LEAD SCORE CASE STUDY

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HIGHLIGHTS

Problem Statement

Steps followed for Logistic Regression analysis

Data Visualizations

Model Summary

Recommendations

PROBLEM STATEMENT

- X Education gets a lot of leads, i.e. professionals who are interested in their courses who land on their website and browse for courses.
- However, its lead conversion rate is very poor.
- X Education needs to identify the most promising leads, i.e. the leads that are most likely to convert into paying customers.
- To make their lead conversion process more efficient, the company wishes to identify the most potential leads, known as 'Hot Leads'.
- The ballpark of the target lead conversion rate should be around 80%.

Goals and Objectives of the Case Study:

- Build a logistic regression model to assign a lead score between 0 and 100 to each of the leads which can be used by the company to target potential leads. A higher score would mean that the lead is hot, i.e. is most likely to convert whereas a lower score would mean that the lead is cold and will mostly not get converted.
- The model should be able to adjust to the company's requirement changes in the future.

Dataset provided:

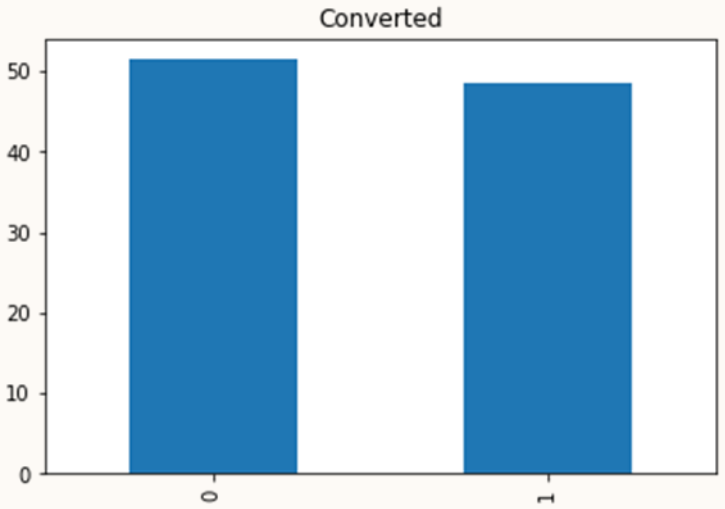
1. 'Leads.csv' - leads dataset from the past with around 9000 data points.
2. 'Leads Data Dictionary.xlsx' – data dictionary to learn more about the dataset.

STEPS FOLLOWED FOR LOGISTIC REGRESSION ANALYSIS

- Step 1: Importing Data
- Step 2: Inspecting the Data frame
- Step 3: Data Preparation: To do an initial data pre-processing
  - Handling missing values & imputing them
  - Handling columns with imbalanced data
  - Handling outliers
- Step 4: Data Visualizations
- Step 5: Data Preparation – II
  - Converting binary variables (Yes/No) to 0/1
  - For categorical variables with multiple levels - create dummy features
  - Test-Train Split
  - Feature Scaling
  - Looking at Correlations
- Step 6: Model Building
  - Feature Selection Using RFE
  - Assessing the model with Stats Models
  - Evaluate model accuracy, confusion matrix & other metrics
  - Plotting the ROC Curve
  - Finding Optimal Cutoff Point
- Step 7: Making predictions on the test set - Assign Lead Score & Hot Leads

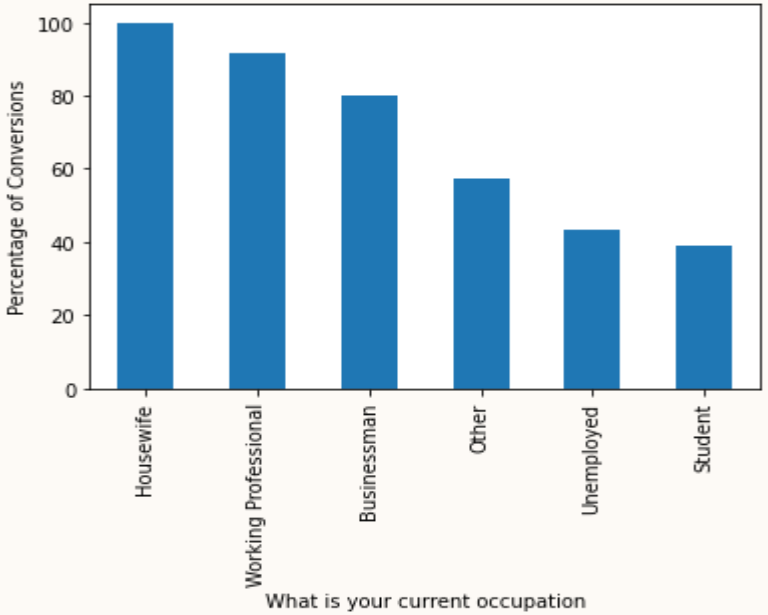
DATA VISUALIZATIONS

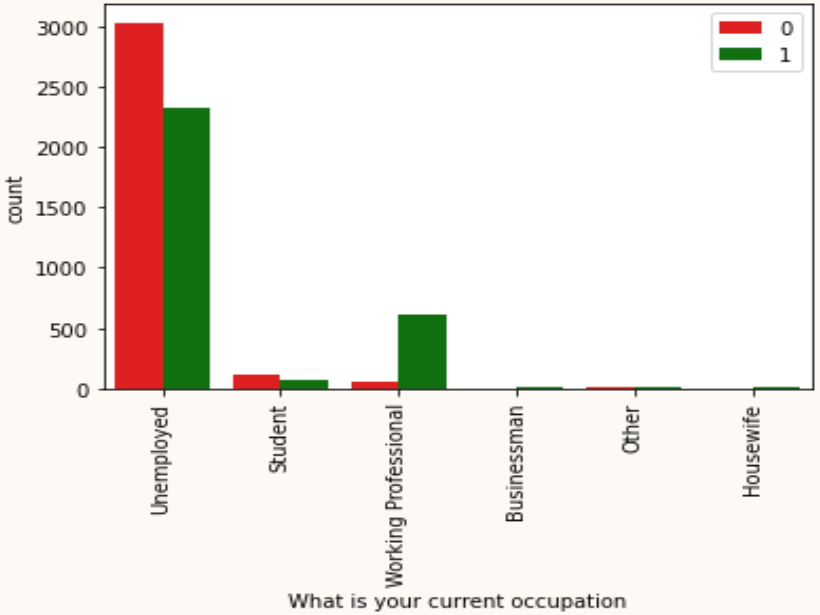
IMBALANCE ANALYSIS OF TARGET FEATURE - CONVERTED



- We have a balanced dataset.
- As per the dataset, 48% leads have converted and 51% not converted which looks okay to start further EDA and analysis.
- The current Conversion rate is 49%.

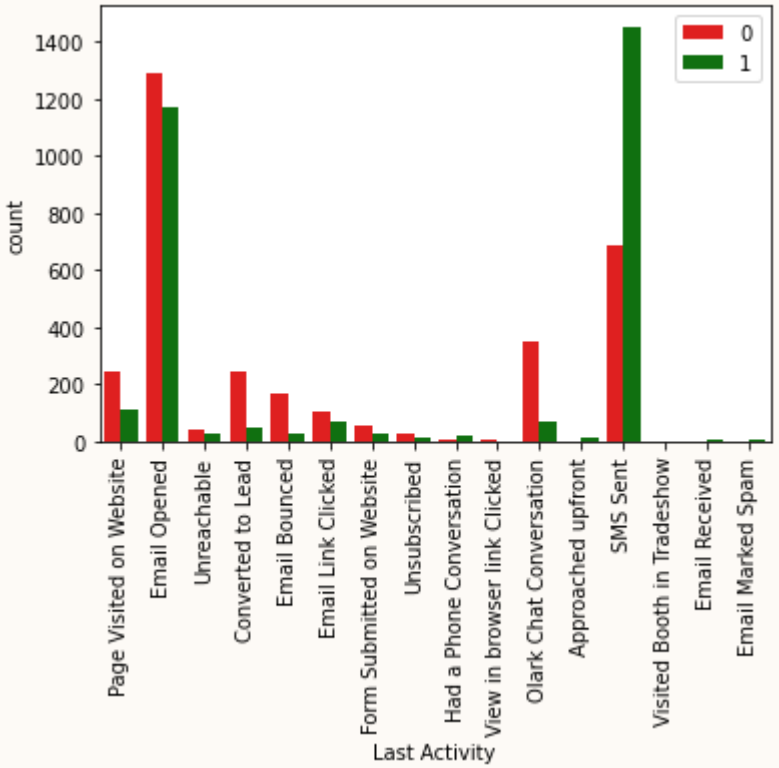
FEATURE ANALYSIS – WHAT IS YOUR CURRENT OCCUPATION

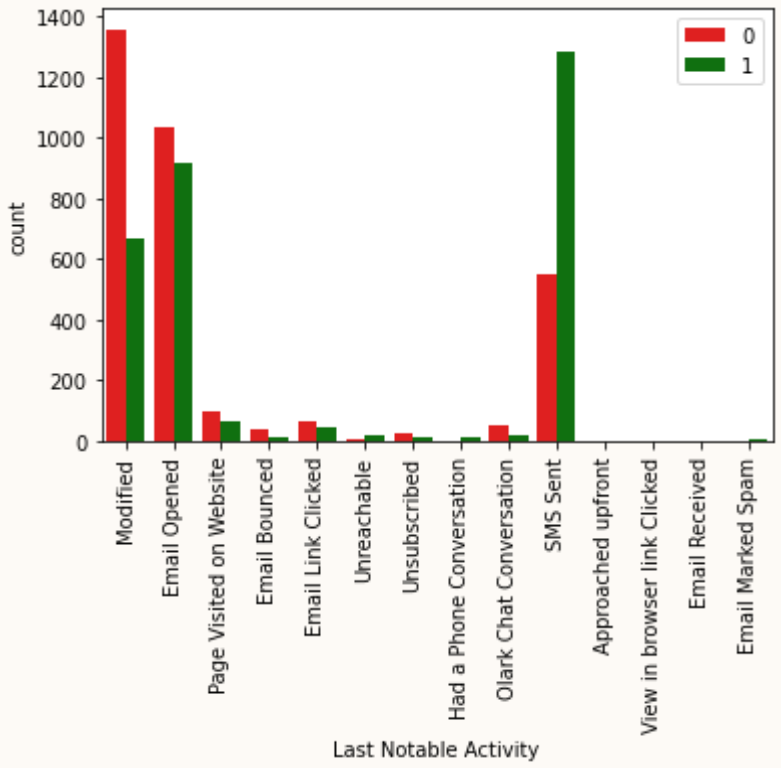




- There is good lead conversion among Working Professionals (WP) ~91% of the total WP have converted. So, WP seems like a good crowd for targeting the campaigns.
- Of the Unemployed Professionals (UP), 43% have converted. Bu, There are large number of UP's who have not converted – which needs to be looked at.
- Of the 10 Housewives identified as leads, all have been converted. So, there seems like a good potential but need to dig in on why we have less Housewives as leads.
- There is also a small student population 34% of whom have converted from potential leads.

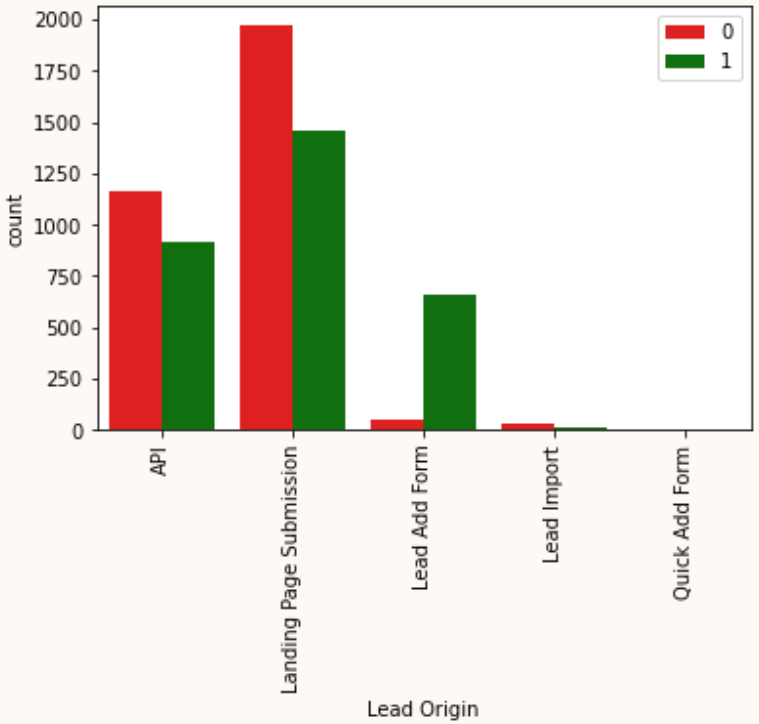
FEATURE ANALYSIS – LAST ACTIVITY & LAST NOTABLE ACTIVITY

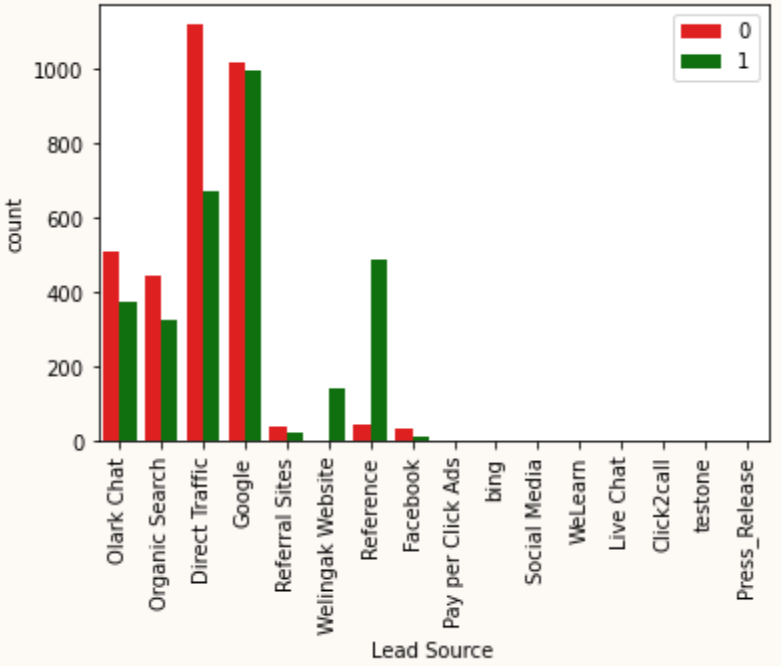




- The customers who have SMS Sent as Last Activity/Last Notable Activity have high conversion rate.
- For the feature Email Opened, both conversion & non-conversion counts are close to each other. Need to see how to be able to target the non-conversions here.
- The features - Modified and Olark Chat Conversion have lesser conversions.
- These 2 features - Last Activity/Last Notable Activity are almost the same - so one can be removed from further analysis.

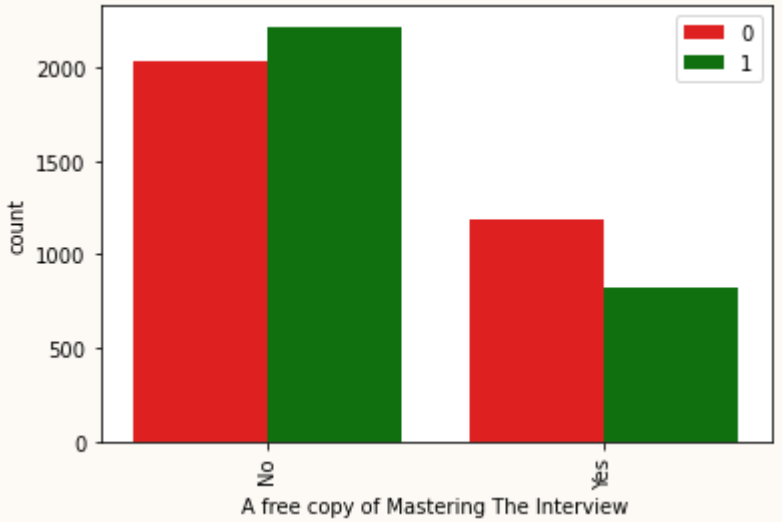
FEATURE ANALYSIS – LEAD ORIGIN & LEAD SOURCE





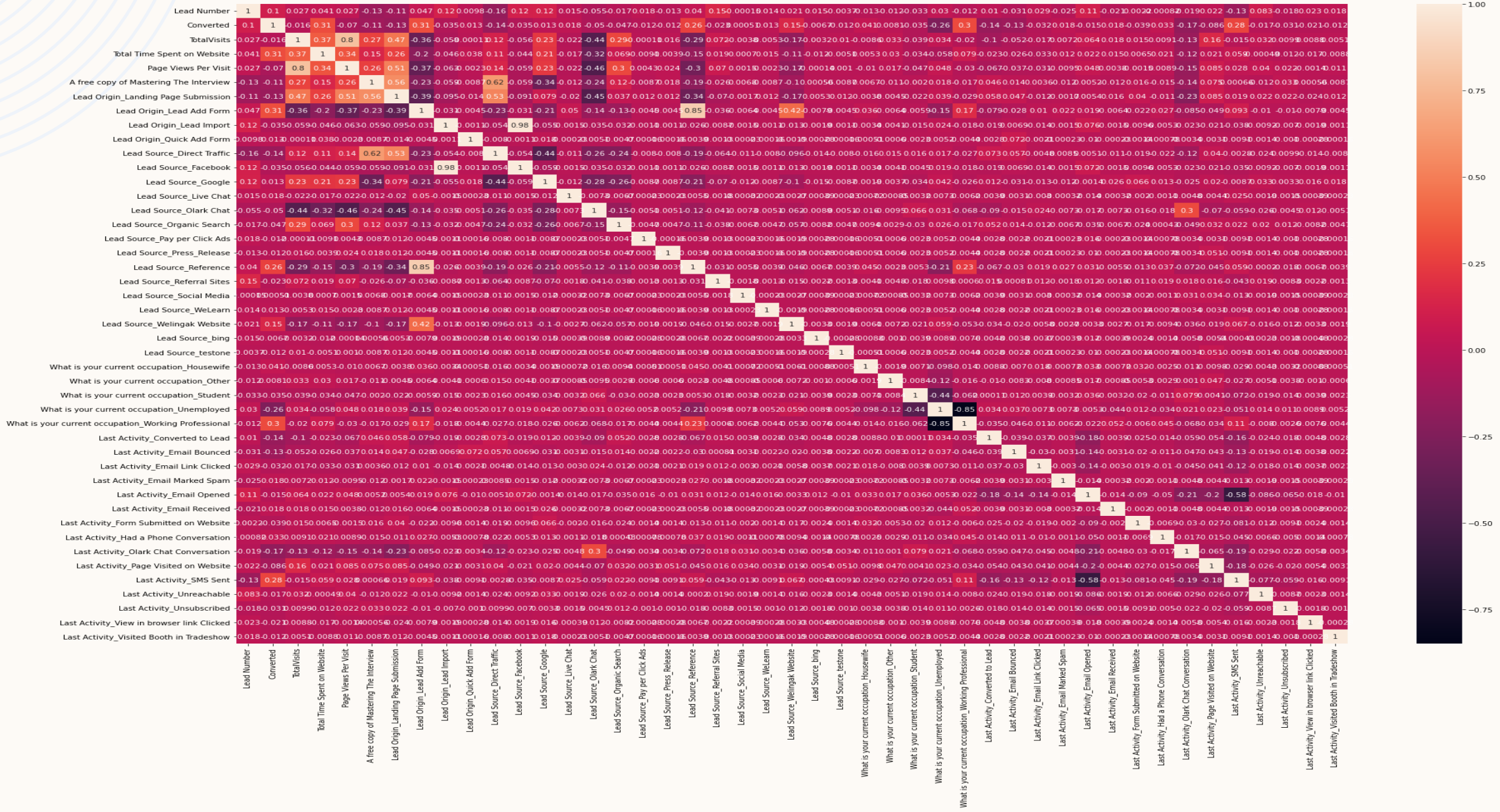
- Lead Source - Reference & Welingak Website have the best conversion rate.
- Direct Traffic, Google, Olark Chat & Organic Search seem to be the origin for majority of the leads where in each has 50% conversion rate.
- The majority of the leads are seen to be originating from the Lead Origin - API, Landing Page Submission & Lead Add Form. Lead Add Form has high conversion rate.

FEATURE ANALYSIS – A FREE COPY OF MASTERING THE INTERVIEW



- 'A free copy of Mastering The Interview' does not seem to be a driving factor for conversions.
- Even those customers who have said No for freebie, have converted from Leads.

HEAT MAP ANALYSIS



HEAT MAP INSIGHTS

- There is strong negative correlation between:
  - What is your current occupation_Unemployed
  - What is your current occupation_Working Professional
- There is positive correlation between the below features:
  - TotalVisits & Page Views Per Visit
  - Lead Origin_Lead Add Form & Lead Source_Reference
  - Lead Origin_Lead Import & Lead Source_Facebook

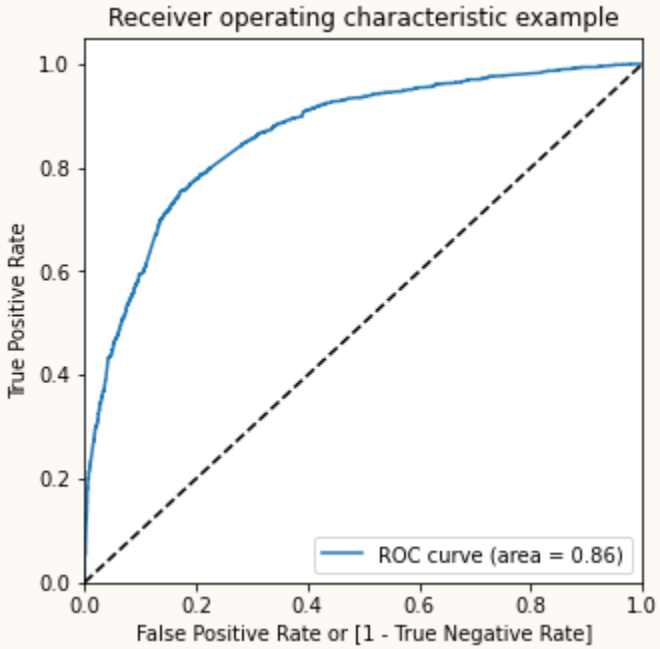
MODEL SUMMARY

- A Logistic Regression Model has been built and trained by the team to achieve 82% lead conversion rate and it achieves the same accuracy for test data as well.
- A lead score between 0 and 100 is assigned to each of the leads which can be used by the company to target potential leads.
- The most potential leads, also known as 'Hot Leads' can be predicted by the model created.
- As per the final model, the following features have Positive Coefficients:
  - Total Time Spent on Website
  - Lead Source_Olark Chat
  - Lead Source_Reference
  - Lead Source_Welingak Website
  - What is your current occupation_Working Professional
  - Last Activity_Email Opened
  - Last Activity_SMS Sent
  - Last Activity_Unreachable
- As per the final model, the following features have Negative Coefficients:
  - Lead Source_Direct Traffic
  - Last Activity_Converted to Lead
  - Last Activity_Email Bounced
  - Last Activity_Olark Chat Conversation

MODEL METRICS

- Model Evaluation Metrics on train data:
  - Accuracy - 77.92
  - Sensitivity - 84.23
  - Specificity - 71.83
  - Precision - 74.25
  - Recall - 84.23

- Model Evaluation Metrics on test data:
  - Accuracy - 77.69
  - Sensitivity - 82.25
  - Specificity - 73.58
  - Precision - 73.72
  - Recall - 82.25



- Receiver Operating Characteristic curve:
  - The ROC curve looks and the area under the curve is 0.86.
  - An AUC score closer to 1 means that the model has the ability to separate the two classes and the curve would come closer to the top left corner of the graph.

RECOMMENDATIONS

- The company can target the leads who spent “more time on the Website” since they are more likely to get converted.
- The company can make calls to the leads coming from the lead sources – “Welingak Websites, Reference & Olark Chat” as these are more likely to get converted.
- The company can reach out to the leads who are “Working Professionals” since they have more chances of conversions.
- The company can make calls to the leads who have last activity as “Email Opened, SMS Sent & Unreachable”.
- The company need NOT make any calls to the leads coming from “Direct Traffic” since it has very less chances of conversion.
- The company need NOT make calls to the leads who have last activity as “Converted to Lead, Email Bounced & Olark Chat Conversation”.

THANK YOU