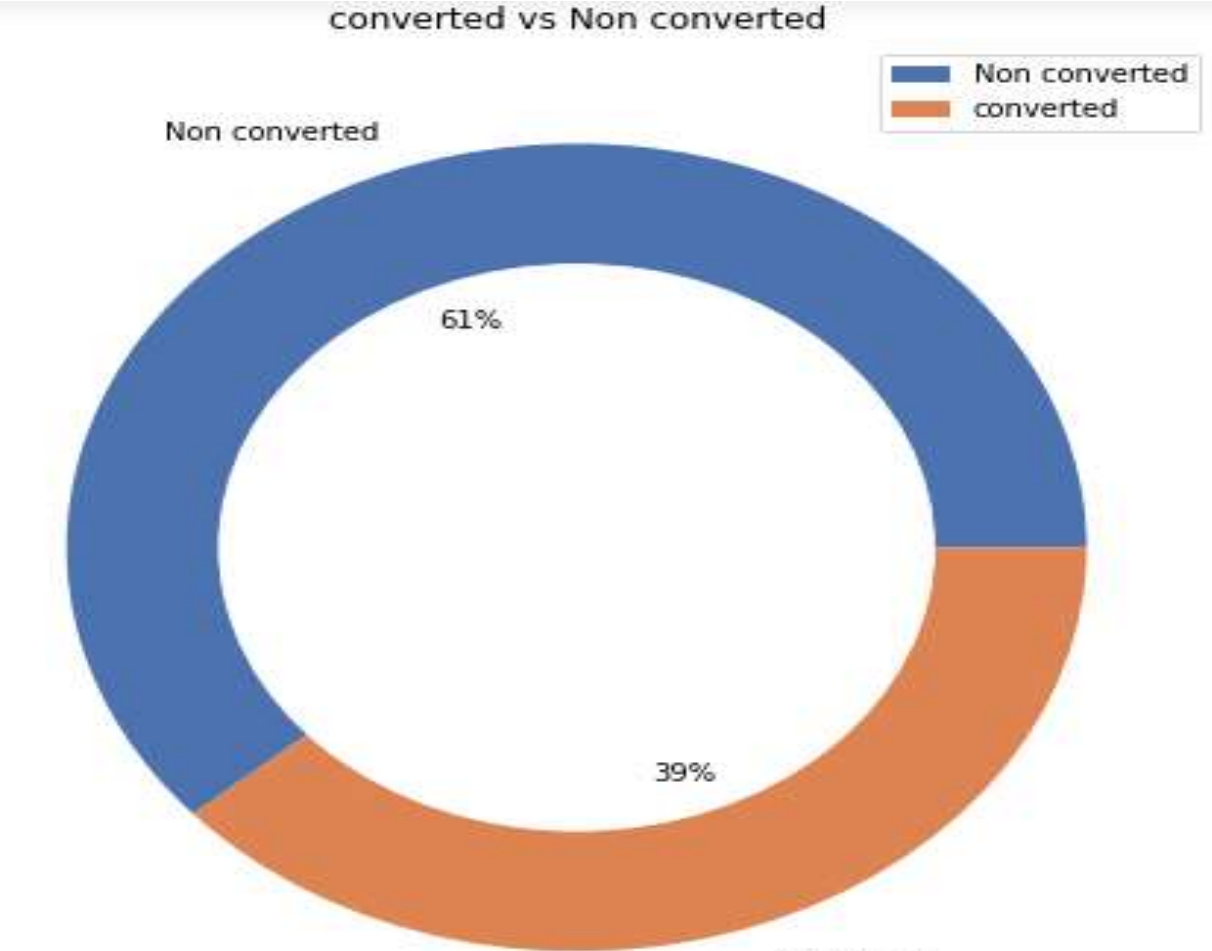
APPROACH FOR THE SOLUTION

- To solve the given problem statement we will use the MACHINE LEARNING model in which the Logistic Regression Algorithm will helpful to determine the solution to it .
- We will import the necessary libraries and then load the data set and move a head with data sanity checking and data cleaning. After it we will do the EDA which help to know the feature and understand it well with graphs and also with relationship between them.
- We will start mapping the features and create the dummies for the categorical variable which help to convert it into the binary digit and then we will split the data into train and test data set and then we will scale the features .
- We use the RFE(Recursive feature Elimination) which is going to help for selecting the best features and than we will do the manual feature selection with the help of p value and the VIF.
- After getting all the models we will go with confusion matrix which will help to calculate specificity,sensitivity, precison and recall along with accuracy .
- Finally we will get the ROC and than we will validate the test data and we will determine the lead as per the solution.

EXPLORATORY DATA ANALYSIS

- **UNIVARIATE ANALYSIS :** The univariate analysis explains the graph of the single variable .
- **BIVARIATE ANALYSIS :** The bivariate analysis explains the graph of the two variables .
- **MULTIVARIATE ANALYSIS :** The multivariate analysis explains the graph of the more than two variables.

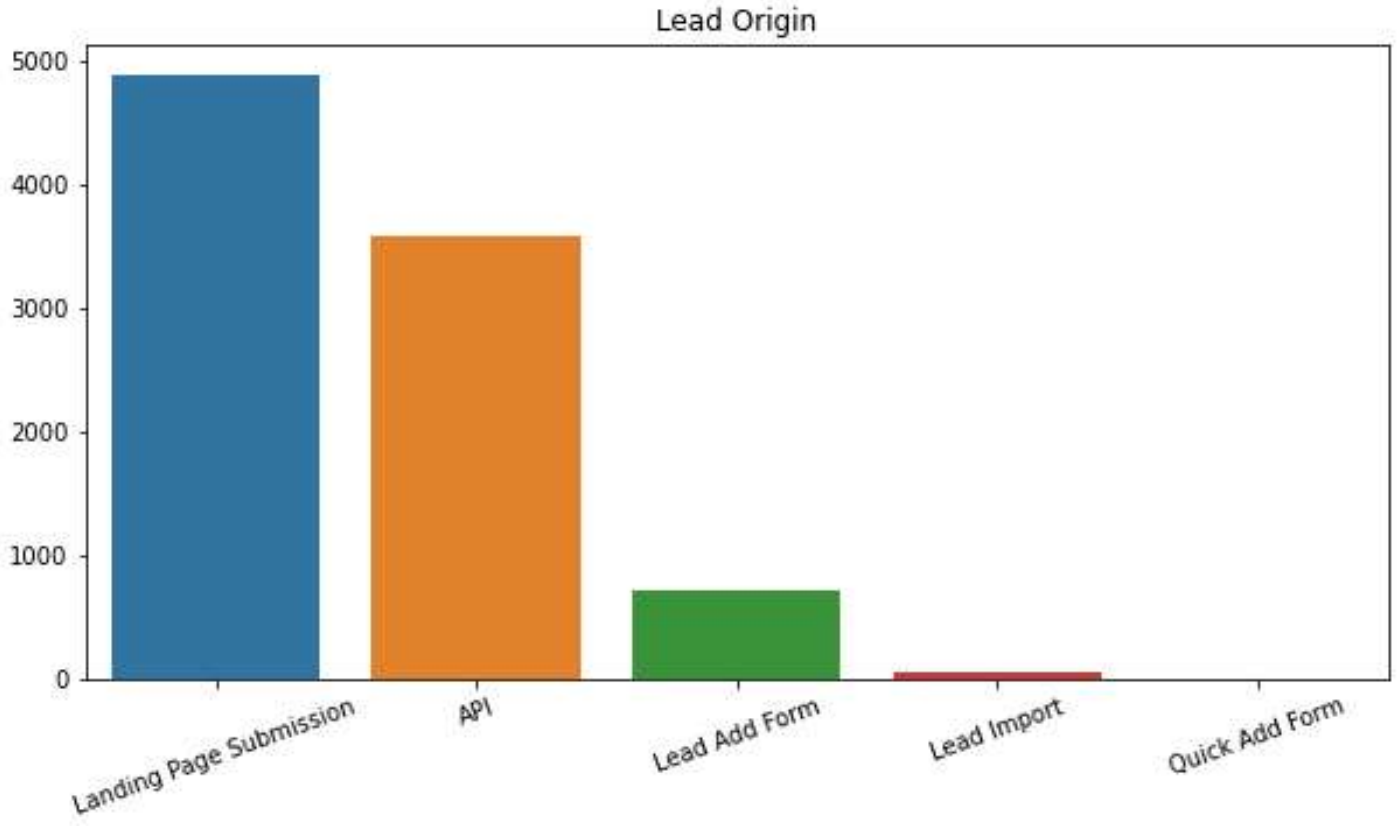
UNIVARIATE ANALYSIS



TARGET VARIABLE : CONVERTED

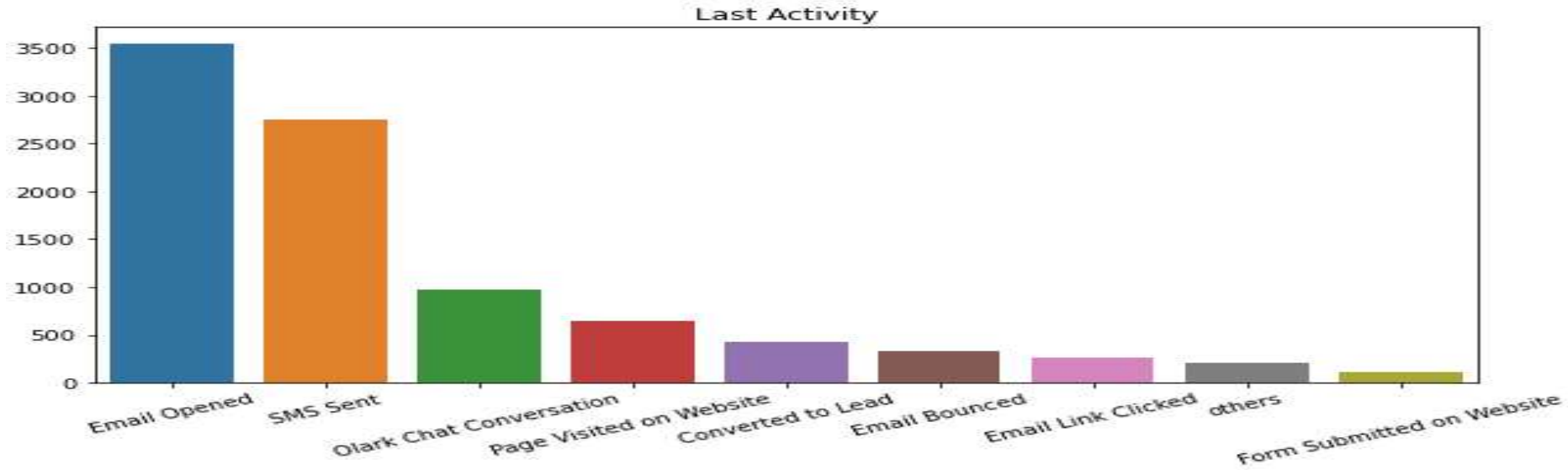
As mentioned that "Converted" is the target variable which means that we are going to predict the conversion using the rest of the data set .
As initially we can see that the conversion rate is approximately 39%.

LEAD ORIGIN



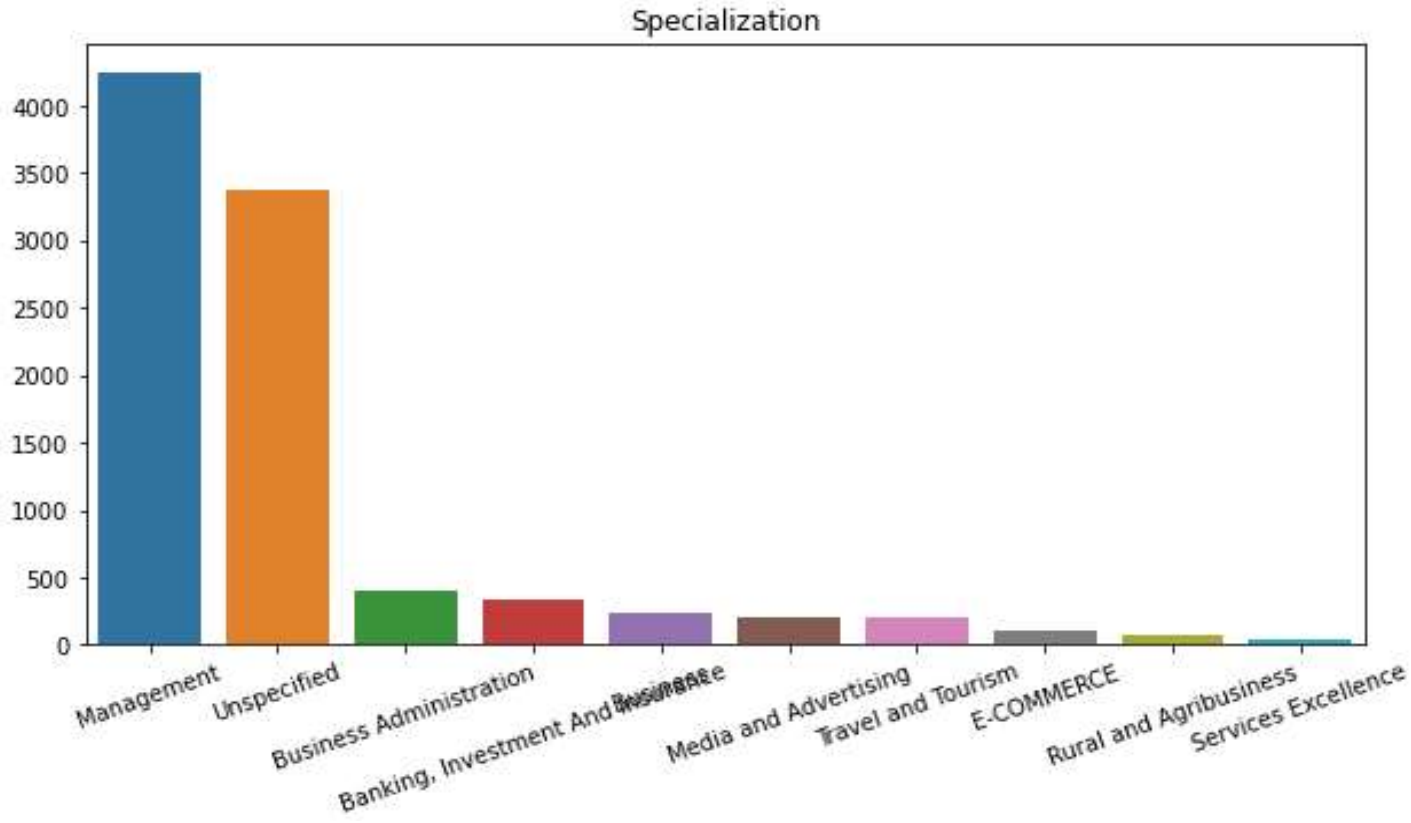
- A lead Origin act as an identifier by which the professionals are identified in different categories.
- Here, the lead origin level for the Landing page submission is higher as compare to others.

LAST ACTIVITY



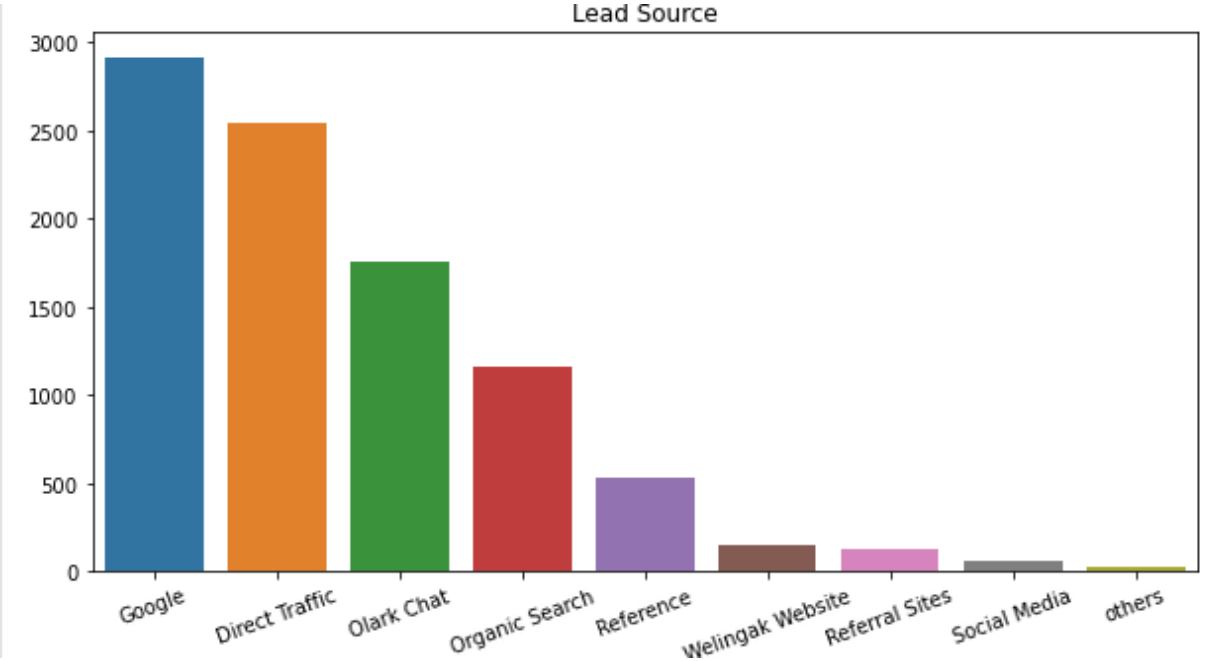
- Last activity performed by the customer. Includes Email Opened, Olark Chat Conversation, etc.
- It mean that what ever the activity is noticed at last from the lead is noted.
- The email opened played a significant role for the leads.

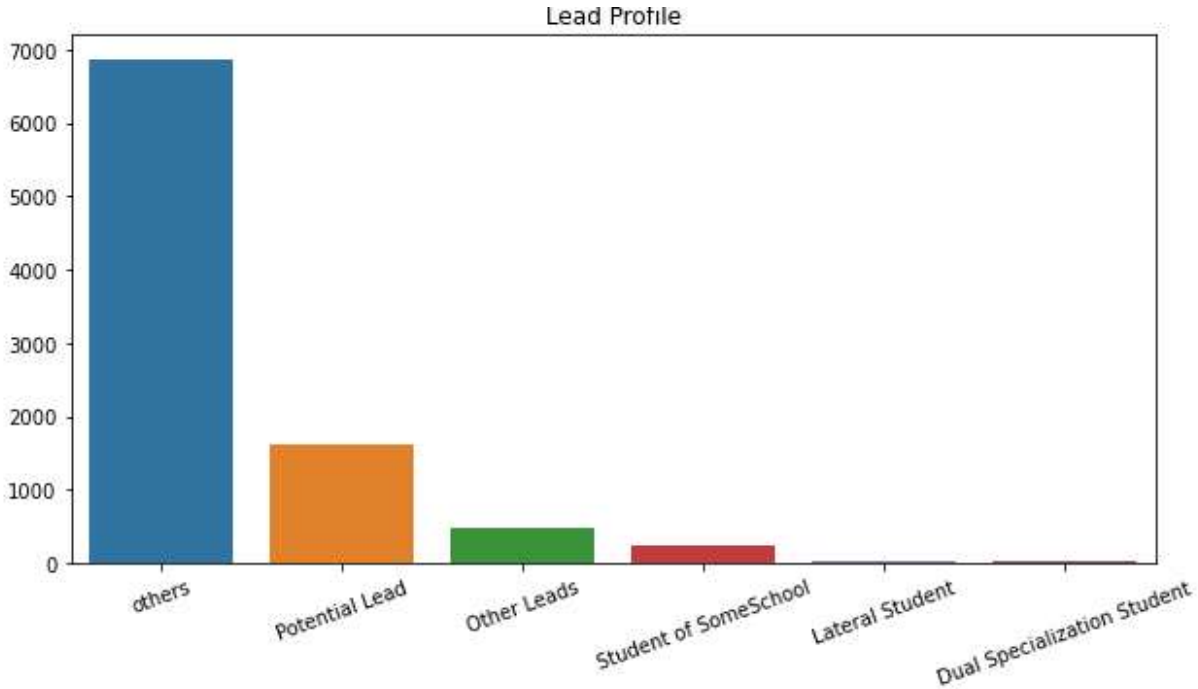
SPECIALIZATION



- Specialization is a feature which tells us the background of the feature.
- Management is quite high as compare to unspecified and far more than others.

LEAD SOURCE & LEAD PROFILE





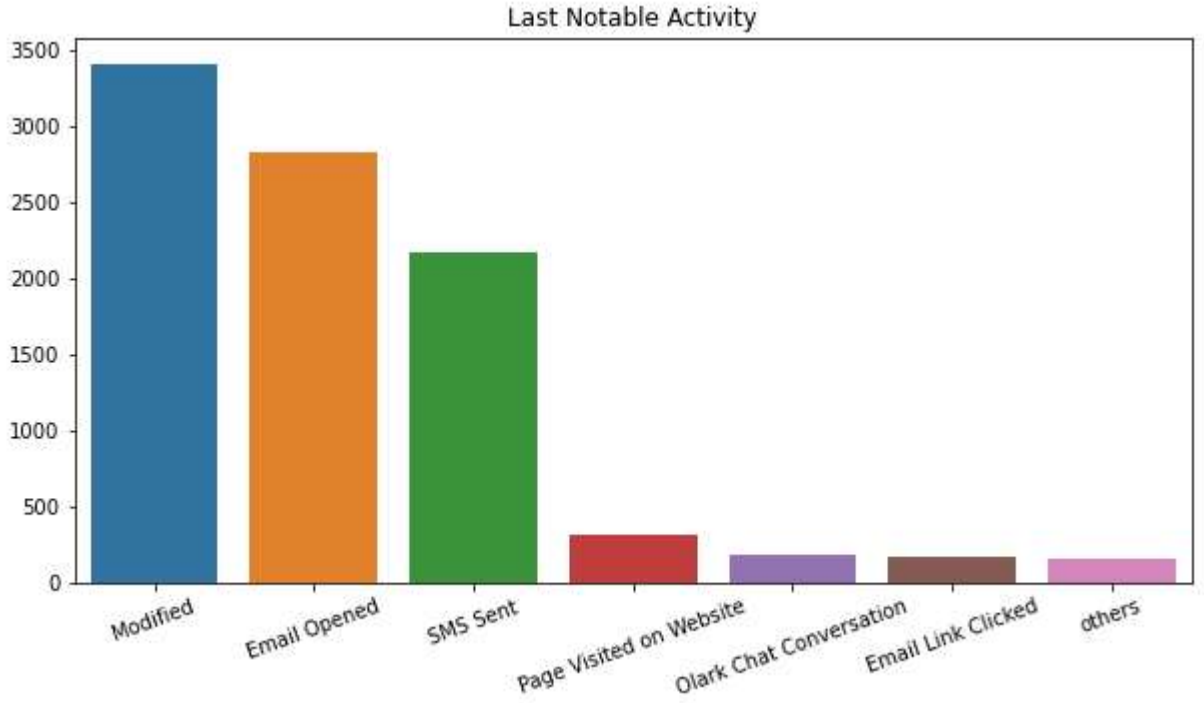
- Lead Source and Lead profile are the two different features . Lead source explains about the platform form which they are coming where as Lead Profile explains the level which is provided to them based on their profile.
- Google is defined as the best source as others is the best category for the profile.

A FREE COPYING OF MASTERING THE INTERVIEW

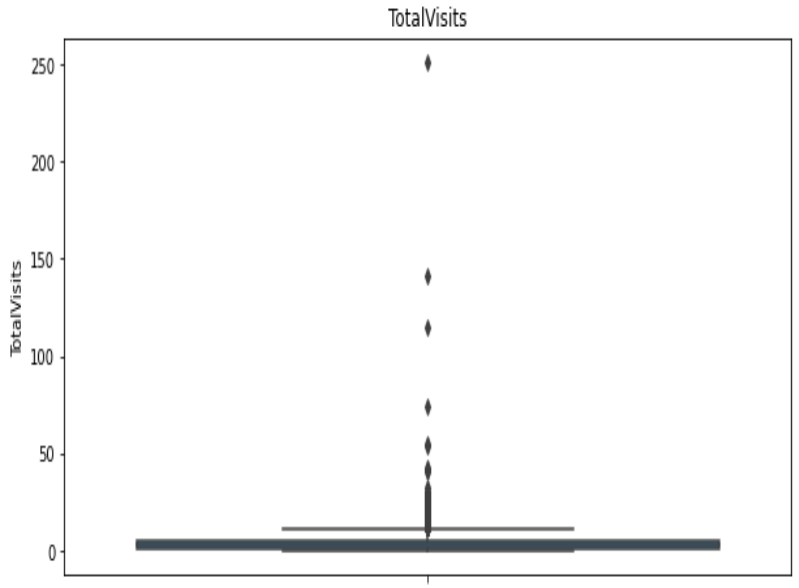
- A free copy of mastering the interview is given to those Leads who are being contacted by any medium.
- Most of them are answering no for it but also few are required for it .

LAST NOTABLE ACTIVITY

- What ever activity is observed by the professionals at last that is noted.
- The modified category have the highest in all follower by email opened and sms sent.

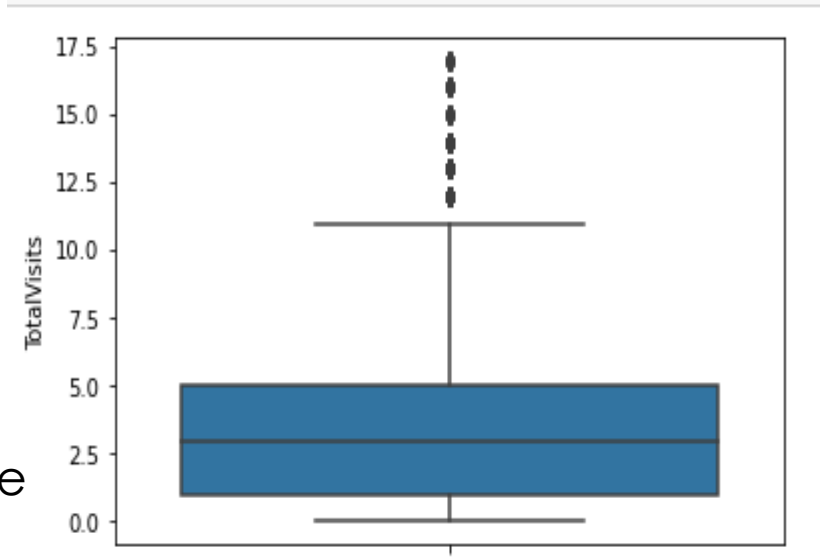


TOTAL VISITS



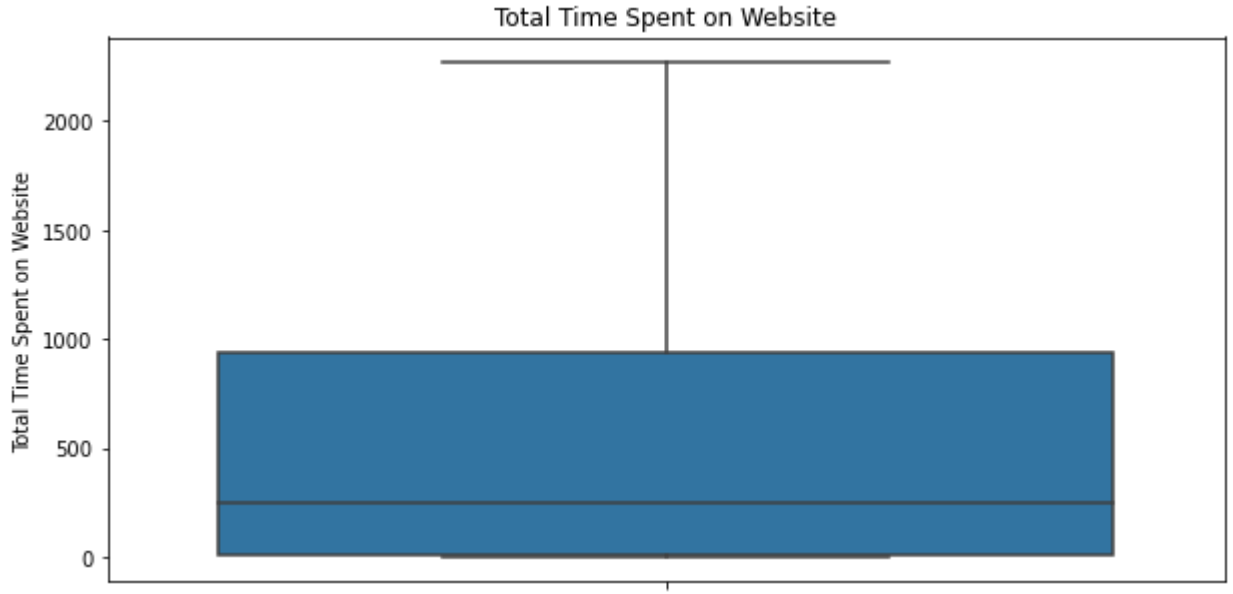
Here it is seen as more outliers.

After caping finally the box plot is clearly readable and able to see the values.



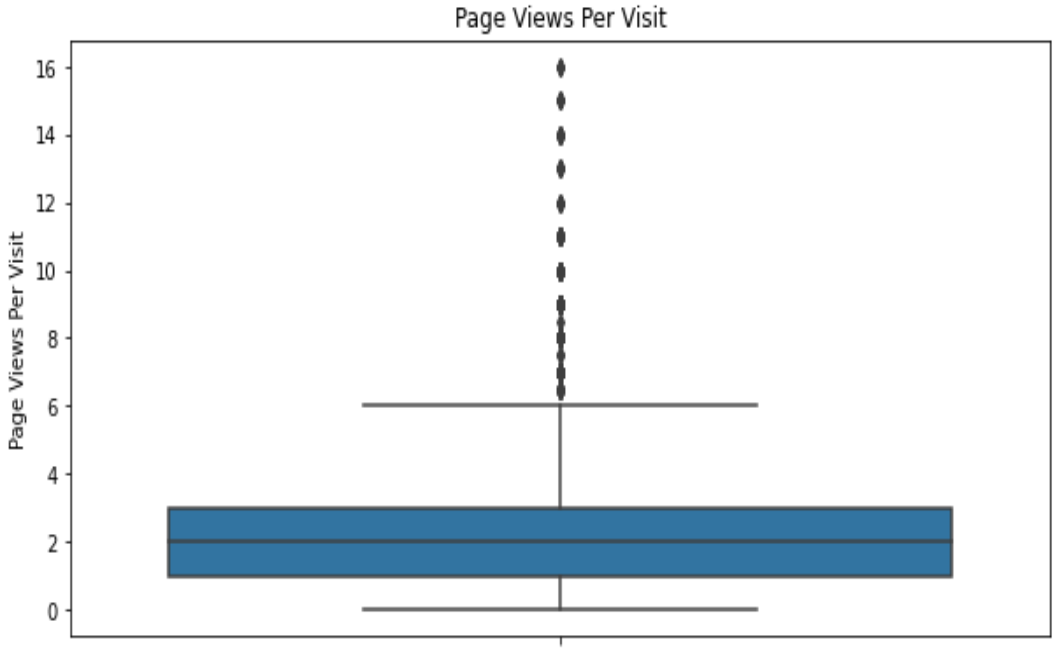
- A boxplot is a standardized way of displaying the distribution of data based on a five number summary (“minimum”, first quartile (Q1), median, third quartile (Q3), and “maximum”).
- Box plot is sketched for the continuous variables only.

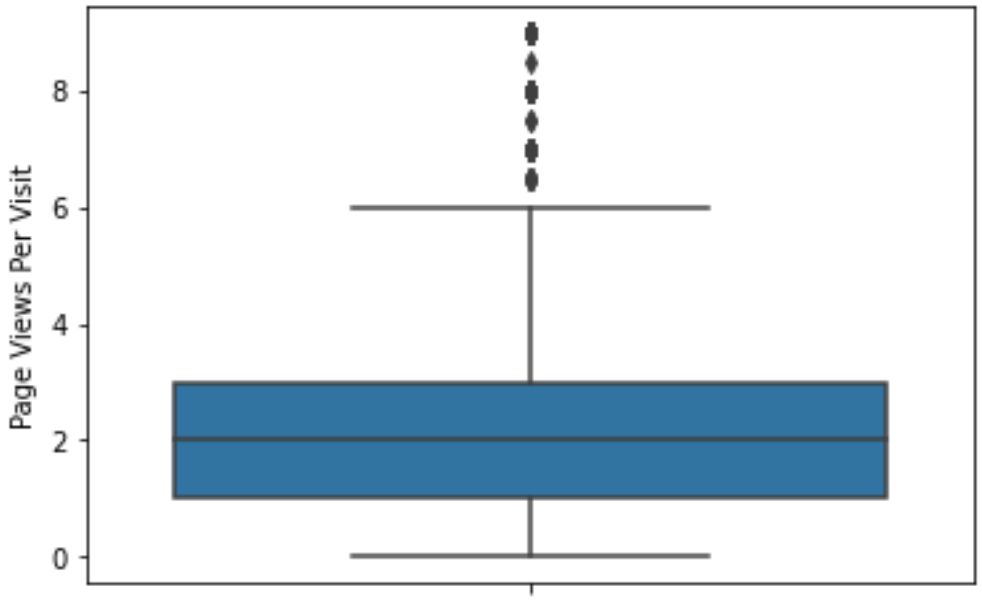
TOTAL TIME SPENT ON WEBSITE



- As here we can observe that the plot is defined very properly with no outliers.
- As it is also to be noted that the after 3rd quartile the value reaches high .

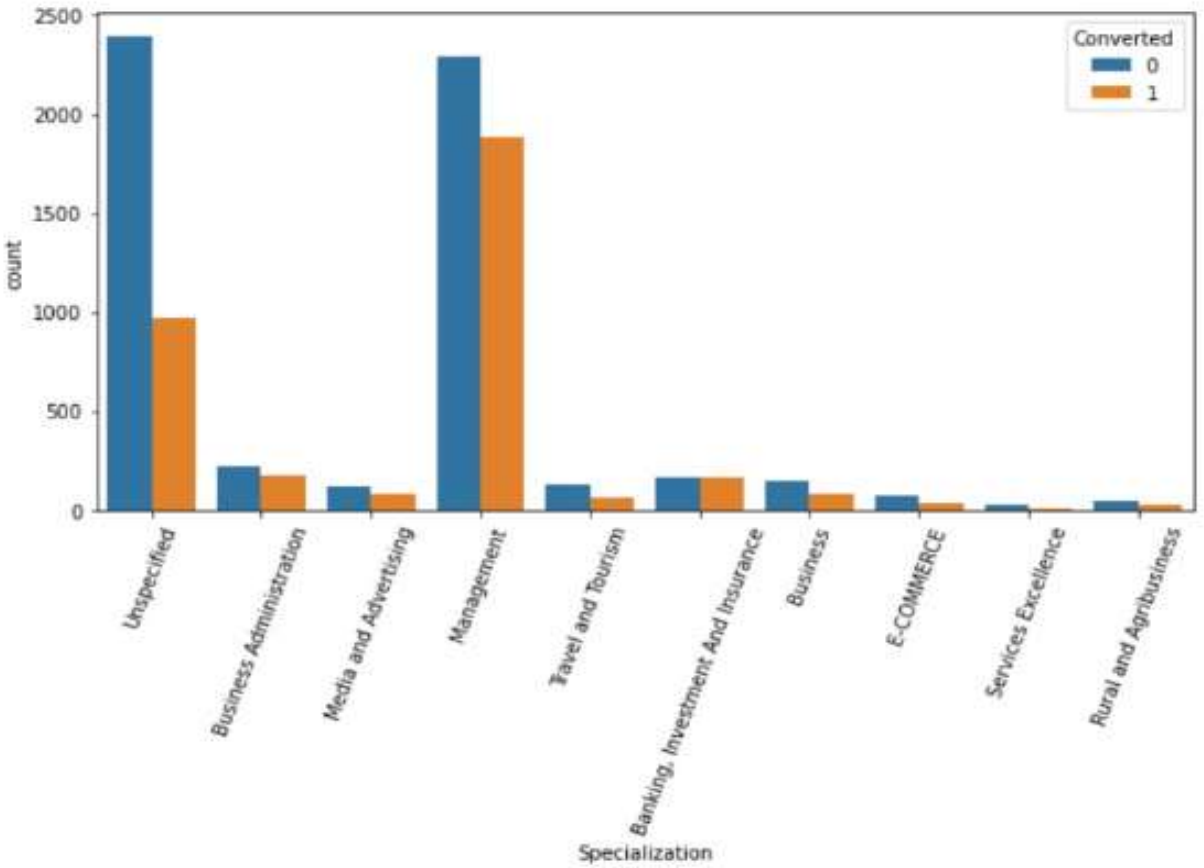
PAGES PER VISIT





- As there are more number of outliers are seen so we do the caping at 99 percentile .
- Finally the sketch of boxplot is well defined .

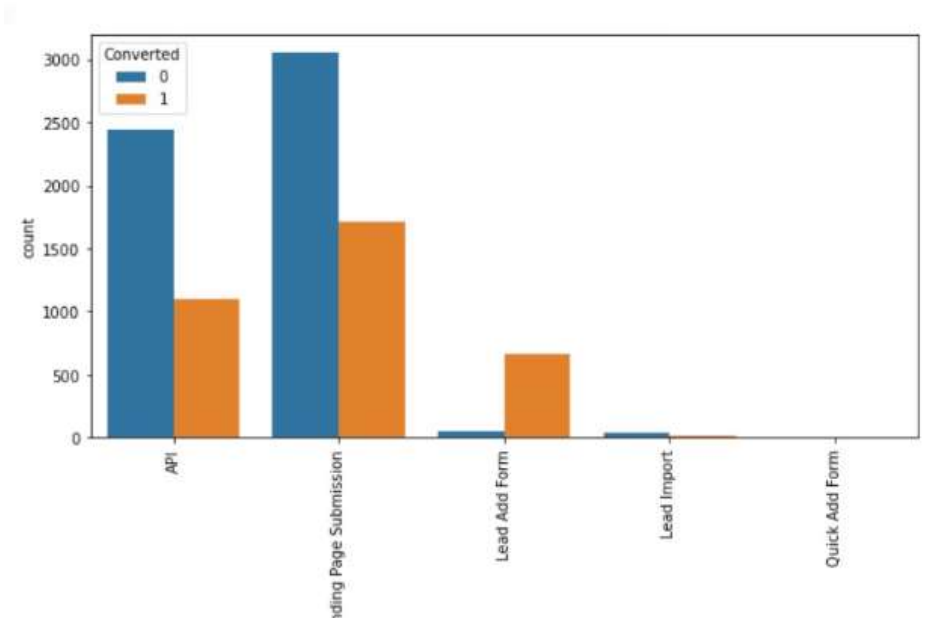
BIVARIATE ANALYSIS



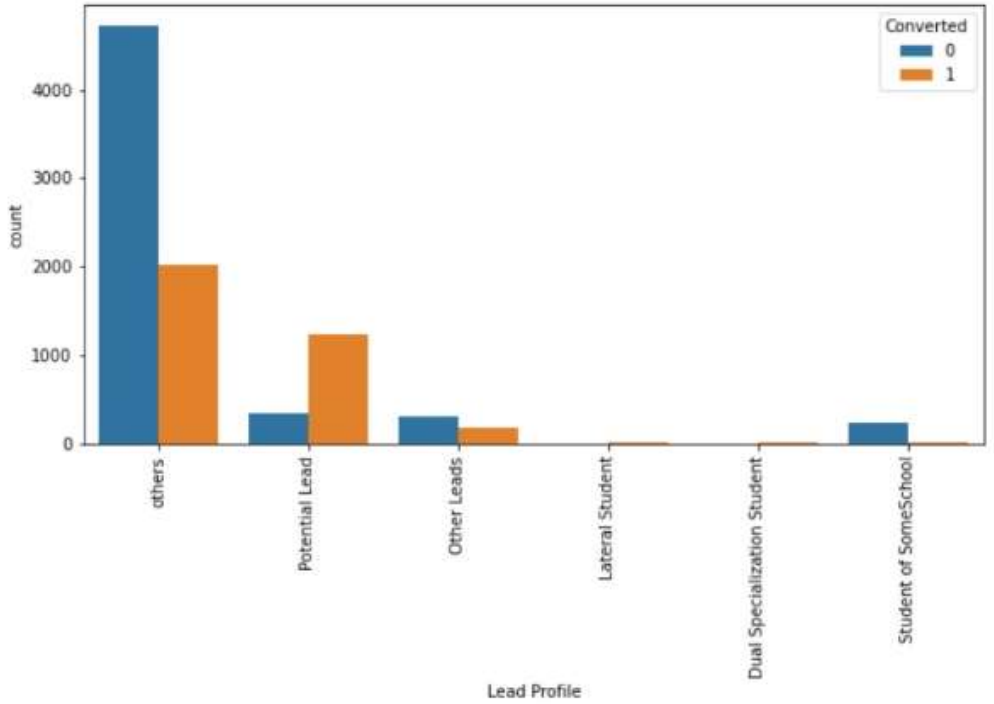
SPECIALIZATION

- As on the analysis we depict that the Management professional have the higher chance of converging .

LEAD ORIGIN & LEAD PROFILE

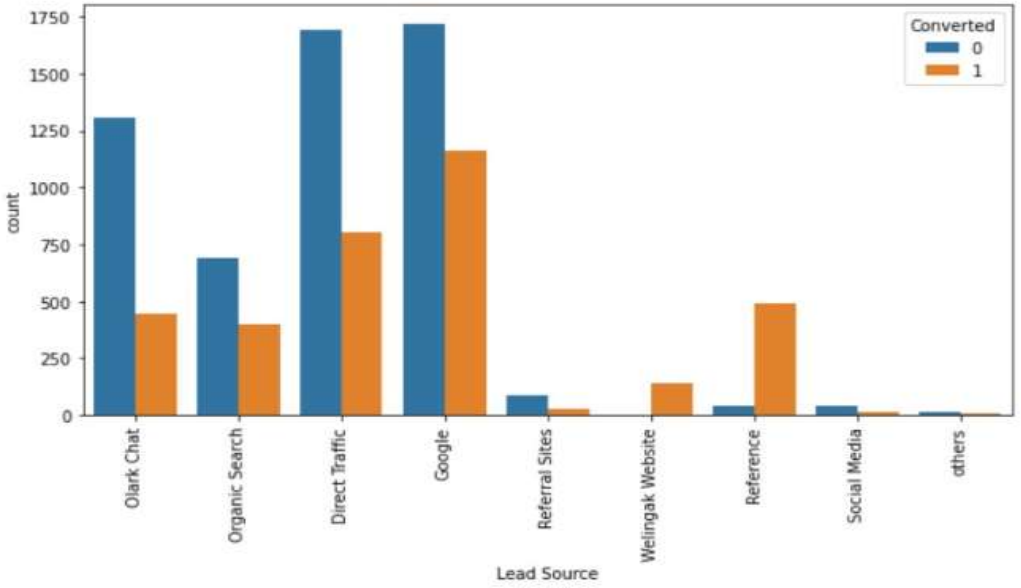


The Landing page Sumbission are more converting in numbers. The point to be noted that the LeadAdd form have the high coversion rate as others .

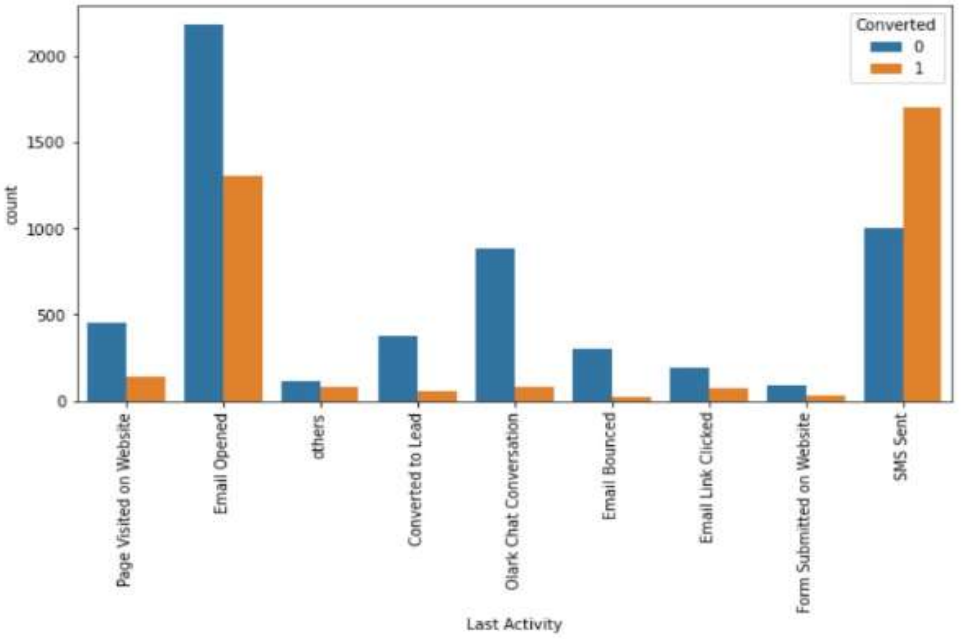


The potential lead are less in number but have high conversion rate although unspecified are more converting .

LEAD SOURCE & LEAD ACTIVITY

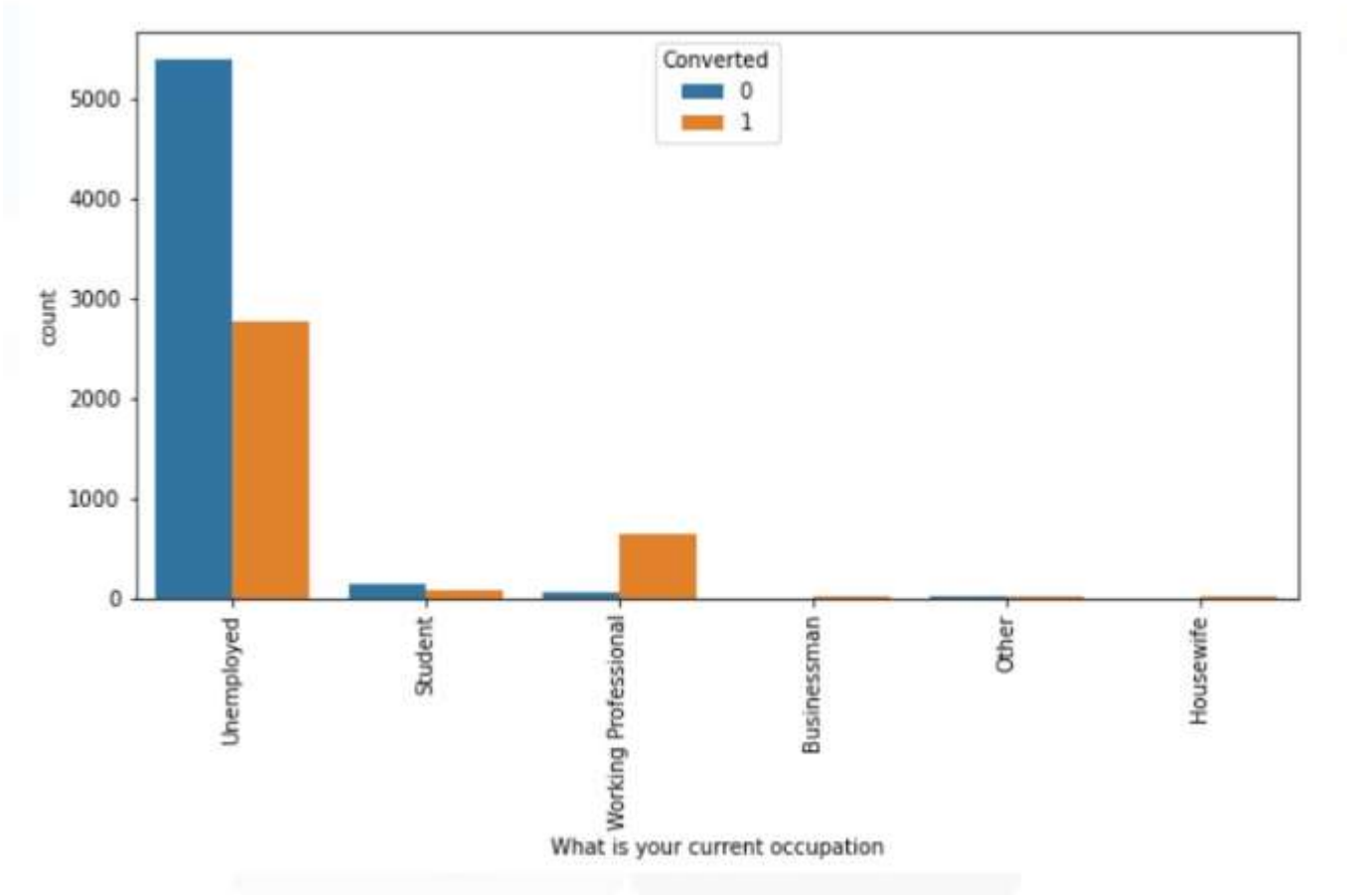


Direct traffic from Google have the most no. of conversions. Reference also have high conversion rate.



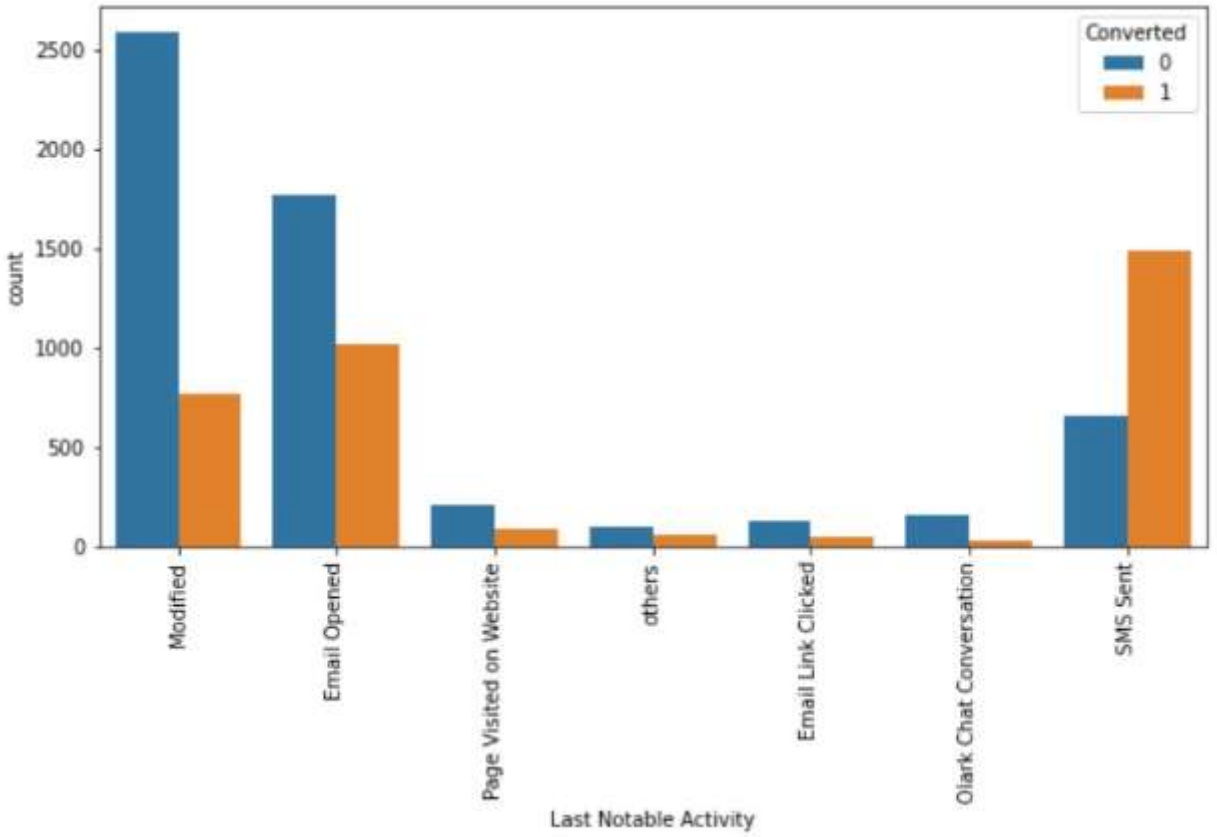
As we can see that in all bars the non conversion is high as compared to conversion. The case of SMS sent it works vice versa.

What is Your current occupation



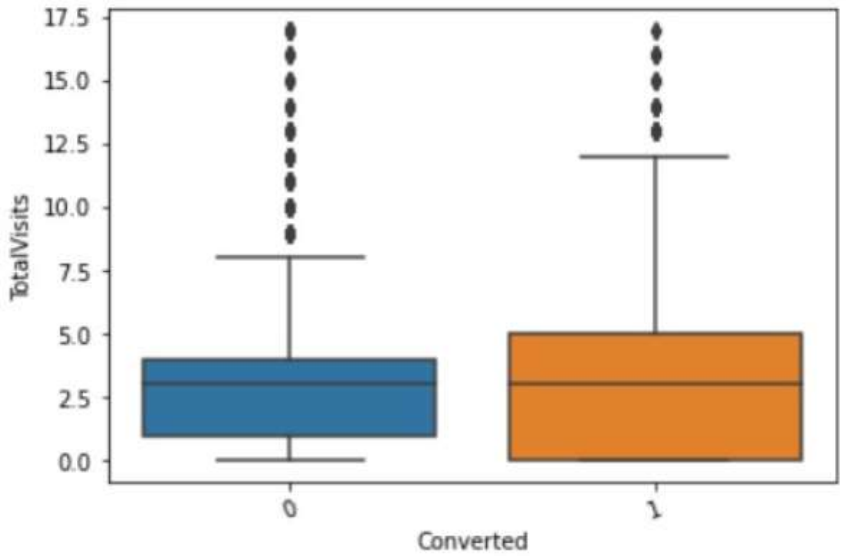
- The Unemployed category under the Current occupation has been more in numbers of getting converted as compare to others.

LAST NOTABLE ACTIVITY



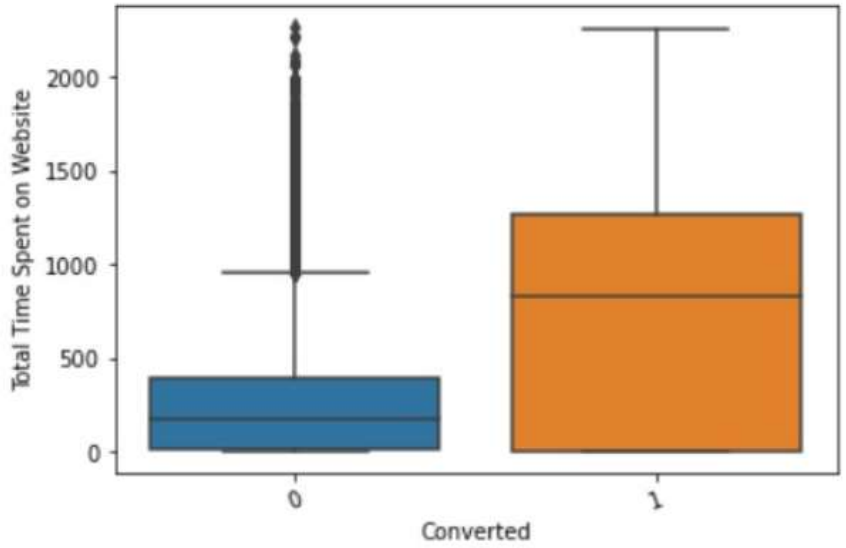
- Here it can be seen that the sms sent has the high rate of converting .
- It is also noted that it is following the same trend as Last Activity feature.

TotalVisits & Total Time Spent on Websites

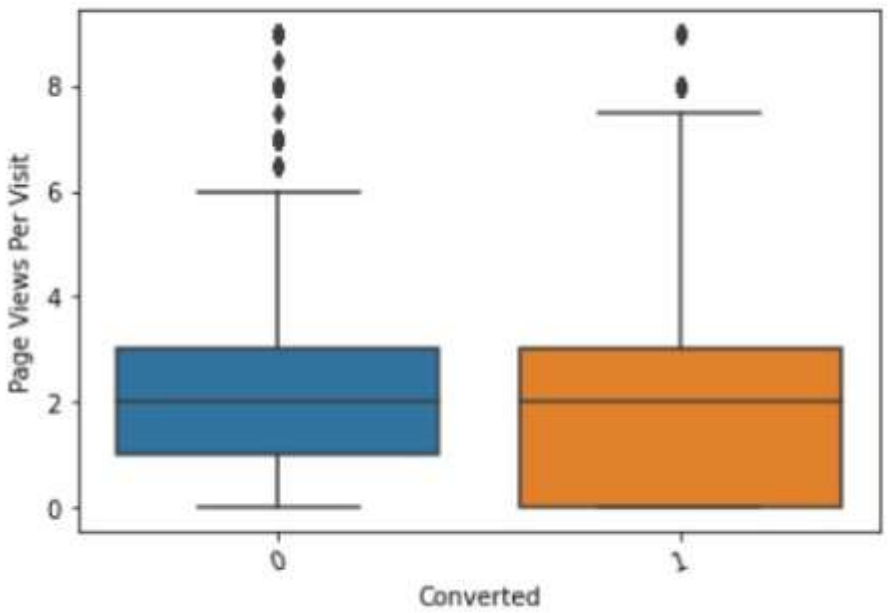


The similar trend is seen in converted and non converted but the upper and the lower range differs although they have the close median value in the TotalVisits.

leads spending more time on the website are more likely to be converted. Website should be made more engaging to make leads spend more time.



PAGES VIEWS PER VISITS

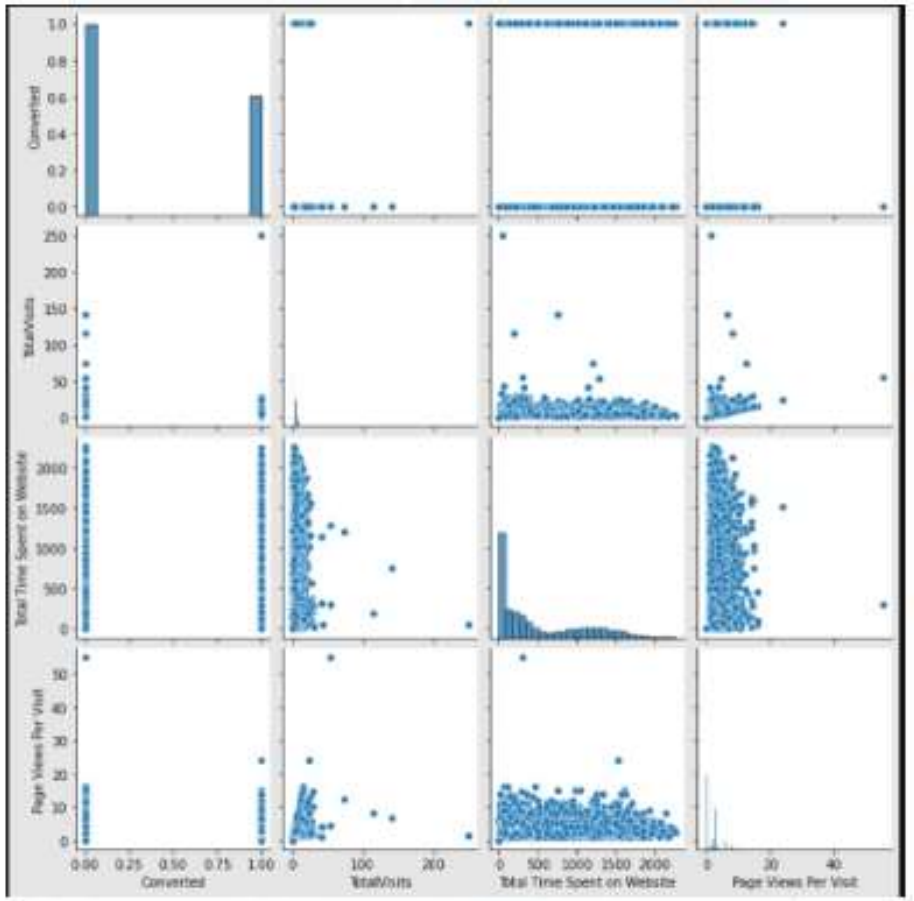


- The median value for both the converted and non converted are very close to each other so commenting on it is high risky factor.
- The range of conversion is seen high as compare to the non conversion.

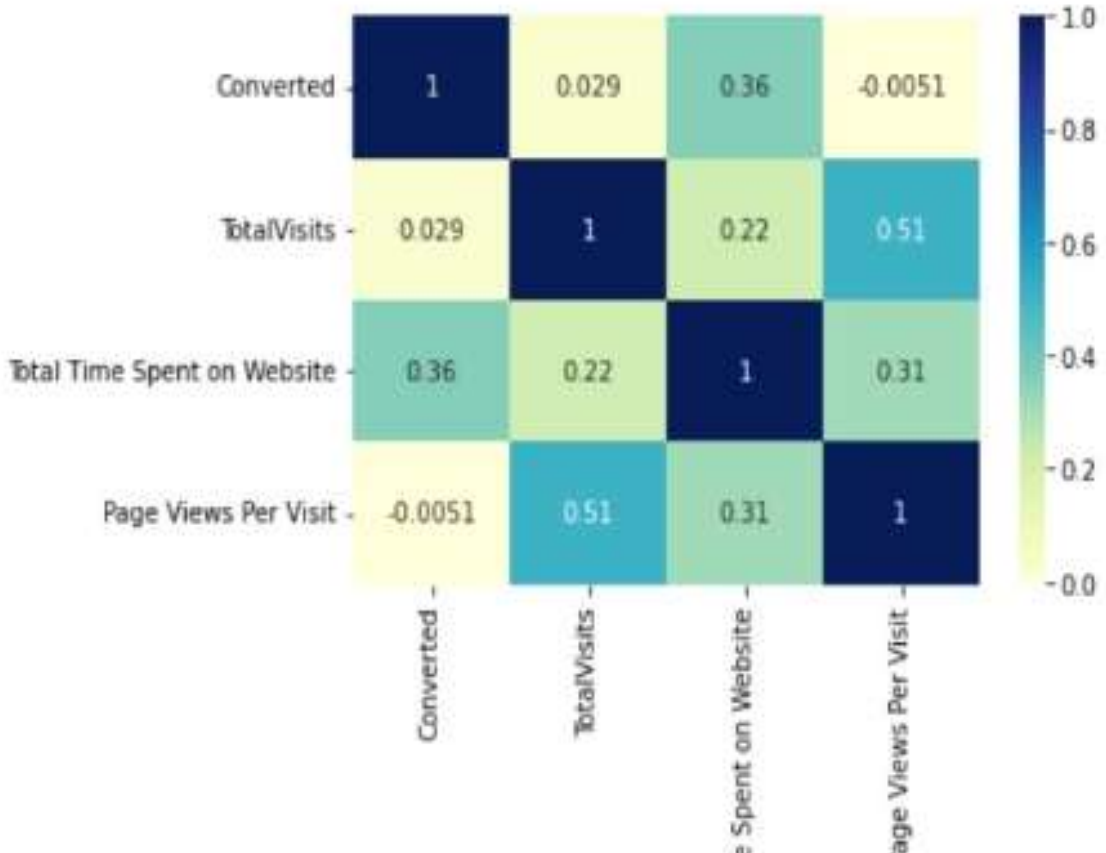
MULTIVARIATE ANALYSIS

SCATTER PLOT

- The scatter plot shows the relationship between the continuous variables .
- As here we can depict that the relationship between any two variable is not well defined so there is high chance that the relationship shall be less than 0.5 which can be seen with the heatmap or with the correlation matrix.
- But, eventually the relationship between the total visit and the pages per visit is seen better than others.



HEAT MAP ON CONTINUOUS VARIABLE



- The heat map defines the correlation matrix with the colour variation as the colour is as deep the matrix is more closer to 1 it shows that it is perfectly positively correlated.
- It is also to be noted that relationship between 1:1 is observed in the diagonal which is always equal to 1.
- Here we see that pages per visit with total visit is highly correlated where as converted to the pages per visit is vey less correlated among others.

CONFUSION MATRIX

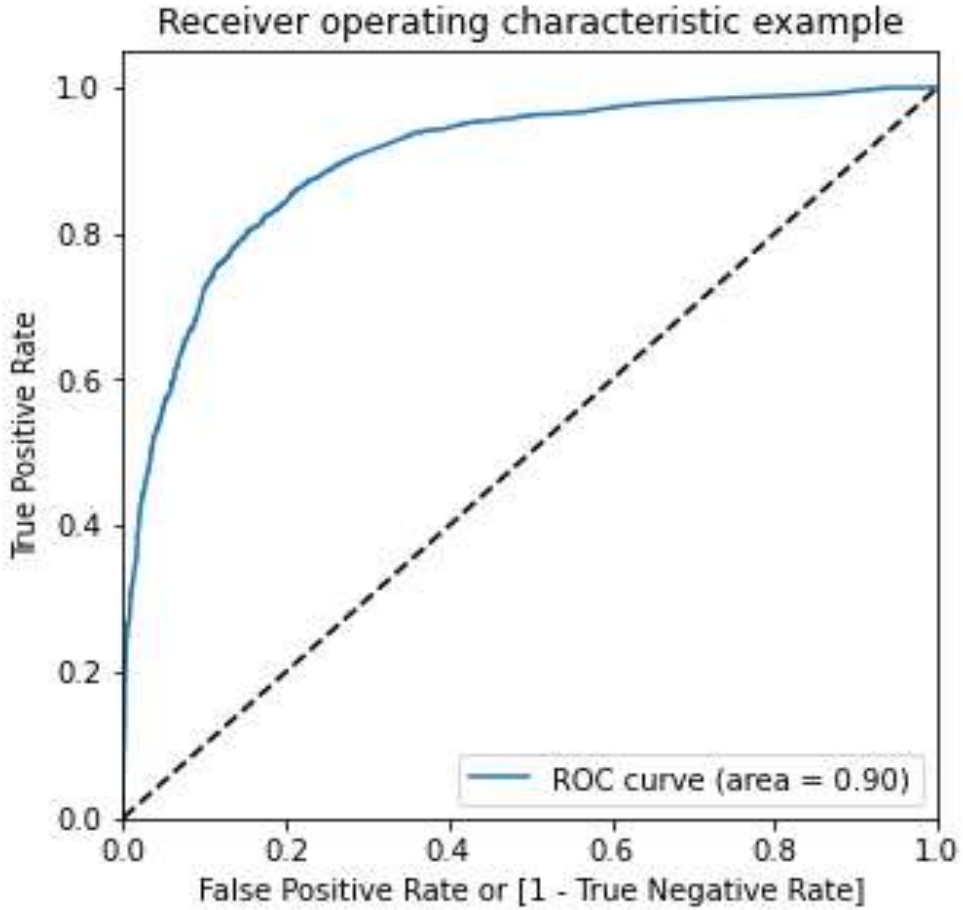
```
# Predicted  -->>      not_converted   Converted

# Actual
# ^^^
# not_converted       3506            429

# converted           631             1797
```

- The confusion matrix tells us how the model is correctly predicted as compared to the actual.
- It helps us to improvise the error that is to reduce the error of the prediction at some instant .

ROC CURVE

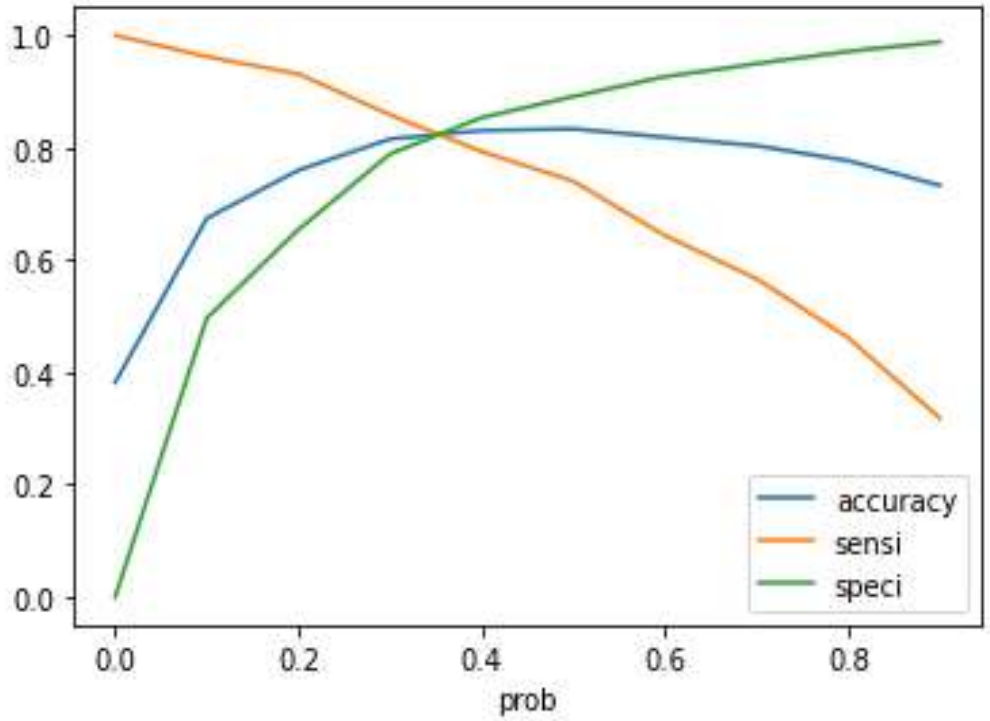


- The ROC curve is created by plotting the true positive rate (TPR) against the false positive rate (FPR) at various threshold settings. The true-positive rate is also known as sensitivity, recall or *probability of detection*. The false-positive rate is also known as *probability of false alarm* and can be calculated as (1 − specificity).
- The ROC curve is called as Receiver Operating Characteristics curve.
- As much the curve is towards the y axis the curve getting the better characteristic.

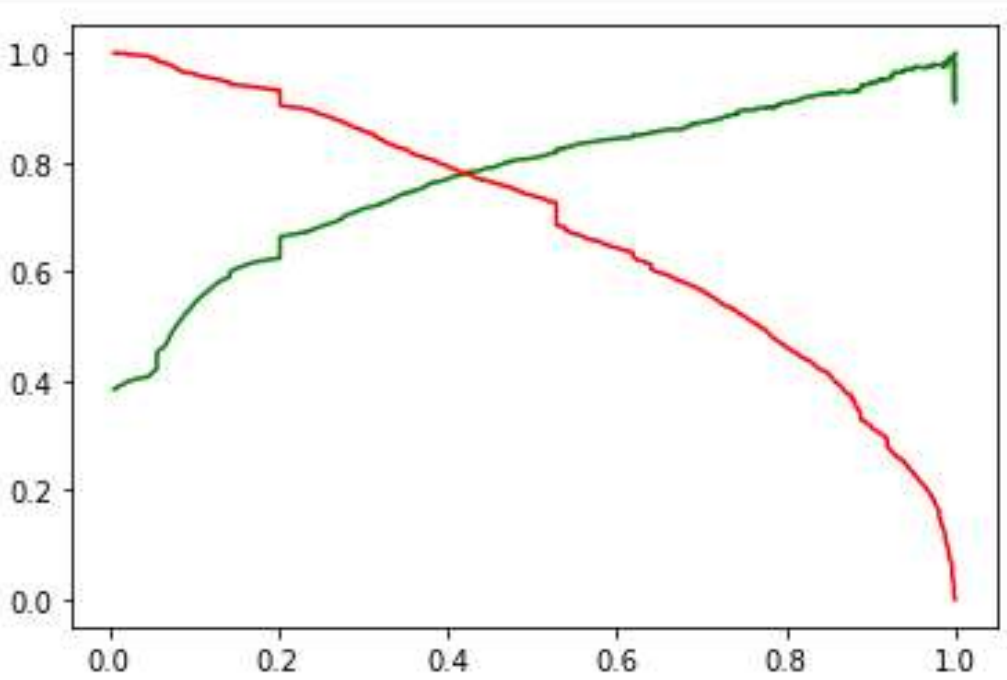
OPTIMAL CUT OFF

- The optimal cut off is that point where the Accuracy, Specificity and the sensitivity cuts each other .

- The point of Optimal cut of is the point by which we decide the cut off prob and proceed further to calculate the value of Recall and the precision.



THRESHOLD CURVE



- The threshold curve is the intersection of the precision and the recall value.
- We calculate the threshold value to determine the cut off probability .

CONCLUDING REMARKS

- Finally we have made the models with the remaining features which will help to predict the hot leads.
- This will help the CEO to reduce the cost at advertisement as well as also to gain more profit .
- The final lead score calculated lies between 0 to 100 which satisfy the problem statement.
- The model will also help us to know how much our prediction is true and how we can improvise it to get the better result with the help of the confusion matrix.

Thanks for your special view