Loan prediction Project

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Introduction

Topic:

Loans are the core business of banks. The main profit comes directly from the loan’s interest. The loan companies grant a loan after an intensive process of verification and validation. However, they still don’t have assurance if the applicant can repay the loan with no difficulties.

Goal:

Predict if the user can take loan or not from the given features.

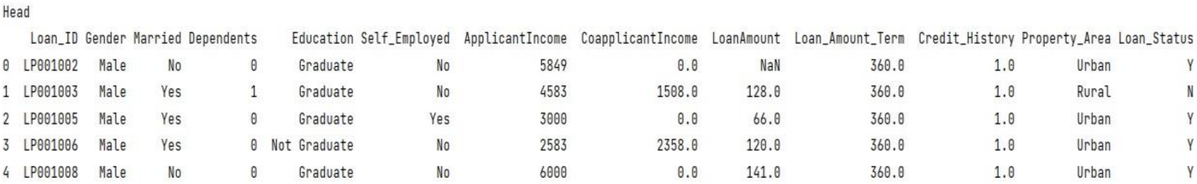
Dataset description:

The dataset is composed of 614 persons with their Loan ID Gender , Married Dependents , Education, Self Employed ,Applicant Income Co-applicant Income ,Loan Amount ,Loan Amount Term ,Credit HistoryProperty Area and Loan Status.

The project processes

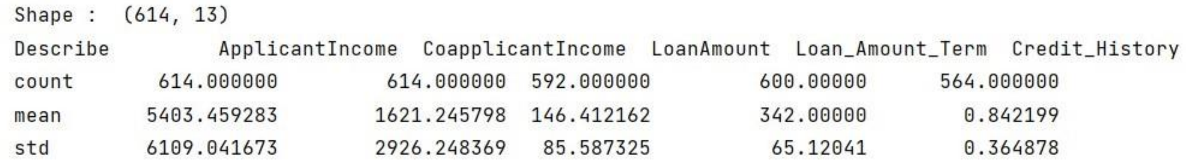
First:

We started by importing the libraries as (pandas and sklearn)
 then the dataset loading and displaying the head of data



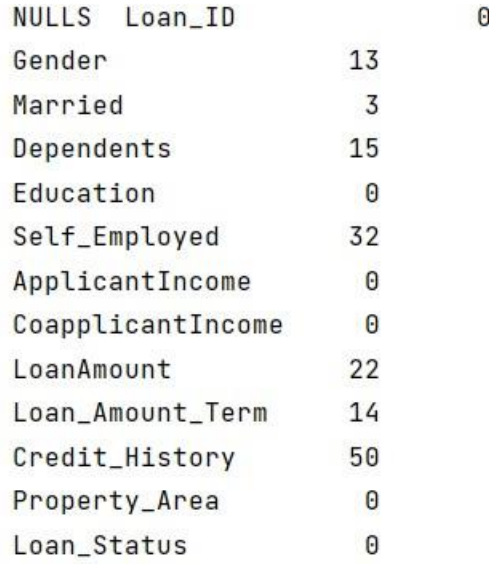
```
Head
    Loan_ID Gender Married Dependents     Education Self_Employed ApplicantIncome CoapplicantIncome LoanAmount Loan_Amount_Term Credit_History Property_Area Loan_Status
0  LP001002   Male      No          0      Graduate            No            5849               0.0        NaN            360.0            1.0         Urban           Y
1  LP001003   Male     Yes          1      Graduate            No            4583            1508.0      128.0            360.0            1.0         Rural           N
2  LP001005   Male     Yes          0      Graduate           Yes            3000               0.0       66.0            360.0            1.0         Urban           Y
3  LP001006   Male     Yes          0  Not Graduate            No            2583            2358.0      120.0            360.0            1.0         Urban           Y
4  LP001008   Male      No          0      Graduate            No            6000               0.0      141.0            360.0            1.0         Urban           Y
```

then the description of it (count, std and mean)



```
Shape :  (614, 13)
Describe         ApplicantIncome  CoapplicantIncome  LoanAmount  Loan_Amount_Term  Credit_History
count       614.000000          614.000000  592.000000          600.00000       564.000000
mean       5403.459283         1621.245798  146.412162          342.00000         0.842199
std        6109.041673         2926.248369   85.587325           65.12041         0.364878
```

Then we counted null values

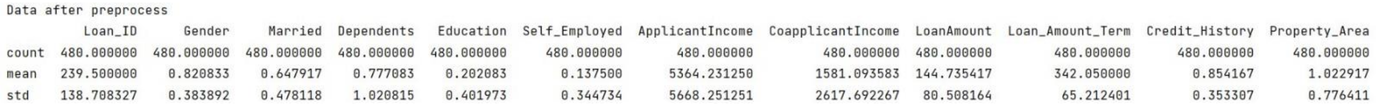


```
NULLS  Loan_ID              0
Gender               13
Married               3
Dependents           15
Education             0
Self_Employed        32
ApplicantIncome       0
CoapplicantIncome     0
LoanAmount           22
Loan_Amount_Term     14
Credit_History       50
Property_Area         0
Loan_Status           0
```

Second:

Pre-process:

Then we removed the null values from the dataset.
We made label encoding to the data by changing the data which has string values by giving it an integer value then We did the data scaling and displayed the new data description after the scaling.

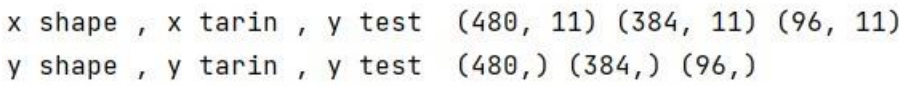


```
Data after preprocess
          Loan_ID      Gender     Married  Dependents   Education  Self_Employed  ApplicantIncome  CoapplicantIncome  LoanAmount  Loan_Amount_Term  Credit_History  Property_Area
count  480.000000  480.000000  480.000000  480.000000  480.000000     480.000000       480.000000         480.000000  480.000000        480.000000      480.000000     480.000000
mean   239.500000    0.820833    0.647917    0.777083    0.202083       0.137500      5364.231250        1581.093583  144.735417        342.050000        0.854167       1.022917
std    138.708327    0.383892    0.478118    1.020815    0.401973       0.344734      5668.251251        2617.692267   80.508164         65.212401        0.353307       0.776411
```

Then we split data to x and y where x means the data which the prediction depends on it so it contained the data set except Loan id and Loan status and y means the predicted data which is loan status

Then we split data to 80% for train and 20% for test

So, data become as the following



```
x shape , x tarin , y test  (480, 11) (384, 11) (96, 11)
y shape , y tarin , y test  (480,) (384,) (96,)
```

Third:

Classification:

We made algorithms to calculate the accuracy of data like and print the accuracy before and after scaling:

support-vector machine (SVM).

SVM algorithm accuracy is equals to:

before scaling= 0.5833333333333334.

after scaling = 0.7291666666666666.

“Decision Tree Classifier “we made the decision tree to classify the data and calculate the accuracy of these data which is

before scaling=0.6666666666666666.

after scaling=0.7604166666666666.

“Logistic Regression” we made logistic regression to return the probability value by sigmoid function which gave us an accuracy equals to:

before scaling=0.6666666666666666.

after scaling=0.7604166666666666.

Fourth:

extracted a new feature principal component analysis (PCA).