Logistic Regeression:

Here in this file we are going to perform logistic regression on our dataset. With the help of this we are going to find the attributes which are contributing towards the opening or closing of business.

So first let us import all necessery modules. Let us Load the dataset using pandas and see the columns in the dataset.

Let us see how many busnesses are open and close using countplot.

Now we will take *business_lattitude, business_longitude, business_stars, buness_review_count* as independant variable. i.e, we are going to predict how much these attributes contribute towards opening and closinf of businesses. *business_open* is our dependant variable.

Now let us split our data for training and testing using *train_test_split* module leaving 30% of the dataset for testing purpose. SMOTE is use for sampling purpose.

Now let us fit our training set for sampling. Now let us make all our training and testing dataset as a DataFrame.

L is the list which contains different regularization constant. For all these constants let us apply Logistic regression model and let us store all accuracy values inside a dictionary. In this dictionary key is Regualrization constant and values is respective accuracy score. The maximum accuracy we got is 55% for regularization constant being 1.

Lets move further and calculate accuracy precision and recall for the prediction we made. Lets plot an ROC curve and see what is the AUC(area under curve) we get. Basically AUC measures the performance of the mopdel i.e if the AUC is high that means model's performance is good at disntinguishing between the positive and negetive classes.

Let us also visualize the graph for C vs Accuracy values.

We can also plot a confusion matrix for the model which gives True Positive, True Negetive, False Positive and False Negetive values.

The last but not the least is the contribution of each attribute for the model. By seeing this we can say *business_stars* has more impact i.e, 40% in predicting the openining and closing of the business