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1.INTRODUCTION

1.1 Overview

Loan Prediction is very helpful for employee of banks as well as for the applicant also. The aim of this Paper is to provide quick, immediate and easy way to choose the deserving applicants. Dream housing Finance Company deals in all loans. They have presence across all urban, semi urban and rural areas. Customer first apply for loan after that company or bank validates the customer eligibility for loan.

Company or bank wants to automate the loan eligibility process (real time) based on customer details provided while filling application form. These details are Gender, Marital Status, Education, Number of Dependents, Income, Loan Amount, Credit History and other. This project has taken the data of previous customers of various banks to whom on a set of parameters loan were approved.

So the machine learning model is trained on that record to get accurate results. Our main objective of this project is to predict the safety of loan. To predict loan safety, the SVM and Naïve bayes algorithm are used. First the data is cleaned so as to avoid the missing values in the data set.

1.2 Purpose

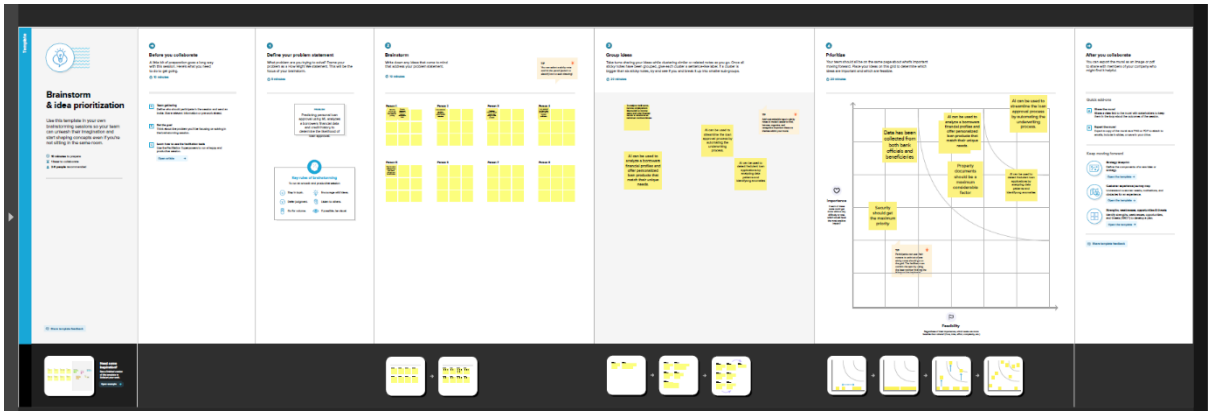
It is done by predicting if the loan can be given to that person on the basis of various parameters like credit score, income, age, marital status, gender, etc. The prediction model not only helps the applicant but also helps the bank by minimizing the risk and reducing the number of defaulters.

Loan Prediction System allows jumping to specific application so that it can be check on priority basis. This Paper is exclusively for the managing authority of Bank/finance company, whole process of prediction is done privately no stakeholders would be able to alter the processing.

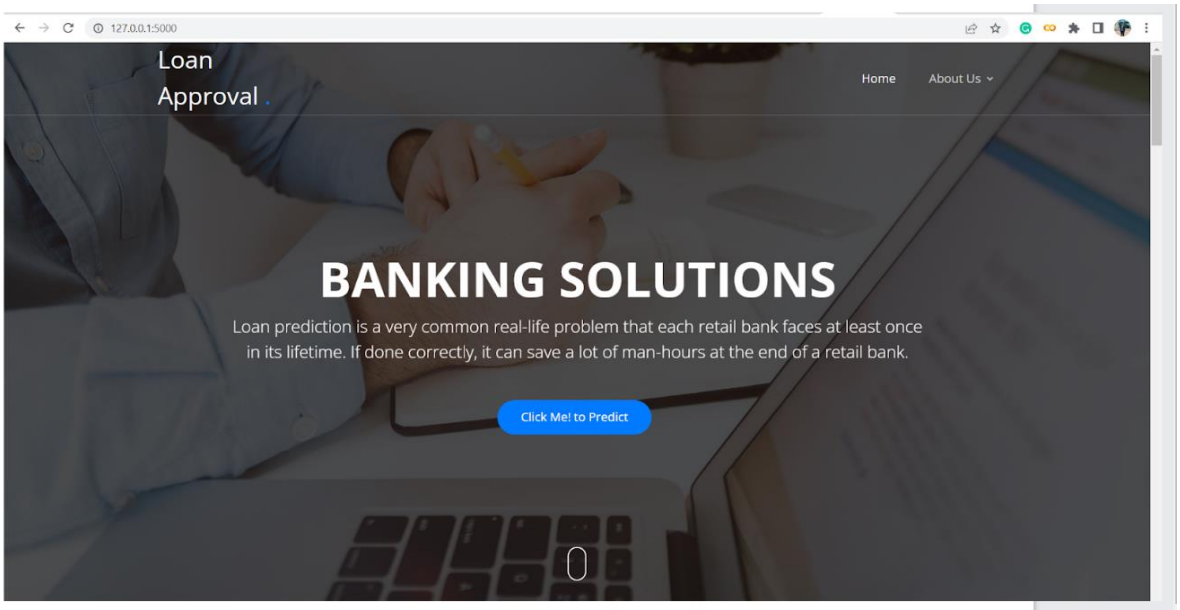
2. Problem Definition & Design Thinking

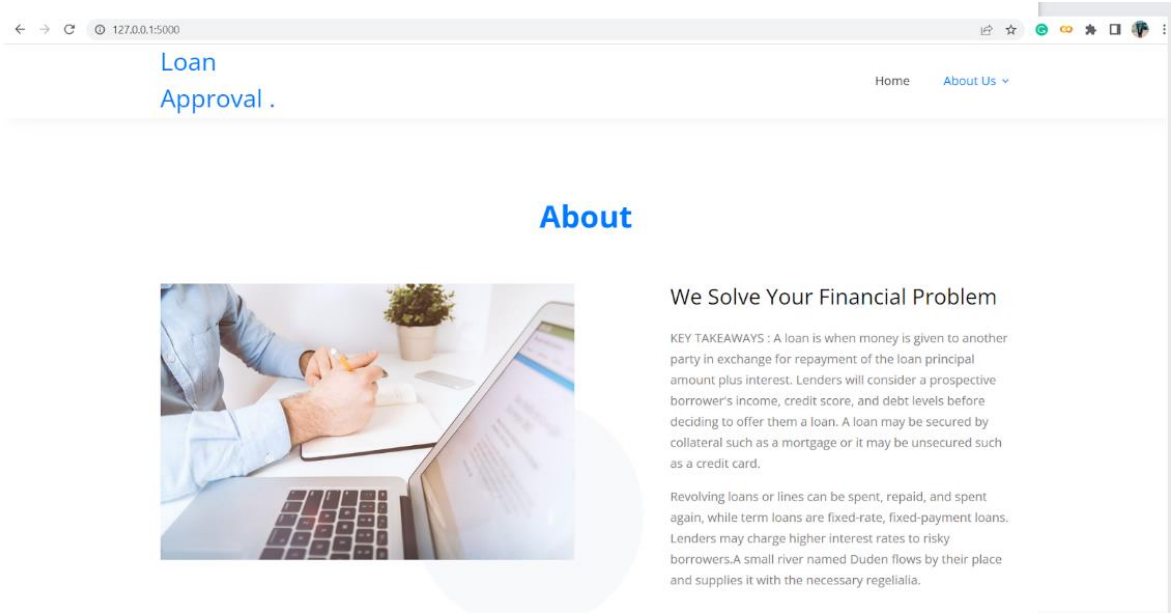
2.1 Empathy map

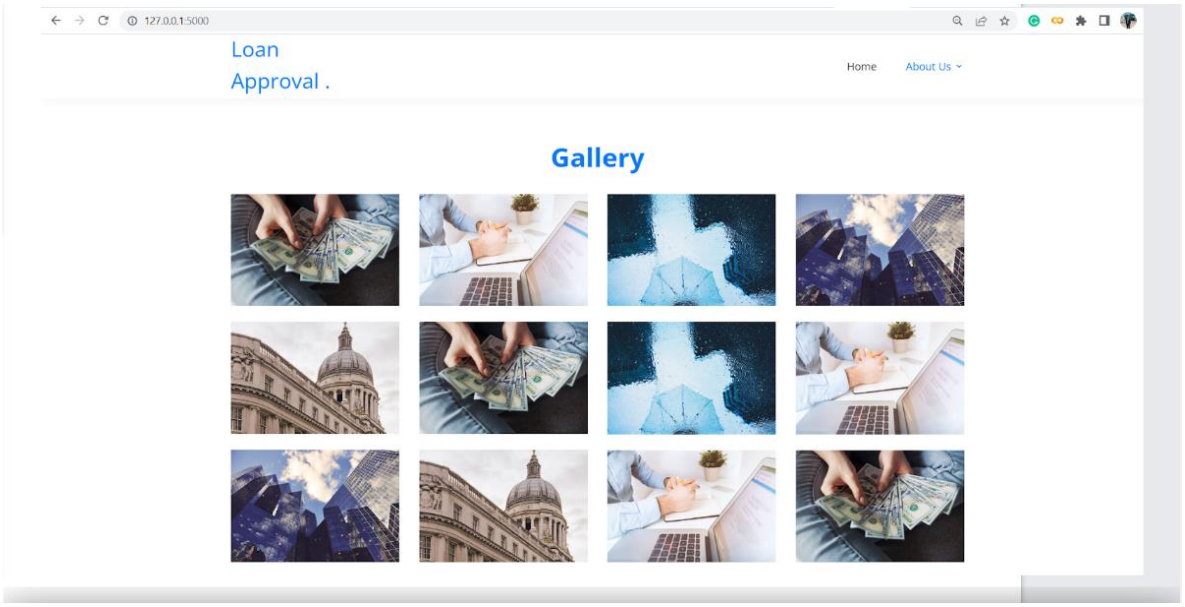
2.2 Ideation & Brainstroming map



3. Result




127.0.0.1:5000
Loan
Approval .
Home
About Us
About
We Solve Your Financial Problem
KEY TAKEAWAYS : A loan is when money is given to another party in exchange for repayment of the loan principal amount plus interest. Lenders will consider a prospective borrower's income, credit score, and debt levels before deciding to offer them a loan. A loan may be secured by collateral such as a mortgage or it may be unsecured such as a credit card.
Revolving loans or lines can be spent, repaid, and spent again, while term loans are fixed-rate, fixed-payment loans. Lenders may charge higher interest rates to risky borrowers.A small river named Duden flows by their place and supplies it with the necessary regelialia.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Loan
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Home
About Us
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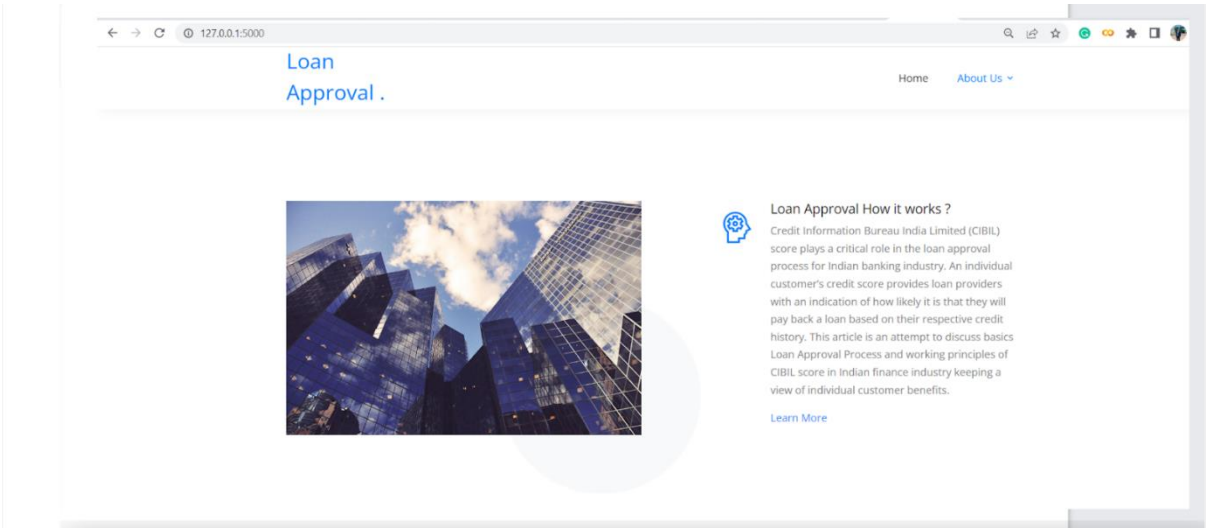
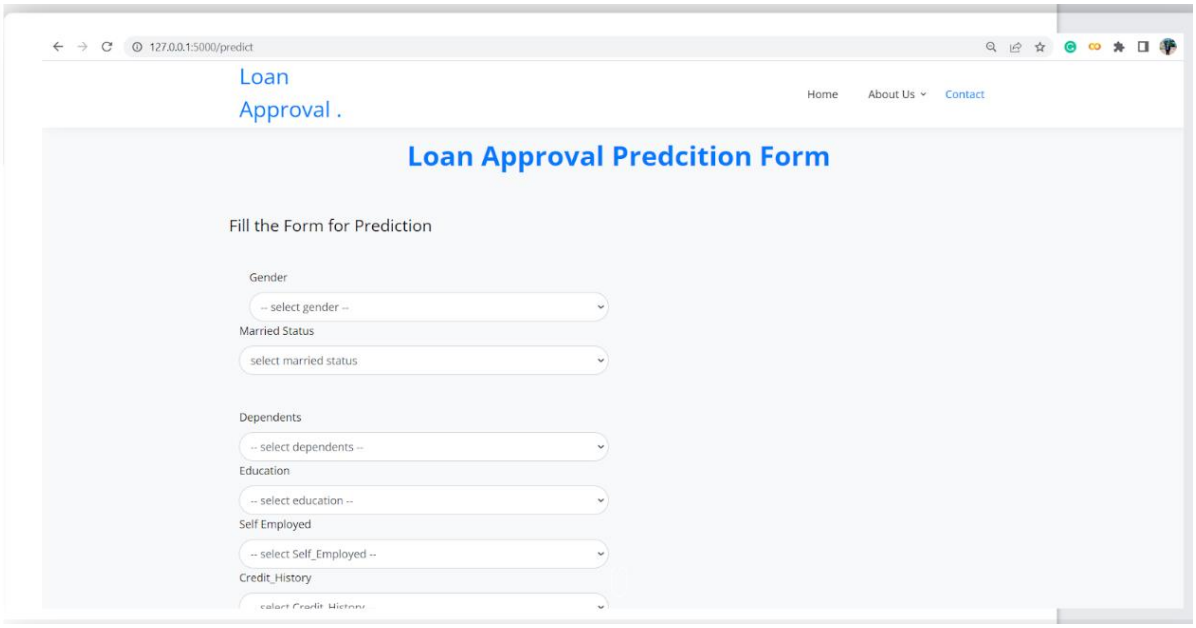
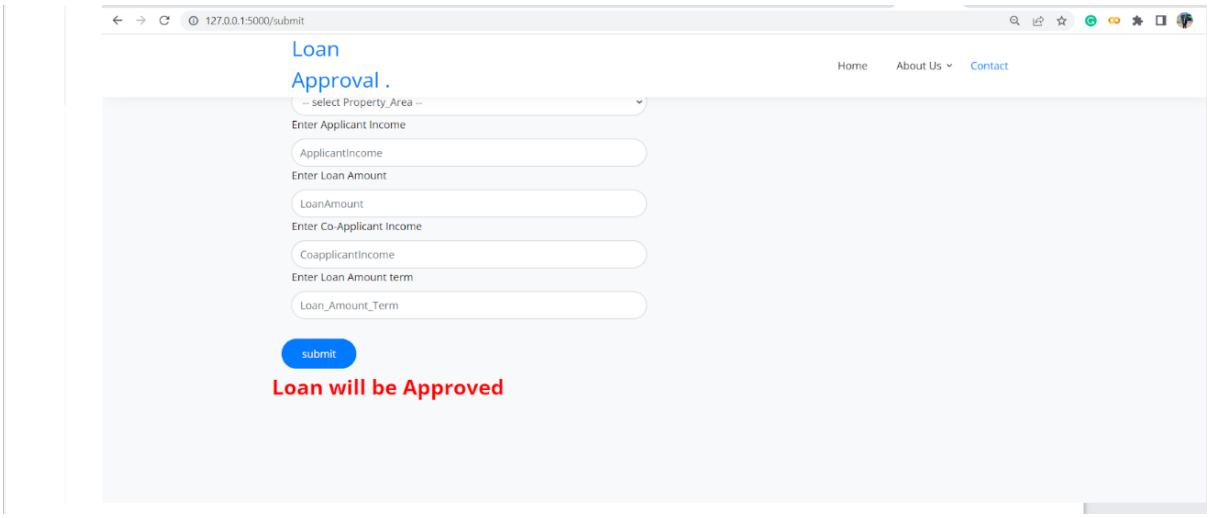

127.0.0.1:5000
Loan
Approval .
Home
About Us
Loan Approval How it works ?
Credit Information Bureau India Limited (CIBIL) score plays a critical role in the loan approval process for Indian banking industry. An individual customer's credit score provides loan providers with an indication of how likely it is that they will pay back a loan based on their respective credit history. This article is an attempt to discuss basics Loan Approval Process and working principles of CIBIL score in Indian finance industry keeping a view of individual customer benefits.
Learn More


127.0.0.1:5000/predict
Loan
Approval .
Home
About Us
Contact
Loan Approval Predcition Form
Fill the Form for Prediction
Gender
-- select gender --
Married Status
select married status
Dependents
-- select dependents --
Education
-- select education --
Self Employed
-- select Self_Employed --
Credit_History



4 Advantages & Disadvantages

Advantages:

Accuracy—one of the primary benefits of using machine learning for credit scoring is its accuracy.

Unlike human manual processing, ML-based models are automated and less likely to make mistakes.

This means that loan processing becomes not only faster but more accurate, too, cutting costs on the whole.

Disadvantages:

The disadvantage of this model is that it emphasize different weights to each factor but in real life sometime loan can be approved on the basis of single strong factor only, which is not possible through this system

you could be paying interest on funds you're not using. You could have trouble making monthly repayments if your customers don't pay you promptly, causing cashflow problems.

5 Applications

Banking and Finance : In the banking and finance sector, loan approval prediction can help lenders assess the creditworthiness of borrowers and make informed decisions about whether or not to approve a loan.

E-commerce : These companies can use loan approval prediction to offer financing options to their customers.

Insurance : These companies can use loan approval prediction to access the financial stability of potential policy holders.

Real Estate : In this industry, loan approval prediction can help lenders assess the risk of default on montage loans.

6. Conclusion

So here, it can be concluded with confidence that the Naïve Bayes model is extremely efficient and gives a better result when compared to other models. It works correctly and fulfills all requirements of bankers. This system properly and accurately calculate the result. It predicts the loan is approve or reject to loan applicant or customer very accuratly.

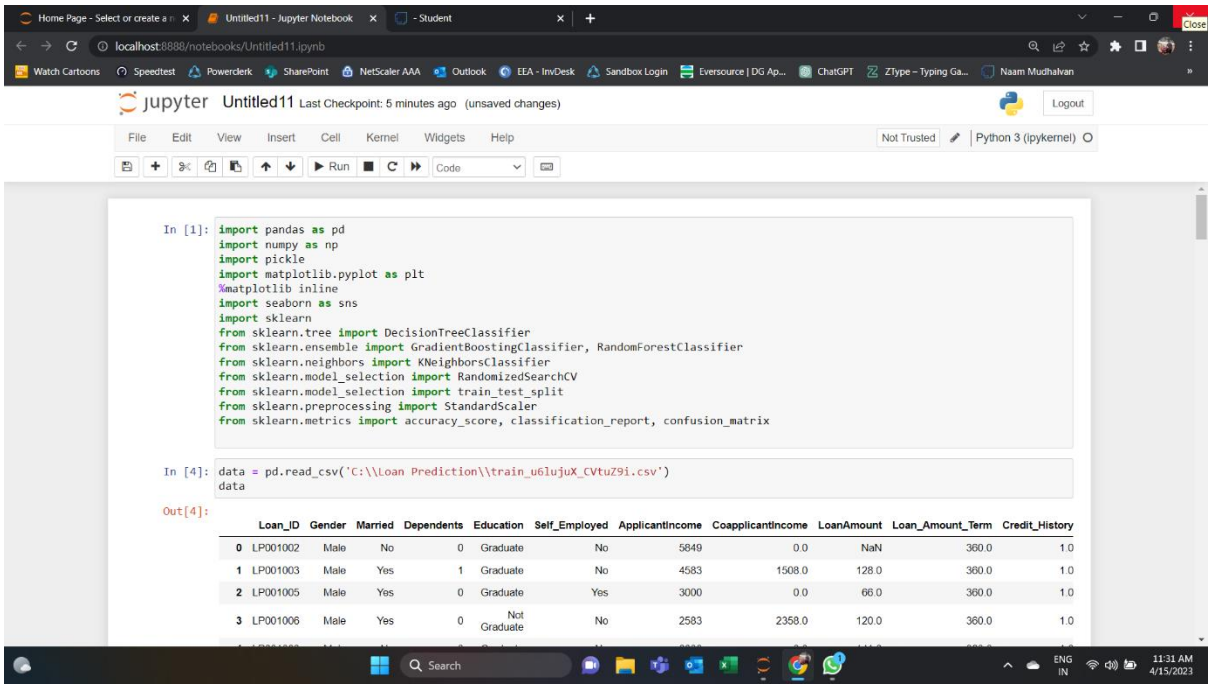
7. Future Scope

With the help of loan prediction , business could provide more targeted recommendations based on users prediction location.

Loan prediction can be used to improve transportation services such as predicting traffic congestion and optimizing routes for public transportation, ride sharing services.

These models can be used to segment customers based on their creditworthiness and other factors.

8. Appendix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Python 3 (ipykernel)
Run
Code
In [1]:
import pandas as pd
import numpy as np
import pickle
import matplotlib.pyplot as plt
%matplotlib inline
import seaborn as sns
import sklearn
from sklearn.tree import DecisionTreeClassifier
from sklearn.ensemble import GradientBoostingClassifier, RandomForestClassifier
from sklearn.neighbors import KNeighborsClassifier
from sklearn.model_selection import RandomizedSearchCV
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.metrics import accuracy_score, classification_report, confusion_matrix
In [4]:
data = pd.read_csv('C:\\Loan Prediction\\train_u6lujuX_CVtuZ9i.csv')
data
Out[4]:
Loan_ID Gender Married Dependents Education Self_Employed ApplicantIncome CoapplicantIncome LoanAmount Loan_Amount_Term Credit_History
0 LP001002 Male No 0 Graduate No 5849 0.0 NaN 360.0 1.0
1 LP001003 Male Yes 1 Graduate No 4583 1508.0 128.0 360.0 1.0
2 LP001005 Male Yes 0 Graduate Yes 3000 0.0 66.0 360.0 1.0
3 LP001006 Male Yes 0 Not Graduate No 2583 2358.0 120.0 360.0 1.0
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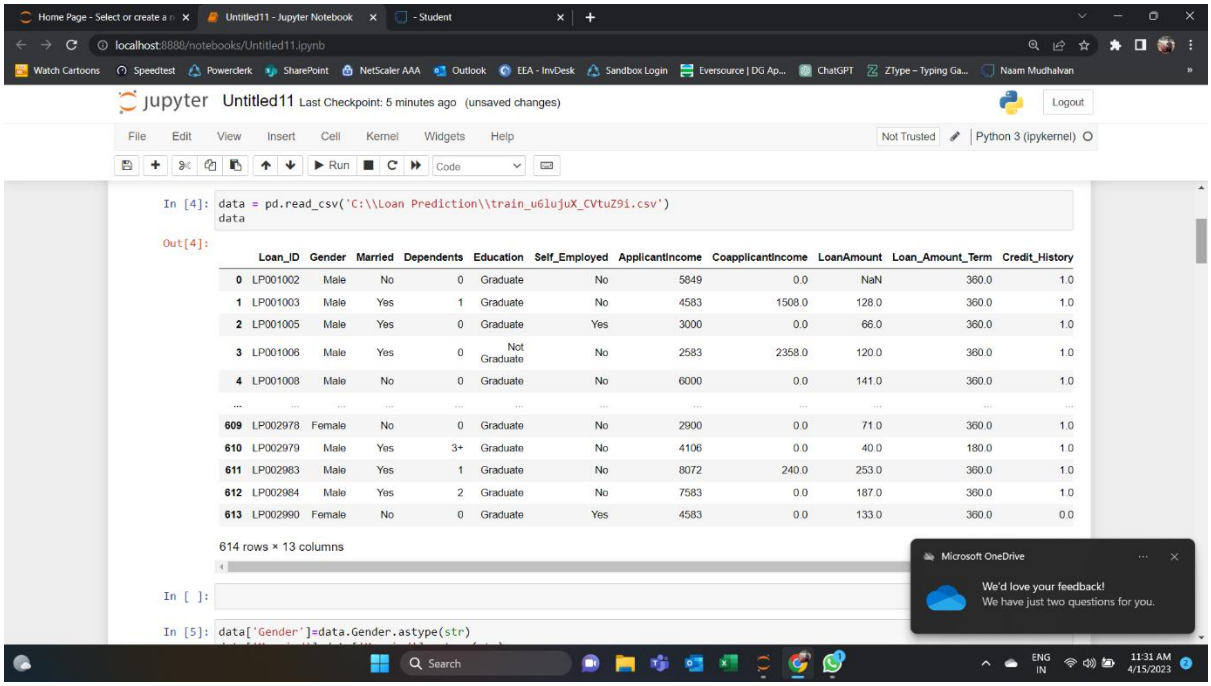

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Run Code

In [4]:
```
data = pd.read_csv('C:\\Loan Prediction\\train_uGlujuX_CVtuZ9i.csv')
data
```

Out[4]:

	Loan_ID	Gender	Married	Dependents	Education	Self_Employed	ApplicantIncome	CoapplicantIncome	LoanAmount	Loan_Amount_Term	Credit_History
0	LP001002	Male	No	0	Graduate	No	5849	0.0	NaN	360.0	1.0
1	LP001003	Male	Yes	1	Graduate	No	4583	1508.0	128.0	360.0	1.0
2	LP001005	Male	Yes	0	Graduate	Yes	3000	0.0	66.0	360.0	1.0
3	LP001006	Male	Yes	0	Not Graduate	No	2583	2358.0	120.0	360.0	1.0
4	LP001008	Male	No	0	Graduate	No	6000	0.0	141.0	360.0	1.0
...	...	...	...	...	...	...	...	...	...	...	...
609	LP002978	Female	No	0	Graduate	No	2900	0.0	71.0	360.0	1.0
610	LP002979	Male	Yes	3+	Graduate	No	4106	0.0	40.0	180.0	1.0
611	LP002983	Male	Yes	1	Graduate	No	8072	240.0	253.0	360.0	1.0
612	LP002984	Male	Yes	2	Graduate	No	7583	0.0	187.0	360.0	1.0
613	LP002990	Female	No	0	Graduate	Yes	4583	0.0	133.0	360.0	0.0

614 rows × 13 columns

Microsoft OneDrive
We'd love your feedback!
We have just two questions for you.

In [ ]:

In [5]:
```
data['Gender']=data.Gender.astype(str)
```

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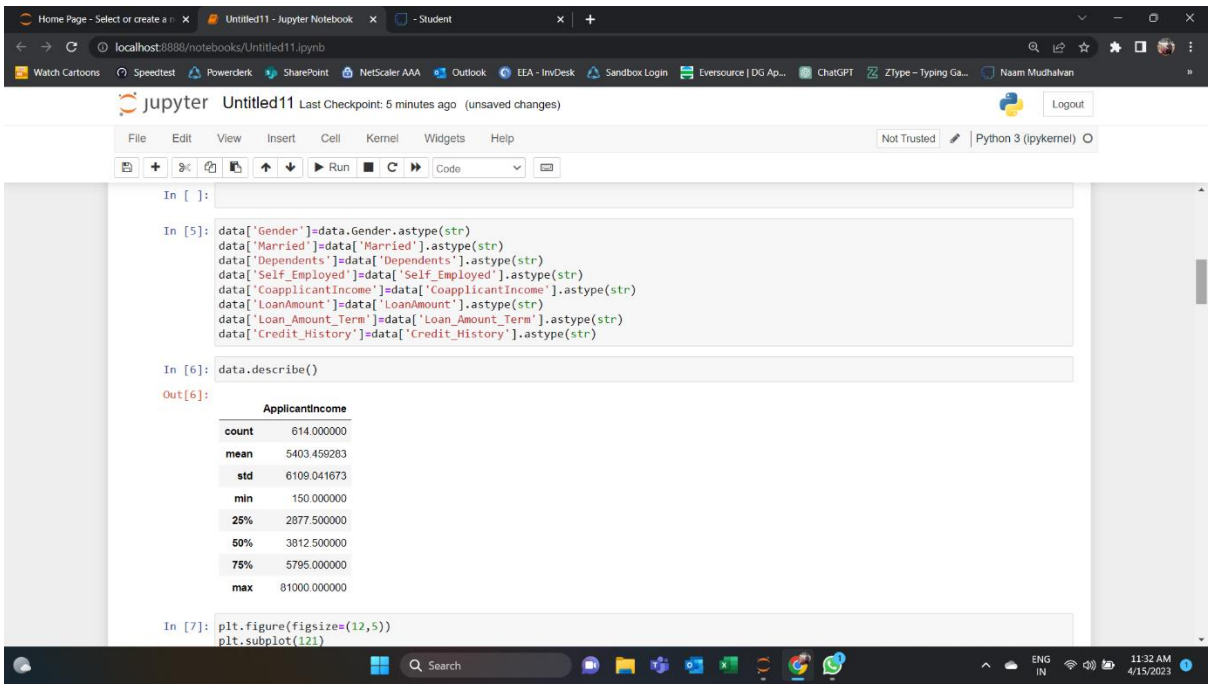

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Run Code

In [ ]:

In [5]:
```
data['Gender']=data.Gender.astype(str)
data['Married']=data['Married'].astype(str)
data['Dependents']=data['Dependents'].astype(str)
data['Self_Employed']=data['Self_Employed'].astype(str)
data['CoapplicantIncome']=data['CoapplicantIncome'].astype(str)
data['LoanAmount']=data['LoanAmount'].astype(str)
data['Loan_Amount_Term']=data['Loan_Amount_Term'].astype(str)
data['Credit_History']=data['Credit_History'].astype(str)
```

In [6]:
```
data.describe()
```

Out[6]:

	ApplicantIncome
count	614.000000
mean	5403.459283
std	6109.041673
min	150.000000
25%	2877.500000
50%	3812.500000
75%	5795.000000
max	81000.000000

In [7]:
```
plt.figure(figsize=(12,5))
plt.subplot(121)
```

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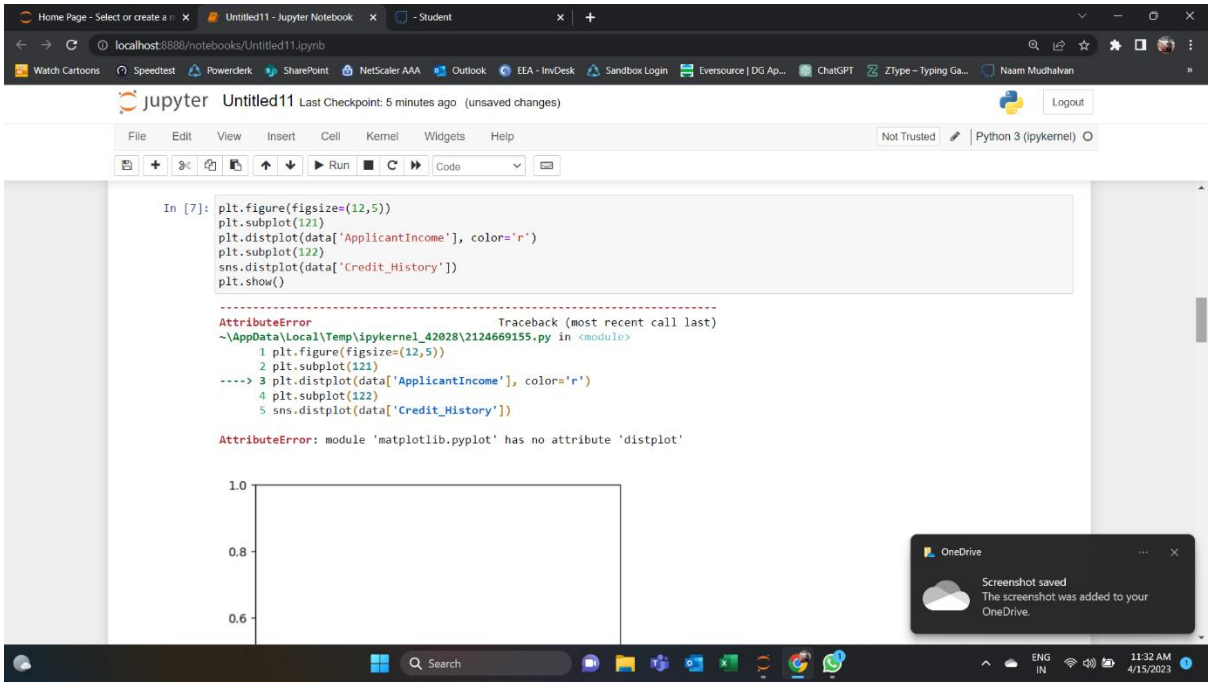
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Python 3 (ipykernel)
Run
Code
In [7]:
plt.figure(figsize=(12,5))
plt.subplot(121)
plt.distplot(data['ApplicantIncome'], color='r')
plt.subplot(122)
sns.distplot(data['Credit_History'])
plt.show()
AttributeError Traceback (most recent call last)
~\AppData\Local\Temp\ipykernel_42028\2124669155.py in <module>
1 plt.figure(figsize=(12,5))
2 plt.subplot(121)
----> 3 plt.distplot(data['ApplicantIncome'], color='r')
4 plt.subplot(122)
5 sns.distplot(data['Credit_History'])
AttributeError: module 'matplotlib.pyplot' has no attribute 'distplot'
1.0
0.8
0.6
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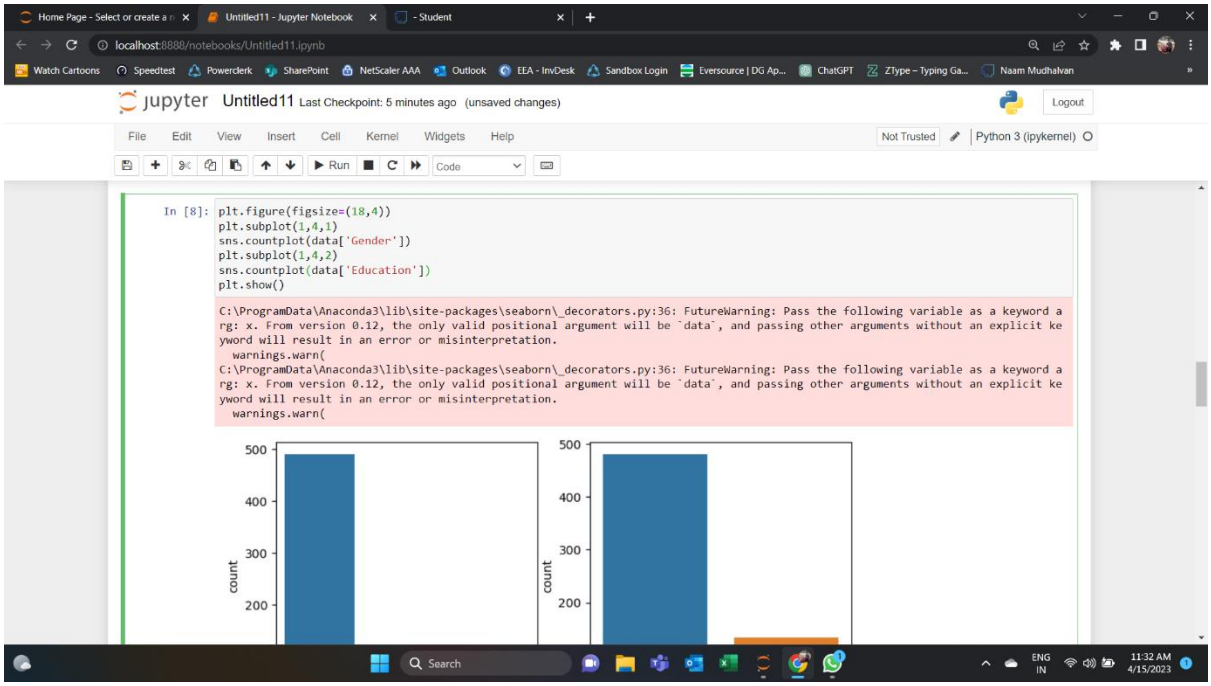
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Python 3 (ipykernel)
Run
Code
In [8]:
plt.figure(figsize=(18,4))
plt.subplot(1,4,1)
sns.countplot(data['Gender'])
plt.subplot(1,4,2)
sns.countplot(data['Education'])
plt.show()
C:\ProgramData\Anaconda3\lib\site-packages\seaborn_decorators.py:36: FutureWarning: Pass the following variable as a keyword arg: x. From version 0.12, the only valid positional argument will be `data`, and passing other arguments without an explicit keyword will result in an error or misinterpretation.
warnings.warn(
C:\ProgramData\Anaconda3\lib\site-packages\seaborn_decorators.py:36: FutureWarning: Pass the following variable as a keyword arg: x. From version 0.12, the only valid positional argument will be `data`, and passing other arguments without an explicit keyword will result in an error or misinterpretation.
warnings.warn(
500
400
300
200
count
500
400
300
200
count
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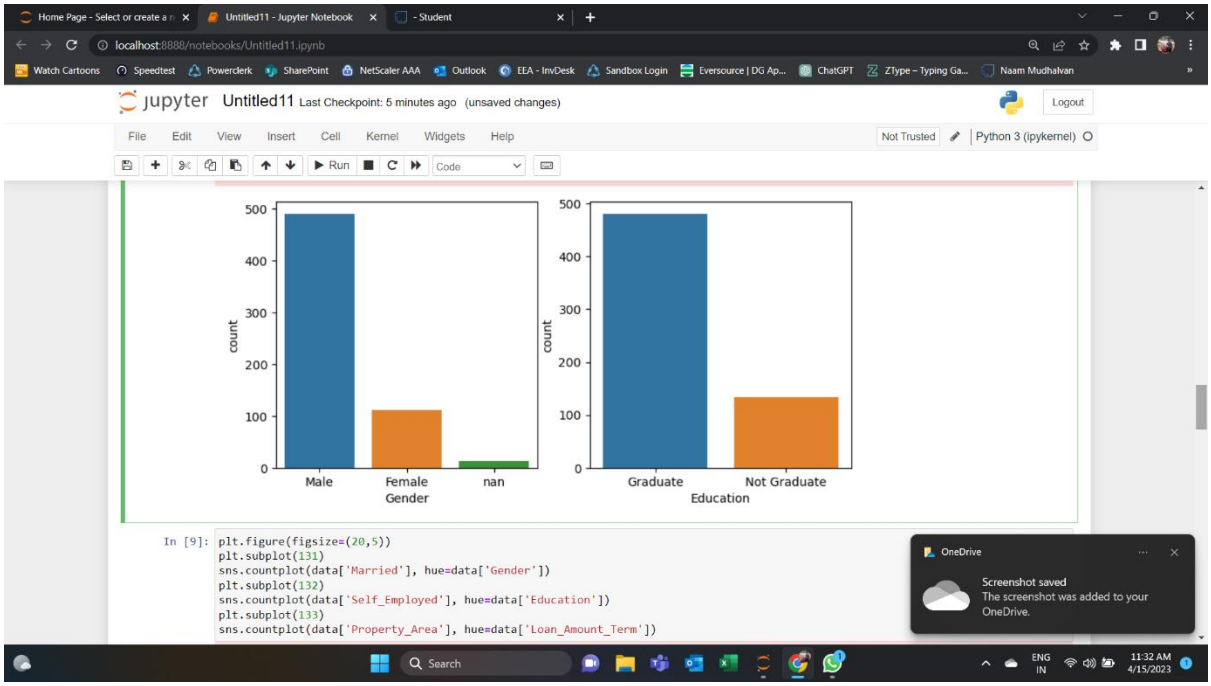
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File Edit View Insert Cell Kernel Widgets Help
Not Trusted
Python 3 (ipykernel)
Run
Code
count
Male
Female
nan
Gender
Graduate
Not Graduate
Education
In [9]:
plt.figure(figsize=(20,5))
plt.subplot(131)
sns.countplot(data['Married'], hue=data['Gender'])
plt.subplot(132)
sns.countplot(data['Self_Employed'], hue=data['Education'])
plt.subplot(133)
sns.countplot(data['Property_Area'], hue=data['Loan_Amount_Term'])
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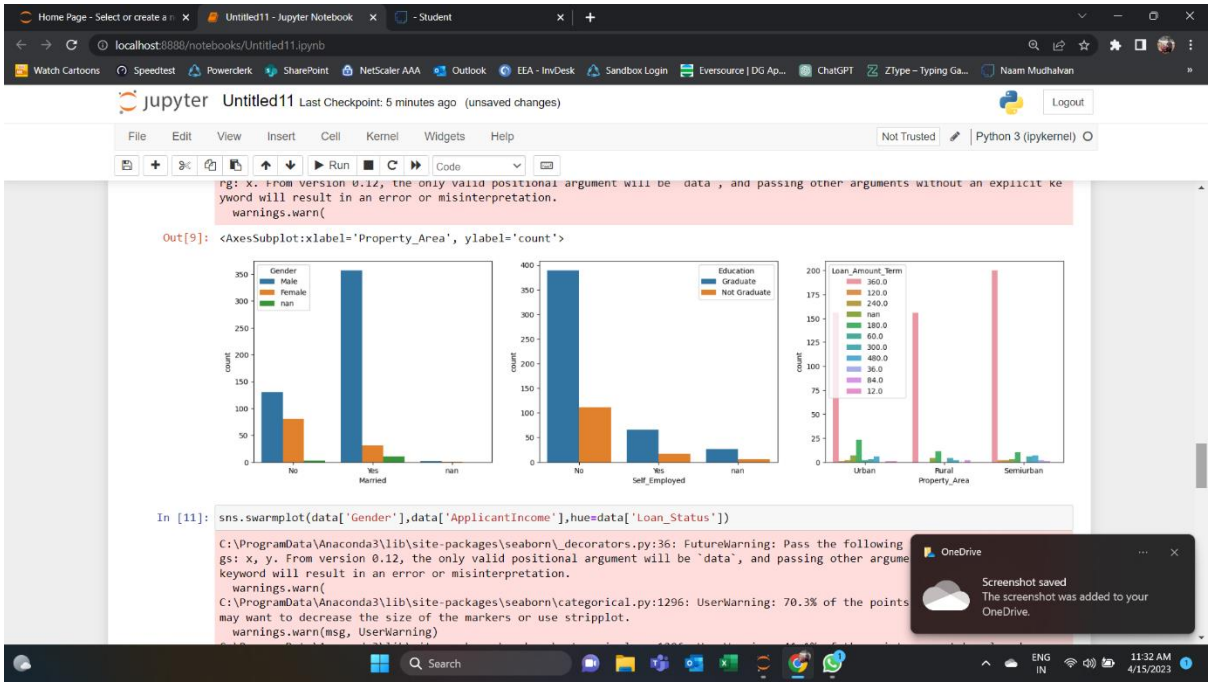
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Python 3 (ipykernel)
Run
Code
yword will result in an error or misinterpretation.
warnings.warn(
Out[9]:
<AxesSubplot:xlabel='Property_Area', ylabel='count'>
Gender
Male
Female
nan
Married
Education
Graduate
Not Graduate
Self_Employed
Loan_Amount_Term
360.0
120.0
240.0
nan
180.0
60.0
300.0
480.0
36.0
84.0
12.0
Urban
Rural
Semiurban
Property_Area
In [11]:
sns.swarmplot(data['Gender'],data['ApplicantIncome'],hue=data['Loan_Status'])
C:\ProgramData\Anaconda3\lib\site-packages\seaborn_decorators.py:36: FutureWarning: Pass the following
gs: x, y. From version 0.12, the only valid positional argument will be `data`, and passing other argume
keyword will result in an error or misinterpretation.
warnings.warn(
C:\ProgramData\Anaconda3\lib\site-packages\seaborn\categorical.py:1296: UserWarning: 70.3% of the points
may want to decrease the size of the markers or use stripplot.
warnings.warn(msg, UserWarning)
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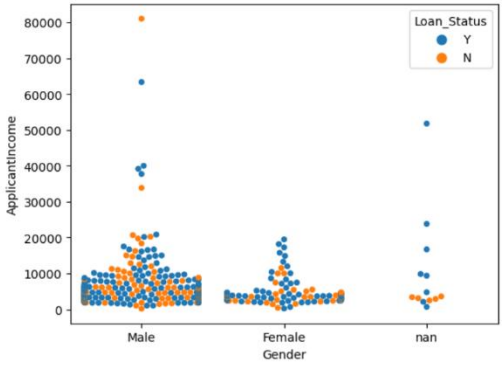
Run Code

Out[11]: <AxesSubplot:xlabel='Gender', ylabel='ApplicantIncome'>



In [13]:
```
!pip install imblearn
import imblearn
```

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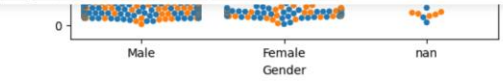

In [13]:
```
!pip install imblearn
import imblearn
```

```
Defaulting to user installation because normal site-packages is not writeable
Requirement already satisfied: imblearn in c:\users\91638\appdata\roaming\python\python39\site-packages (0.0)
Requirement already satisfied: imbalanced-learn in c:\users\91638\appdata\roaming\python\python39\site-packages (from imblearn)
(0.10.1)
Requirement already satisfied: joblib>=1.1.1 in c:\users\91638\appdata\roaming\python\python39\site-packages (from imbalanced-l
earn->imblearn) (1.2.0)
Requirement already satisfied: numpy>=1.17.3 in c:\programdata\anaconda3\lib\site-packages (from imbalanced-learn->imblearn)
(1.21.5)
Requirement already satisfied: scikit-learn>=1.0.2 in c:\programdata\anaconda3\lib\site-packages (from imbalanced-learn->imblea
rn) (1.0.2)
Requirement already satisfied: scipy>=1.3.2 in c:\programdata\anaconda3\lib\site-packages (from imbalanced-learn->imblearn) (1.
9.1)
Requirement already satisfied: threadpoolctl>=2.0.0 in c:\programdata\anaconda3\lib\site-packages (from imbalanced-learn->imble
arn) (2.2.0)
```

In [15]:
```
!pip install tensorflow
import tensorflow
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense
```

```
  WARNING: The scripts pyrsa-decrypt.exe, pyrsa-encrypt.exe, pyrsa-keygen.exe, pyrsa-priv2pub.exe, pyrsa-sign.exe and pyrsa-v
erify.exe are installed in 'C:\Users\91638\AppData\Roaming\Python\Python39\Scripts' which is not on PATH.
```

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