Startup Acquisition Analysis and Prediction  
Technocolabs Datasciens and ML Intership  
  
  
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Abstract

The satisfaction and gratitude that accompany the successful completion of any task would be impossible without the mention of the people who made it possible, whose constant guidance and encouragement crowned our efforts with success.

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Startup Acquisition Analysis and Prediction

* **Data Cleaning**

We deleted columns with redundancy , granularity and irrelevant information we also deleted instances with missing values for specific columns basically we removed null values for the following columns status ,country \_code, category\_code, founded\_at.

For the columns with less percentage of null values with used the Imputing method using mean , median and mode.

* **Data Transformation**

Here we are fixing irrelevant data types to some columns so we converted columns that include date year datatype

* **Data** **Exploitation**

First we started filling the null values in closed\_at for calculation of the age of company then we created column active\_days from subtracting closed\_at from founded\_at then we removed rows with negative values in active\_days and dropped the other two columns

* **EDA**

we detected the existence of outliers through data visualization using box plot

A picture containing chart

Description automatically generated

Then we removed outliers using IQR method then we generalized category\_code and country\_code using One hot encoder to prepare for feature engineering through working on our targeted variable Status and we finalized the data analysis part with deleting duplicates from dataset .

* **Machine Learning**

We started the ML part through applying Logistic Regression Model ,XGBoost Claasifier Model , Quadratic Discriminant Analysis Model and Random Forest Classifier Model .

But first we had to prepare the data through the following steps:

1. Splitting the data

We split the data through sklearn ysing test\_tain\_split function

1. Separating numerical and Categorical columns
2. Applying one-hot encoding to the whole dataset
3. Scaling dataset

After preparing the data we started created a pipeline for each model and applying it then tuned the parameter using several methods to increase train and test accuracy

and we took the best accuracy to be in the pipeline and we saved our data model we can summarize this in the following table

|  |  |  |  |
| --- | --- | --- | --- |
|  | Baseline Model | Hyperparameter tuning(GridSearchCv) | Hyperparameter tuning(RandomizedSearchCv) |
| Logisitc Regression Model | Train accuracy: 87.24%  Test accuracy:86.141% | Train accuracy: 87.254%  Test accuracy:86.102% |  |
| XGBoost Classifier Model | Train accuracy: 92.59%  Test accuracy:90.84% | Train accuracy: 91.63%  Test accuracy:91.22% |  |
| Quadratic Discriminant Analysis Model | Train accuracy: 65.24%  Test accuracy:63.43% | Train accuracy: 84.35%  Test accuracy:83.23% |  |
| Random Forest Classifier Model | Train accuracy: 95.  76%  Test accuracy:86.96% | Train accuracy: 91.4%  Test accuracy:91.34% | Train accuracy: 91.51%  Test accuracy:91.38% |