

PROJECT REPORT

PROJECT NAME: Smart Lender-Applicant Credibility Prediction For Loan Approval

TEAM ID: PNT2022TMID35168

1.INTRODUCTION:

1.1 PROJECT OVERVIEW: One of the most important factors which affect our country's economy and financial condition is the credit system governed by the banks. The process of bank credit risk evaluation is recognized at banks across the globe. "As we know credit risk evaluation is very crucial, there is a variety of techniques are used for risk level calculation. In addition, credit risk is one of the main functions of the banking community.

1.2 PURPOSE: The prediction of credit defaulters is one of the difficult tasks for any bank. But by forecasting the loan defaulters, the banks definitely may reduce their loss by reducing their non-profit assets, so that recovery of approved loans can take place without any loss and it can play as the contributing parameter of the bank statement. This makes the study of this loan approval prediction important. Machine

Learning techniques are very crucial and useful in the prediction of these types of data.

2.LITRATURE SURVEY

2.1 EXISTING PROBLEM

The only risk in smart lending is credit default by borrowers. It is similar to the risk involved in fixed income instruments such as NCD (Non-Convertible Debentures) and CPs (Commercial Papers), says Bhavin Patel, CEO & Co-founder, LenDenClub. To minimise the default risk, one should diversify investments and lend small amounts to multiple borrowers.

"To diversify, investors can use the 80:20 formula, that is: lending 80 per cent to high-rated clients with reasonable returns and 20 per cent to low-rated clients. Diversify maximum while lending to lower-rated clients," says Rajan Pathak, Founder & MD, Adapt Fintech Advisors.

If a default happens, most P2P players have an in-house collection and verification team to collect missed payments on behalf of lenders. The default rates at LendenClub, RupeeCircle and Faircent are 4.2 per cent, less than 1 per cent and around 2 per cent, respectively, as per data from the companies.

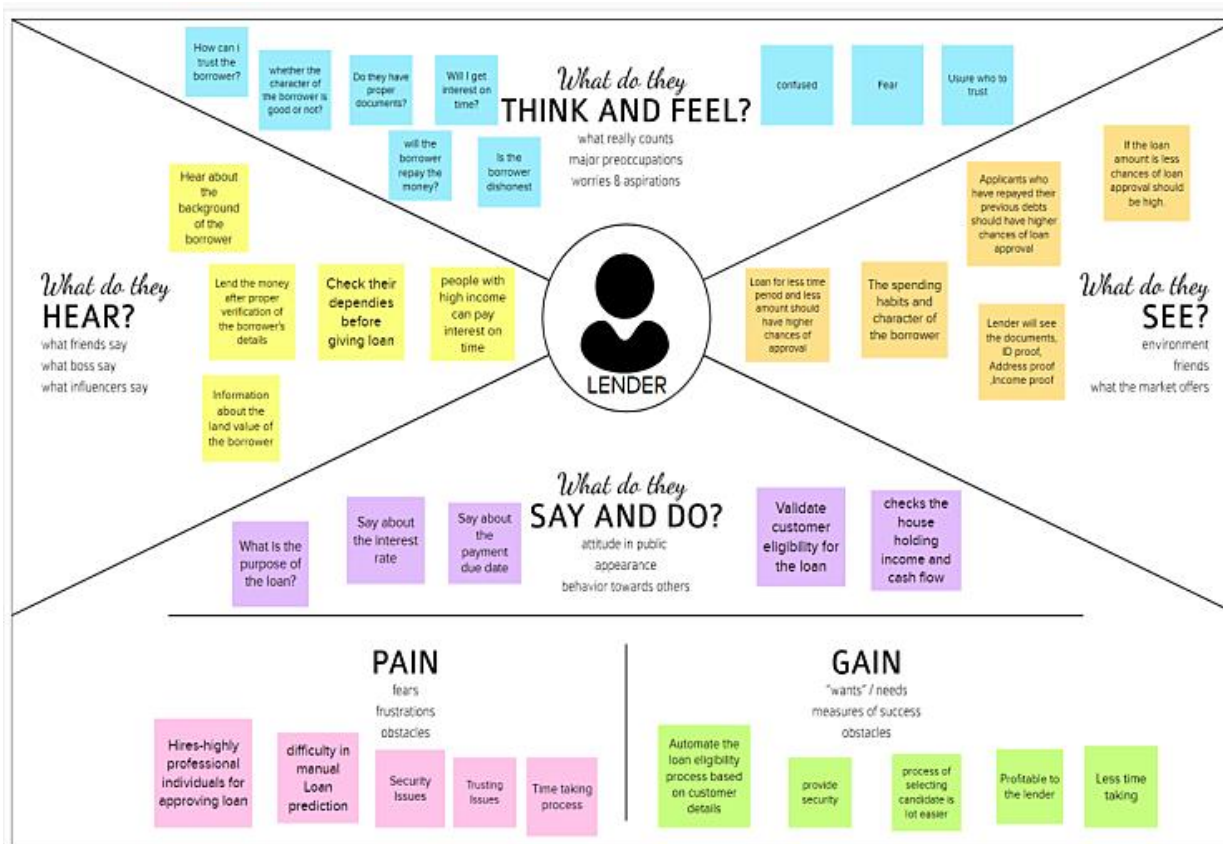
2.2 Problem Statement Defenition

If you have money to invest for the short term, you can consider a new option in the debt segment other than traditional debt instruments such as debentures and bonds - peer-to-peer (P2P) lending, which has emerged as an attractive avenue for people who don't mind taking some additional risks for extra returns. This involves lending money to individuals or businesses through online services that match lenders with borrowers. Recently, even the Reserve Bank of India (RBI) showed confidence in the fledgling segment by revising a lender's

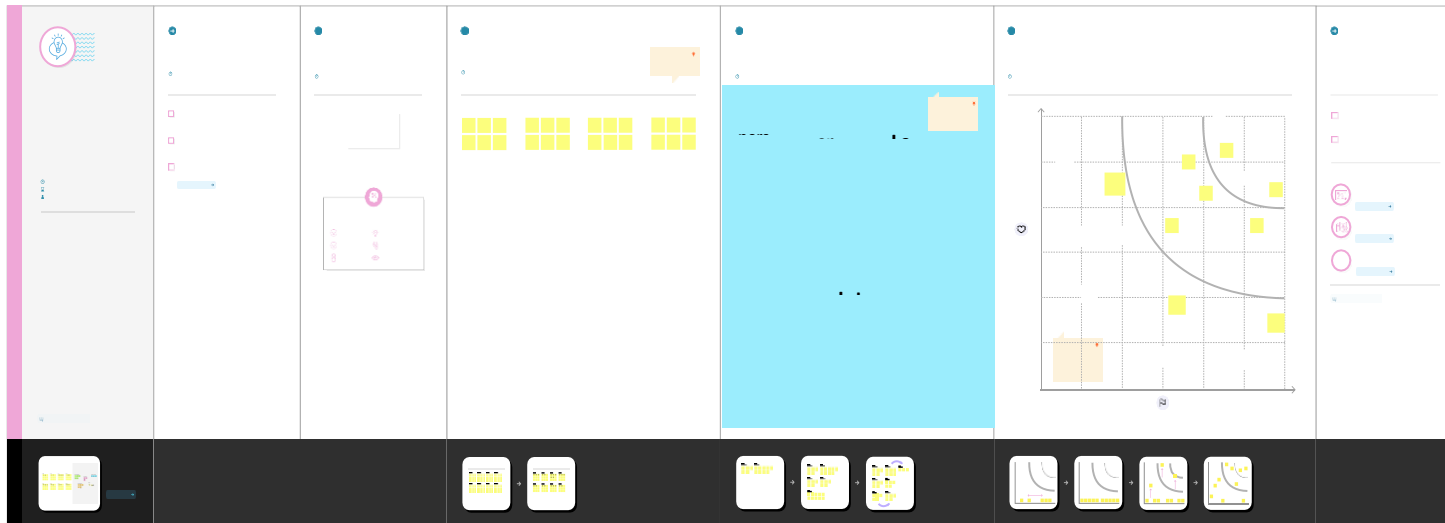
exposure limit across P2P platforms from Rs 10 lakh to Rs 50 lakh. Experts say one can earn good returns by diversifying risks across types of borrowers.

3.IDEATION AND PROPOSED SOLUTION

3.1 Emaphthy map Canvas



3.2 IDEATION AND BRAINSTROMING

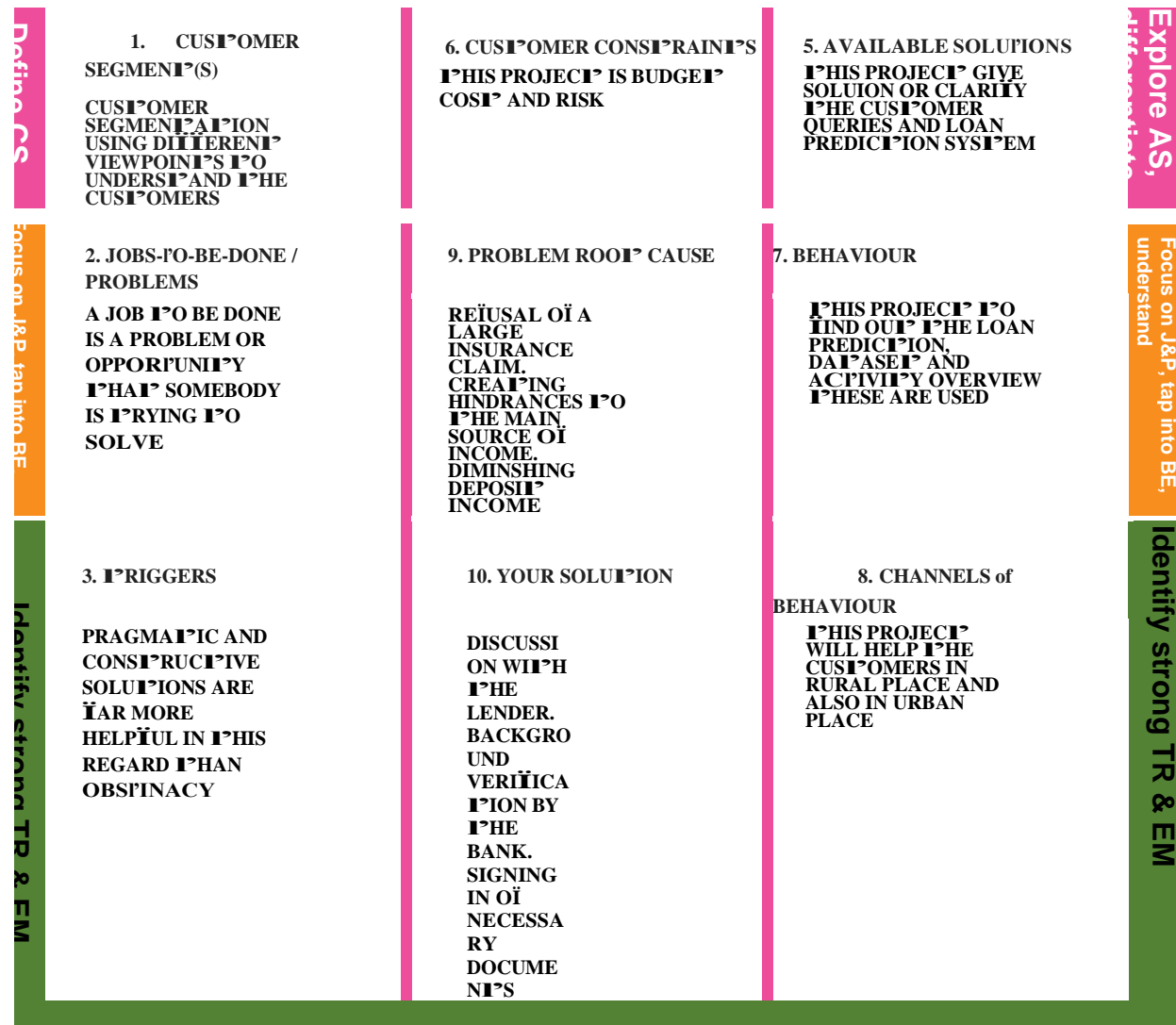


3.3 PROPOSED SOLUTION

Solution of the information and educational context a learner already has before they learn new information. A learner's understanding of educational material can be improved by taking advantage of their prior knowledge before dealing with the new material. General understanding about the way students learn states

that the success of learning is determined by how much the learner already knows about a given topic or related topics

3.4 Problem Solution Fit



4.REQUIREMENT ANALYSIS:

4.1 Functional Requirement

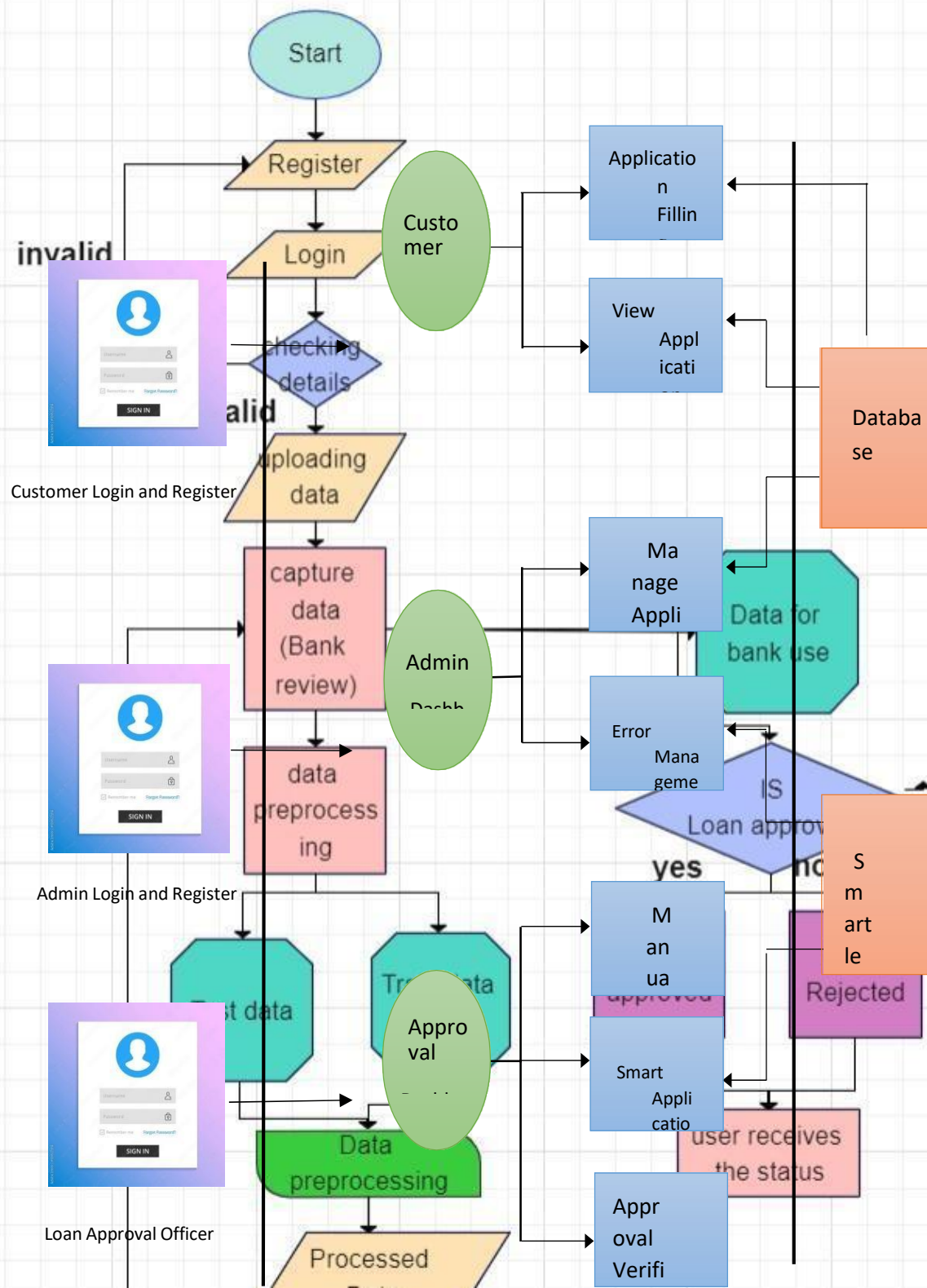
FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Form Registration through Gmail Registration through LinkedIn
FR-2	User Confirmation	Confirmation via Email Confirmation via OTP
FR-3	User Application	Filling of application Modification of application Verification of application
FR-4	Loan Issuance	Checking status of loan Approval Loan Rejection
FR-5	Credit history analysis	Credit score auditing Income auditing
FR-6	User management	Choosing appropriate loan program for users Categorizing users according to credit history.

4.2 NON FUNCTIONAL REQUIREMENTS

FR No.	Non-Functional Requirement	Description
NFR-1	Usability	Simple and understandable UI. Easy to navigate Smooth and seamless Easy to comprehend
NFR-2	Security	Restricted access to data. Login verification Registration verification Upholding privacy of user
NFR-3	Reliability	Backup to prevent data loss Negation of data loss due to lag.
NFR-4	Performance	Web based application. Requires minimum Intel Pentium 4 processor, 4 GB RAM, 1280x1024 screen with application window size 1024x680

5.PROJECT DESIGN

5.1 . Data Flow Diagrams



5.3 User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Priority Release
Customer (web user, mobile user)	Registration	USN-1	As a user, I can register for the application by entering my name, email ID, password, Account number etc.	I can access my account	High	Sprint-1
	Login	USN-2	As a user, I can log into the application by entering the user's name and password	I can login to the website	High	Sprint-1
	Navigation	USN-3	As a user, I can navigate to different tabs like home, description, contactt	I can navigate and view different details	Low	Sprint-2
	View procedure	USN-4	As a user, I can view the procedure to apply for loan	I can view complete steps to apply for loan	Medium	Sprint-2
	Contact	USN-5	As a user, I can contact bank	I can clarify my doubtts	Low	Sprint-2
	Ratings	USN-6	As a user, I can provide ratings for the service Provided	I can give my review for the service	Medium	Sprint-3
Bank administrator	View user details	USN-1	As a Bank administrator, I can view the user details	I can view all the details uploaded by the customer	Medium	Sprin-3
	Credit verification	USN-2	As a Bank administrator, I can verify the credibility of the customer	I can verify all the details of the customer	High	Sprint-3
	Document Verification	USN-3	As a Bank administrator, I can verify all the document proof and ID proof of the customer	I can verify all the documents submitted by the customer	High	Sprint-4
	Loan approval Status	USN-4	As s Bank administrator, I can Approve/Reject the loan for the customer based on them details	I can give the loan approval status of the customer	High	Sprint-4

6.Project Planning And Sheduling

6.1 Sprint Planning

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration	USN-1	As a user, I can register for the application by entering my details like email, password etc..	2	High	John beniyel Hiran dev
Sprint-1	Login	USN-2	As a user, I can log into the application by entering the username and password.	2	High	Ajith Iyappan
Sprint-1		USN-3	As a user,I can log in using Gmail.	1	Low	John beniyel iyappan
Sprint-2	Upload details	USN-4	As a user,I can upload my details and documents.	3	Medium	Ajith Hiran Dev
Sprint-2	Navigation	USN-5	As a user, I can navigate to different tabs like home, description, contact,login,procedure.	2	Low	Iyappan Ajith
Sprint-2	View procedure	USN-6	As a user, I can view the procedure to apply for a loan.	1	Medium	Ajith John Beniyel
Sprint-2	Contact	USN-7	As a user, I can contact the bank.	1	Low	Ajith Hiran Dev
Sprint-3	Ratings	USN-8	As a user, I can provide ratings for the service Provided.	2	Medium	Ajith Iyappan
Sprint-3	View user details	USN-9	As a Bank administrator , I can view the user details	2	Medium	John Beniyel Ajith
Sprint-3	Credit verification	USN-10	As a Bank administrator, I can verify the credibility of the customer.	3	High	John Beniyel Iyappan
Sprint-4	Document Verification	USN-11	As a Bank administrator,I can Verify all the documents proof and ID proof of the customer.	3	High	Hiran dev Ajith
Sprint-4	Loan approval status	USN-12	As a Bank administrator, I can Approve/Reject the loan for the customer based on their details	3	High	John Beniyel Hiran Dev

6.2 Sprint Delivery Shedule

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed (as on Planned End Date)	Sprint Release Date (Actual)
Sprint-1	5	6 Days	24 Oct 2022	29 Oct 2022	5	01 Oct 2022
Sprint-2	7	6 Days	31 Oct 2022	05 Nov 2022	7	05 Nov 2022
Sprint-3	7	6 Days	07 Nov 2022	12 Nov 2022	7	12 Nov 2022
Sprint-4	9	6 Days	14 Nov 2022	19 Nov 2022	9	19 Nov 2022

7.Work with Dataset

7.1 Understanding the Dataset

1. Download the dataset: Dataset
2. Load the dataset into the tool.
3. Perform Below Visualizations.

- Univariate Analysis
- Bi-Variate Analysis
- Multi-Variate Analysis

4. Perform descriptive statistics on the dataset.

5. Check for Missing values and deal with them.

6. Find the outliers and replace them outliers

7. Check for Categorical columns and perform encoding. 8. Split the data into dependent and independent variables. 9. Scale the independent variables

10. Split the data into training and testing

11. Build the Model

12. Train the Model

13. Test the Model

7.2 Load The dataset

The screenshot shows a Jupyter Notebook titled "Uni-Variate Analysis" running on a local server at `localhost:8888`. The notebook contains three input cells and one output cell. The first cell imports the necessary libraries: `numpy`, `pandas`, `seaborn`, `matplotlib.pyplot`, and `sklearn`. The second cell reads a CSV file located at `r"E:\csv\Loan Dataset.csv"` into a DataFrame named `df`. The third cell displays the DataFrame `df`, which contains 614 rows and 13 columns. The output is a table with the following columns: `Loan_ID`, `Gender`, `Married`, `Dependents`, `Education`, `Self_Employed`, `ApplicantIncome`, `CoapplicantIncome`, `LoanAmount`, `Loan_Amount_Term`, and `Credit_History`.

```
In [1]: import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
import sklearn

In [2]: df = pd.read_csv(r"E:\csv\Loan Dataset.csv")

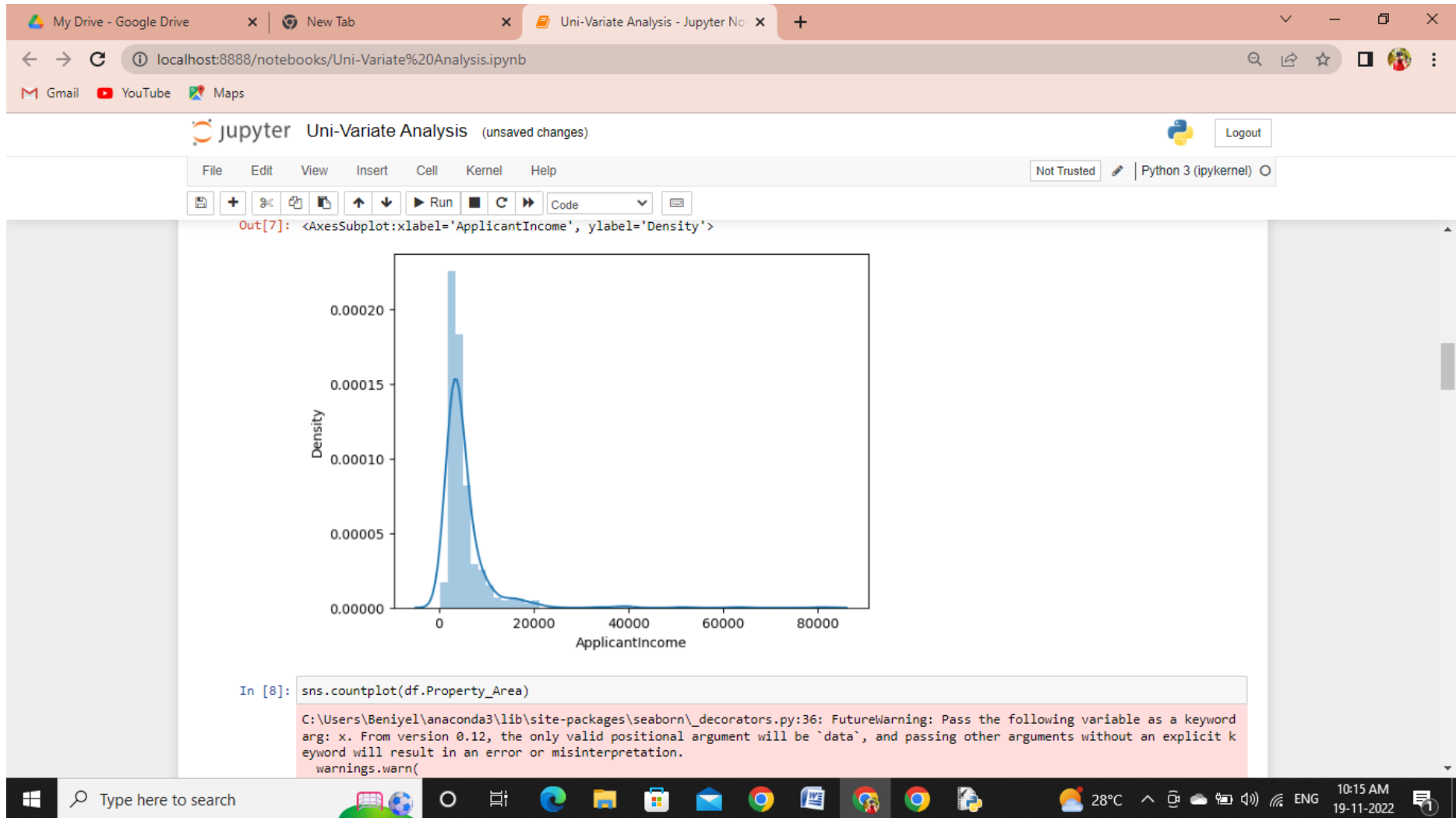
In [3]: df
```

Out[3]:

	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

7.2 Visualisation Charts

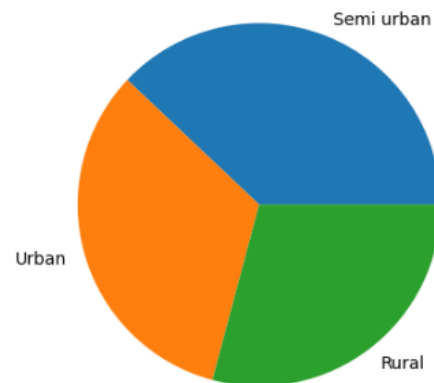


0 10000 20000 30000 40000

CoapplicantIncome

```
In [15]: plt.pie(df.Property_Area.value_counts(),[0,0,0],labels=['Semi urban','Urban','Rural'])
```

```
Out[15]: ([<matplotlib.patches.Wedge at 0x1e98aeed1f0>,
<matplotlib.patches.Wedge at 0x1e98aeed6d0>,
<matplotlib.patches.Wedge at 0x1e98aeedbe0>],
[Text(0.40661098511372595, 1.0220897743275028, 'Semi urban'),
Text(-1.0582795633383781, -0.3000739339235115, 'Urban'),
Text(0.67000963198199, -0.8724030565348555, 'Rural')])
```



8. Testing

8.1 Test Cases

My Drive - Google Drive

New Tab

Uni-Variate Analysis - Jupyter No

prediction

File

E:/New%20folder%20(3)/New%20folder/prediction.html

Share

Star

Fullscreen

Profile

Menu

Gmail

YouTube

Maps

LOAN ELIGIBILITY PREDICTION

Fill the form for prediction

Back

Name

Enter your Name

Email ID

Enter your Email ID

Mobile Number

Enter your Mobile number

Gender

-- select gender --

Married status

-- select married status --

Windows

Type here to search

Taskbar Icons

29°C

10:26 AM

19-11-2022

My Drive - Google Drive

New Tab

Uni-Variate Analysis - Jupyter No

prediction

File | E:/New%20folder%20(3)/New%20folder/prediction.html

Gmail YouTube Maps

Enter LoanAmount

LoanAmount

Enter Loan_Amount_Term

Loan_Amount_Term

Enter Adhar Number

Adhar Number

Enter PAN card ID

PAN card ID

Property Document

Choose File

No file chosen

Govet ID proof

Choose File

No file chosen

☐ I accept the Terms and conditions

PREDICT

Windows Taskbar

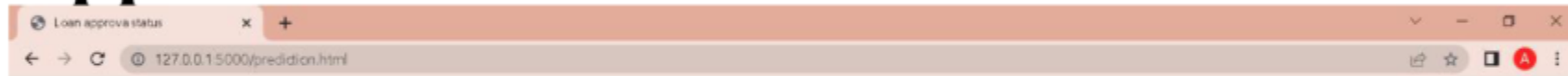
Type here to search

Taskbar Icons

29°C 10:26 AM 19-11-2022

9.RESULTS

Predicted result: Approved



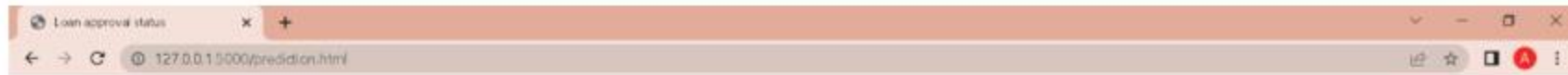
LOAN APPROVAL STATUS

Congratulations! aishu You are eligible for loan



Please provide your feedback





LOAN APPROVAL STATUS

Sorry aishu You are not eligible for loan



Please provide your feedback



10. Advantages

- The customer can predict their eligibility from any part of the world and at any time so it provides user convenience
- Eligible applicant will be sanctioned loan without any delay
- Minimal documentation is required and there is no physical submission of documents
- Whole process will be automated, so human error will be avoided
- Time period for loan sanctioning will be reduced and more accurate prediction for loan eligibility will be given.
- The customer can contact bank at any time in case of any queries and we had also provided the detailed procedure for applying loan and customer can also provide the ratings.

Disadvantages

- The customer can contact the lender only through online using email or call them in case of any queries
- The bank should externally connect to database and use this software in real time we had provided only the feature

- There may be some risk associated with security of the customers as they are providing all their details in online
- The Accuracy of prediction can also be improved

11.CONCLUSION

The analysis has started from data preprocessing ,handling missing value, exploratory analysis and different models were build like Decision tree model,KNN model,Xgboost model and Random Forest model and there performance were evaluated , as a result the Random Forest model is selected as the best model for predicting the loan approval status of the customer after evaluating its performance ,as it got 91% accuracy in prediction.This application is then tested and it functions properly and it also meets all the requirements of the bank in selecting the trust worthy person to provide loan

12.Future Scope

In future,payment option can be included in this application for exchanging money between the lender and borrower and bank can verify the customer documentonline using AI which makes the process of verification simpler and could be made more secure,trustworthy and dynamic weight conformation and in near future this module can be integrated with the module of automated processing system.

13.APPENDIX

SOURCE CODE: <https://github.com/IBM-EPBL/IBM-Project-45244-1660729026>

DEMO VIDEO LINK: <https://youtu.be/6C9HvIrkZko>

