Lead Score Case Study

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Problem Statement

- Online courses are being sold by X Education to industry professionals.
- X Education acquires many leads, but it's lead conversion rate is too poor. For example, if, say, they acquire 100 leads in a day, only about 30 of them gets converted.
- In order to make this procedure more competent, the company identifies it's most potential leads as 'Hot Leads'.
- Identifying this set of leads, would raise the "Lead Conversion Rate", as the sales team would now focus on communicating with the potential leads rather than making calls to everyone.

Business Objective:

- To 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 or 'Hot 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.
- Deployment of the model for future use.

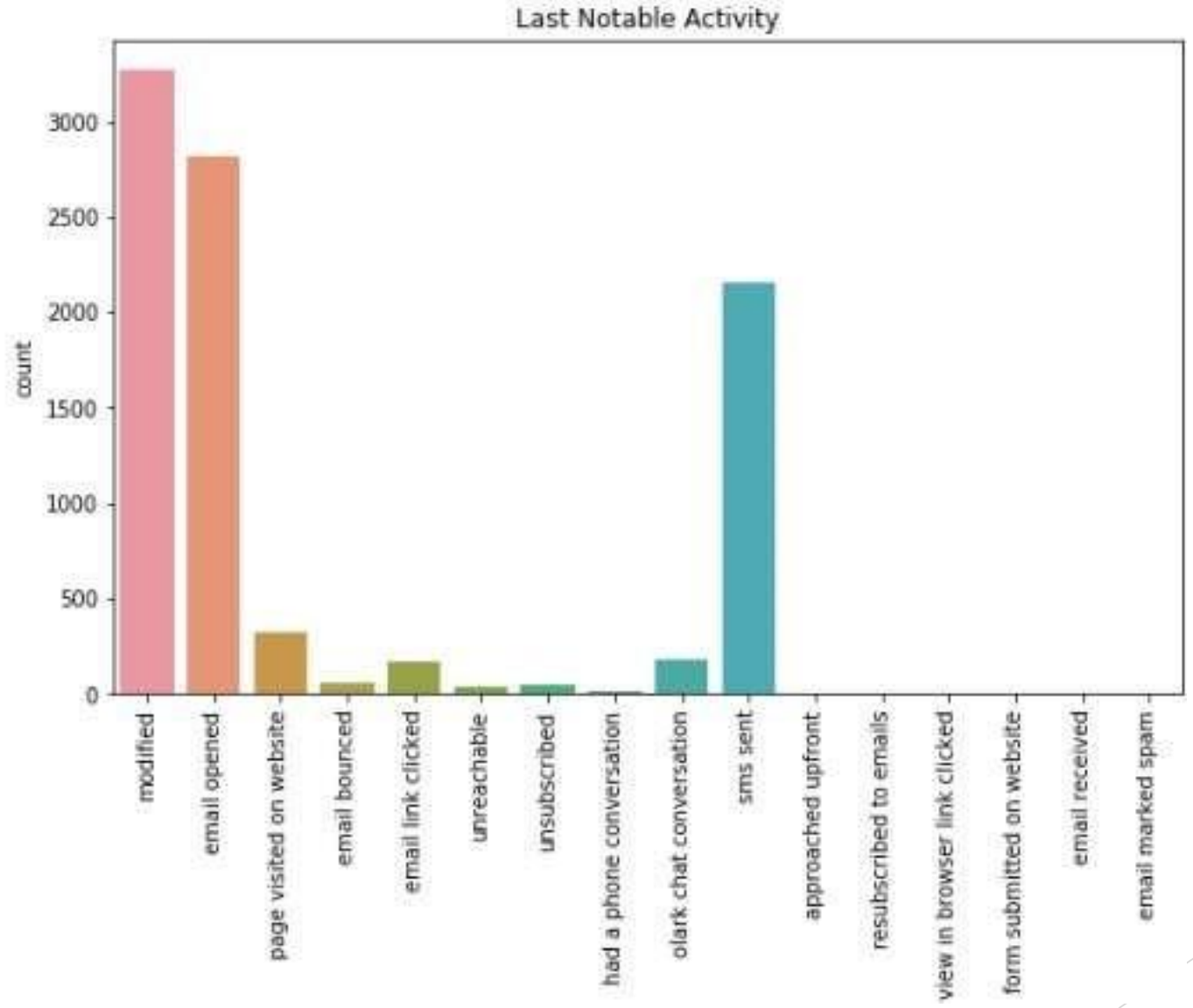
Analysis Approach

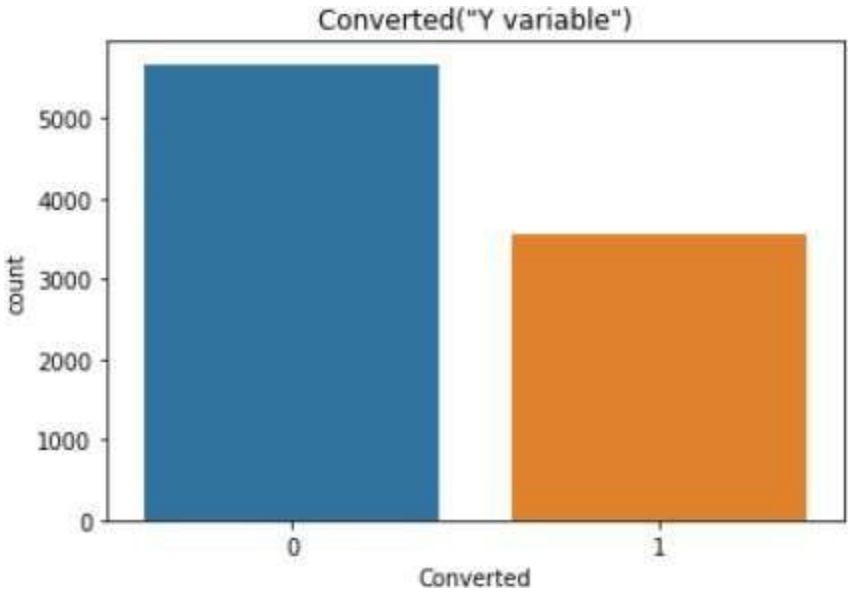
- Data cleaning and data manipulation.
  1. Check and handle duplicate data.
  2. Check and handle NA values and missing values.
  3. Drop columns, if it contains large amount of missing values and not useful for the analysis.
  4. Imputation of the values, if necessary.
  5. Check and handle outliers in data.
- EDA
  1. Univariate data analysis: value count, distribution of variable etc.
  2. Bivariate data analysis: correlation coefficients and pattern between the variables etc.
- Feature Scaling & Dummy Variables and encoding of the data.
- Classification technique: logistic regression used for the model making and prediction.
- Validation of the model.
- Model presentation.
- Conclusions and recommendations.

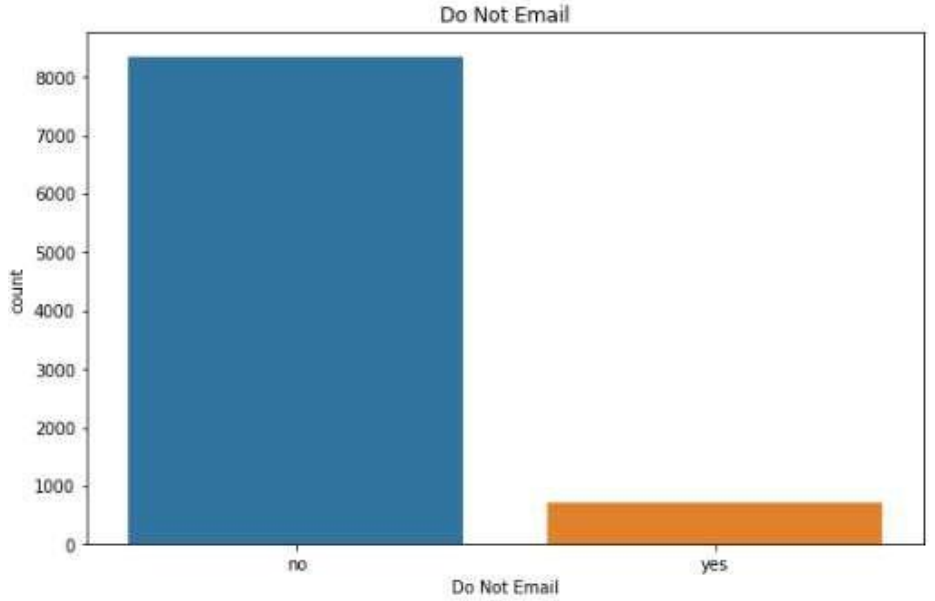
Data Manipulation

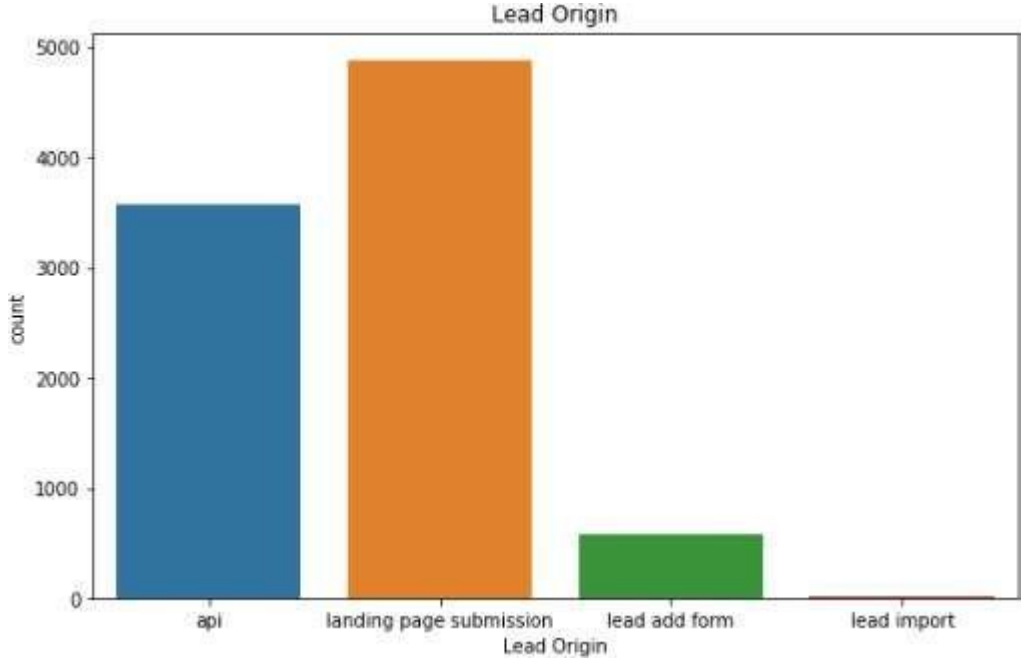
- Total Number of Rows =37, Total Number of Columns =9240.
- Single value features like “Magazine”, “Receive More Updates About Our Courses”, “Update me on Supply”
- Chain Content”, “Get updates on DM Content”, “I agree to pay the amount through cheque” etc. have been dropped.
- Removing the “Prospect ID” and “Lead Number” which is not necessary for the analysis.
- After checking for the value counts for some of the object type variables, we find some of the features which has not enough variance, which we have dropped, the features are: “Do Not Call”, “What matters most to you in choosing course”, “Search”, “Newspaper Article”, “X Education Forums”, “Newspaper”, “Digital Advertisement” etc.
- Dropping the columns having more than 35% as missing value such as ‘How did you hear about X Education’ and ‘Lead Profile’.

EDA

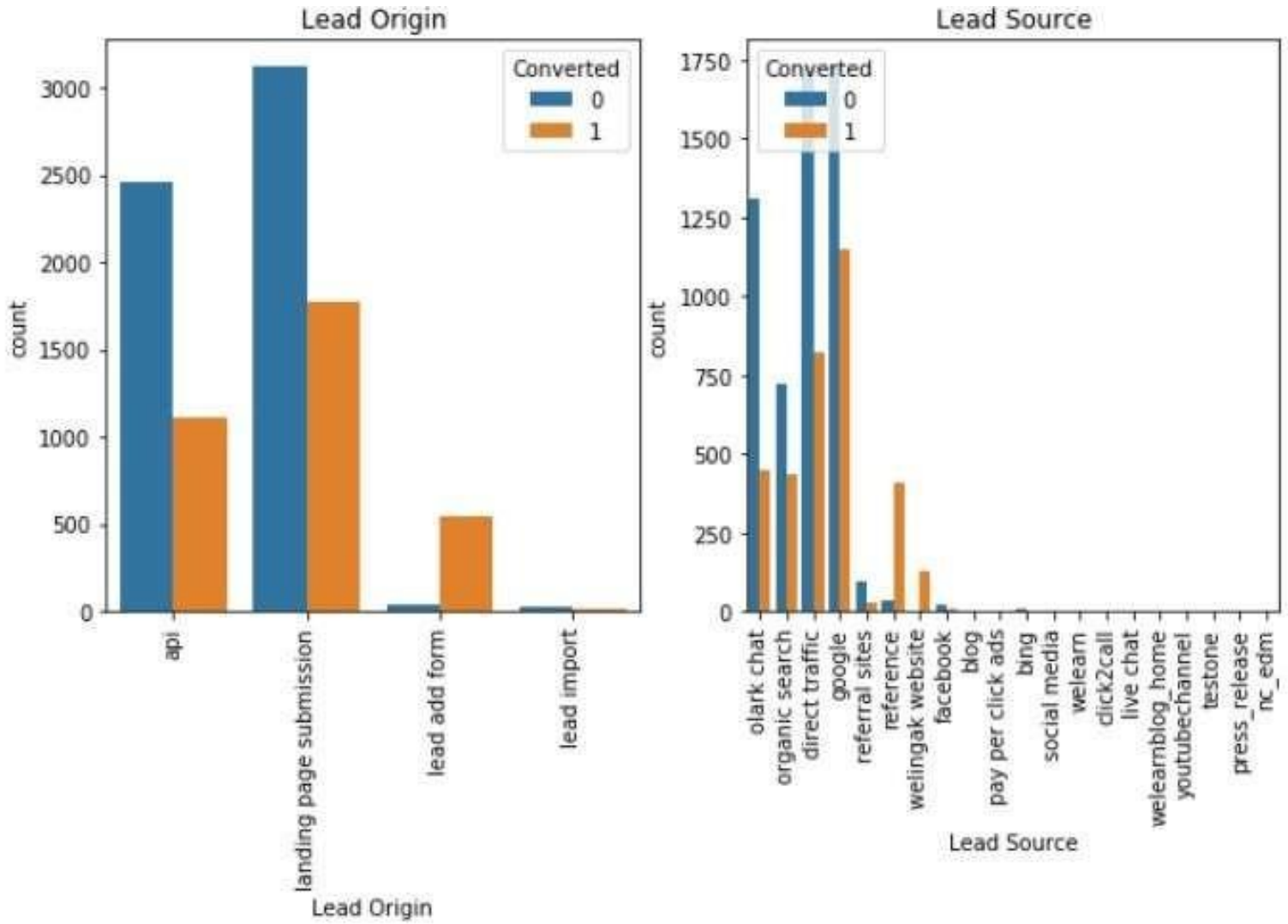

Last Notable Activity
count
3000
2500
2000
1500
1000
500
0
modified
email opened
page visited on website
email bounced
email link clicked
unreachable
unsubscribed
had a phone conversation
olark chat conversation
sms sent
approached upfront
resubscribed to emails
view in browser link clicked
form submitted on website
email received
email marked spam

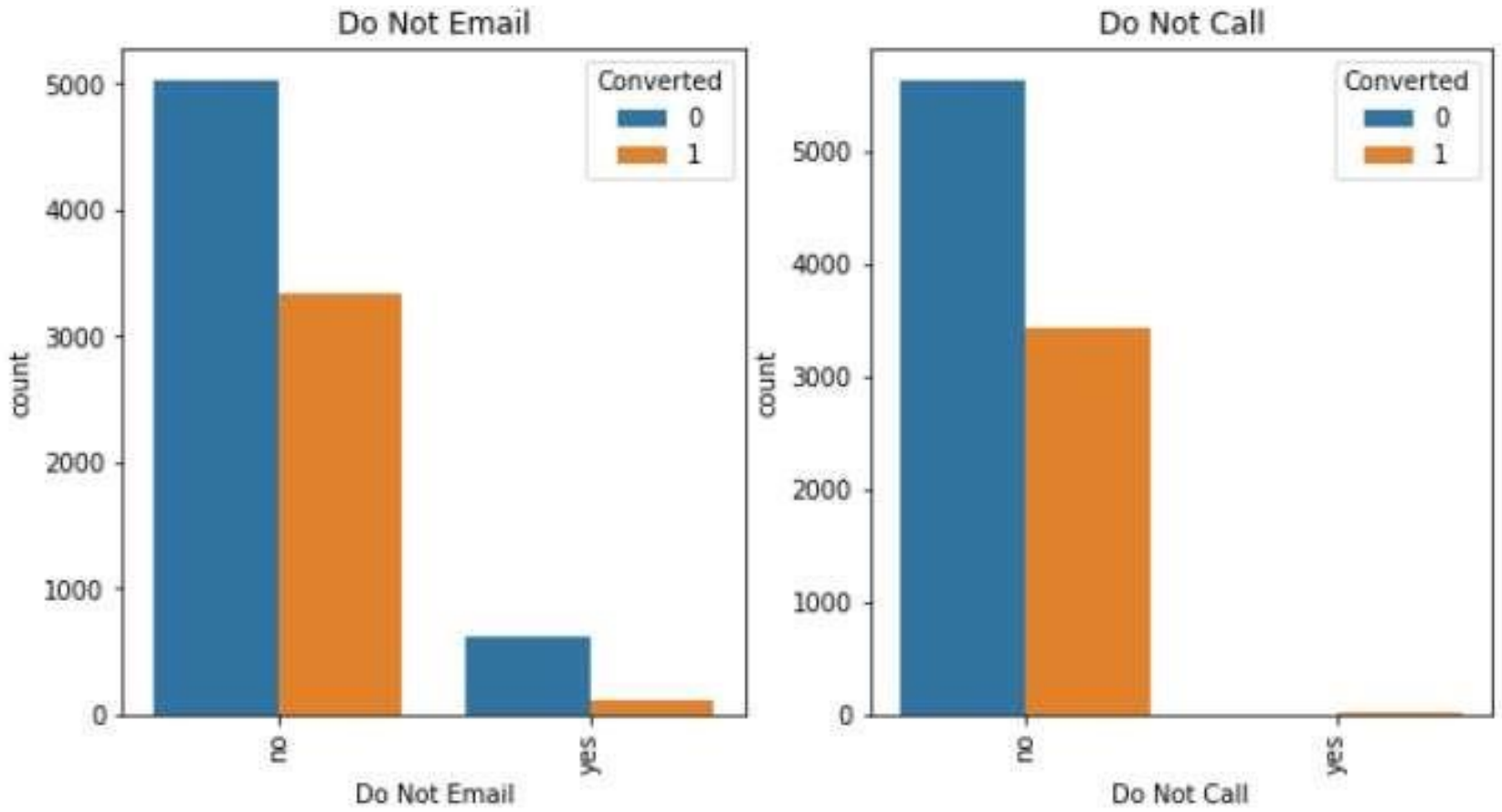

Converted("Y variable")
count
5000
4000
3000
2000
1000
0
0
1
Converted

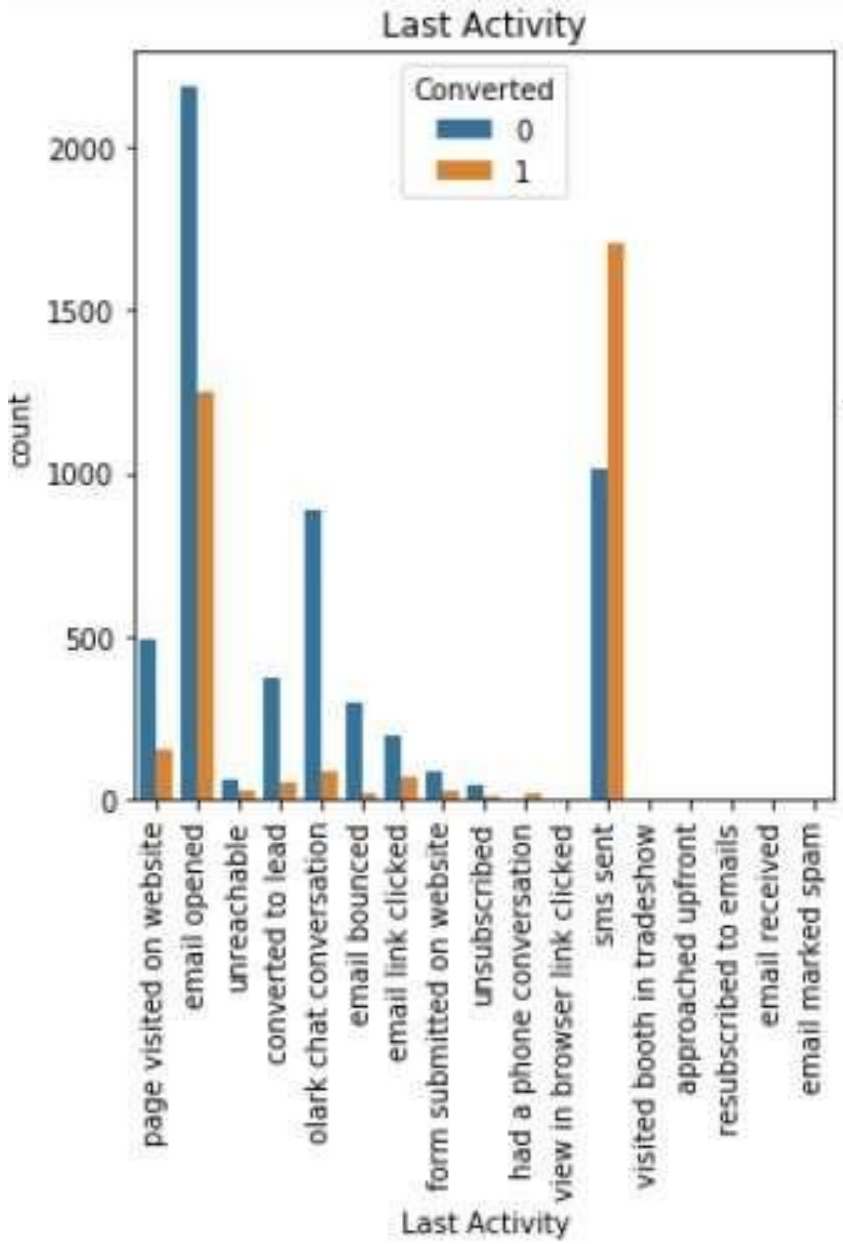

Do Not Email
count
8000
7000
6000
5000
4000
3000
2000
1000
0
no
yes
Do Not Email

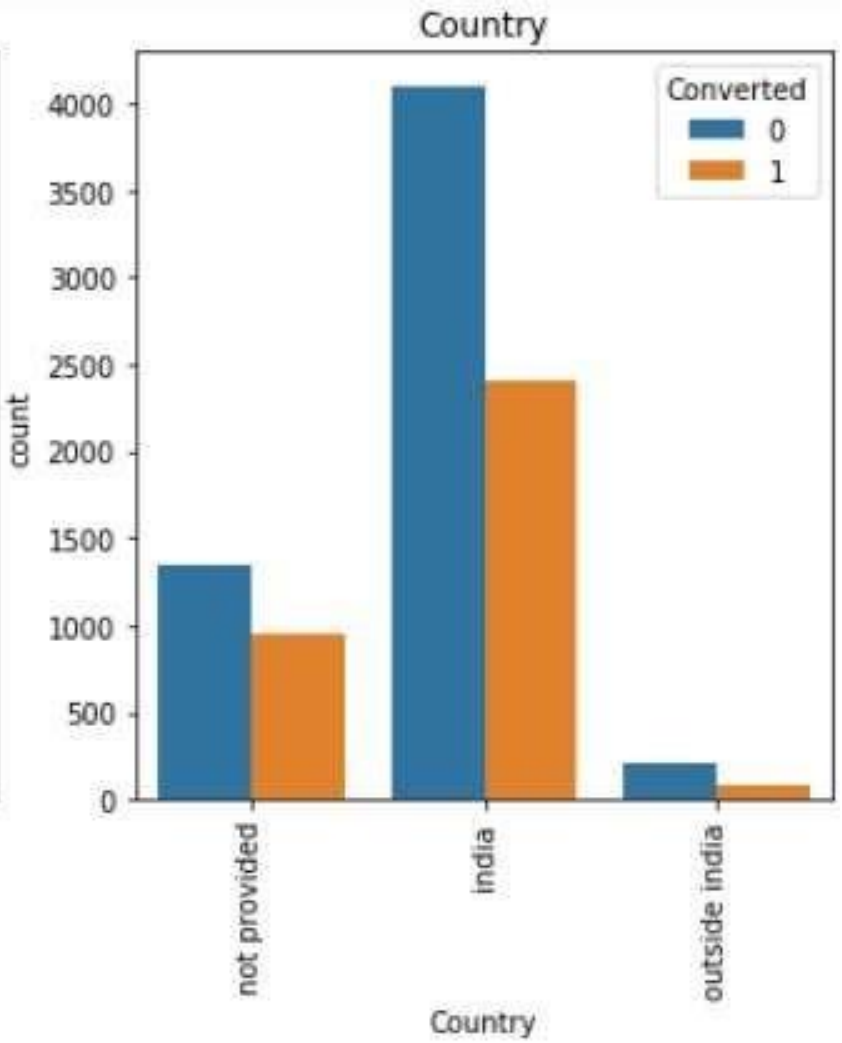

Lead Origin
count
5000
4000
3000
2000
1000
0
api
landing page submission
lead add form
lead import
Lead Origin

Categorical Variable Relation




Do Not Email
Converted
0
1
5000
4000
3000
2000
1000
0
count
no
yes
Do Not Email
Do Not Call
Converted
0
1
5000
4000
3000
2000
1000
0
count
no
yes
Do Not Call


Last Activity
Converted
0
1
count
2000
1500
1000
500
0
page visited on website
email opened
unreachable
converted to lead
olark chat conversation
email bounced
email link clicked
form submitted on website
unsubscribed
had a phone conversation
view in browser link clicked
sms sent
visited booth in tradeshow
approached upfront
resubscribed to emails
email received
email marked spam
Last Activity


Country
Converted
0
1
count
4000
3500
3000
2500
2000
1500
1000
500
0
not provided
india
outside india
Country

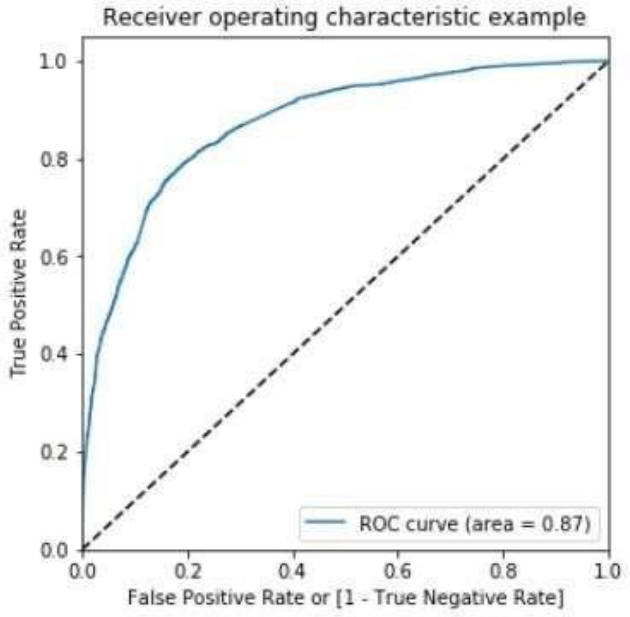
Data Conversion

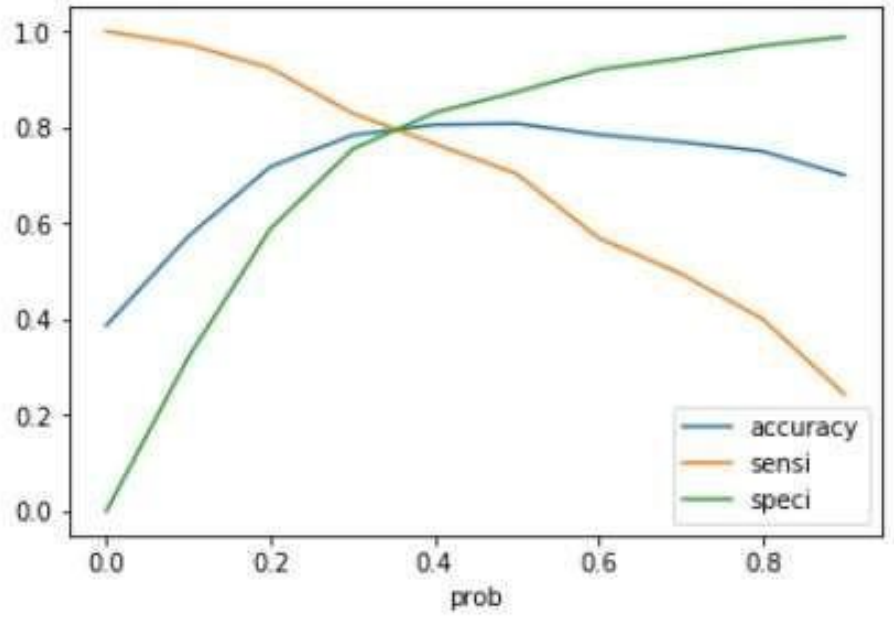
- Numerical Variables are Normalised
- Dummy Variables are created for object type variables
- Total Rows for Analysis: 8792
- Total Columns for Analysis: 43

Model Building

- Splitting the Data into Training and Testing Sets
- The first basic step for regression is performing a train-test split, for which we have chosen 70:30 ratio.
- Use RFE for Feature Selection
- Running RFE with 15 variables as output
- Building Model by removing the variable whose p- value is greater than 0.05 and vif value is greater than 5
- Predictions on test data set
- Overall accuracy 81%

ROC Curve





- **Finding Optimal Cut off Point**
- Optimal cut off probability is that
- probability where we get balanced sensitivity and specificity.
- From the second graph it is visible that the optimal cut off is at 0.35.

Results in Business Terms

It was found that the variables that mattered the most in the potential buyers are (In descending order) :

- The total time spend on the Website.
- Total number of visits.
- When the lead source was:
  a. Google
  b. Direct traffic
  c. Organic search
  d. Welingak website
- When the last activity was:
  a. SMS
  b. Olark chat conversation
- When the lead origin is Lead add format.
- When their current occupation is as a working professional.

Keeping these in mind the X Education can flourish as they have a very high chance to get almost all the potential buyers to change their mind and buy their courses.