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LOAN APPROVAL ANALYSIS AND EDA PROJECT

LOAN APPROVAL SUMMARY:

1. Receiving the Loan Application

The journey begins with the bank receiving a loan application. An interested borrower can either physically visit the bank or initiate this process online, depending on the bank's provisions.

2. Document Collection

The next step invariably involves the applicant submitting essential documents. This usually includes:

- Address proof
- Identity proof
- Income documents
- Completed loan application form
- Some passport-sized photographs

The applicants also need to provide their bank statements for loan approval. Lenders may request statements ranging from the last six months to several years. The applicant should submit statements from all main accounts for a complete analysis.

3. Document Verification

Once the documents are collected, they're sent to the bank's verification department. The bank/lenders usually take about 1 to 2 days to process. A representative might physically visit the borrower's residence and workplace to validate the provided details.

Simultaneously, electronic verification of identity documents like PAN cards and Aadhaar is executed via online platforms.

4. Analysis of the Bank Statement for Loan Approval

The bank reviews these statements to learn about the applicant's financial habits, steady income, and any warning signs. Many automated tools often help with this, giving fast and clear information.

Here's a detailed process of how lenders usually analyse the bank statement for loan approval:

- **Analysis of Income Streams:** The primary concern for any lender is the borrower's ability to repay. By assessing regular income inflows, be it from salaries, business income, or other sources, lenders gauge an applicant's repayment capacity.
- **Evaluation of Expenditure:** By reviewing regular payments, monthly bills, and other costs, lenders can understand an applicant's spending habits. It also gives insight into any existing financial commitments.
- **Examination of Overdrafts and NSF Fees:** Frequent overdrafts or Non-Sufficient Funds (NSF) fees are red flags. They indicate poor financial management and might stop lenders from giving a loan.
- **Scrutiny of Large and Unusual Transactions:** Any large or irregular deposits and withdrawals will be examined closely. Lenders search for steady financial habits. These transactions can show hidden debts or income.

- **Monitoring Consistency with Application Data:** Details provided in the loan application are cross-checked with the bank statement for loan approval. Discrepancies, if any, can affect the loan decision.

5. Calculation of Debt-to-Income Ratio

By comparing monthly debt obligations to monthly income, lenders compute the Debt-to-Income (DTI) ratio. A lower DTI is preferred as it indicates lesser financial stress on the borrower.

6. Verification Report Generation

Using the data gathered through verification, they craft a detailed report that captures their discoveries. It includes insights into:

- Applicant's financial history
- Their financial stability
- Potential risks

The loan officer will then closely examine the report to decide whether to approve or reject the application.

7. Decisioning

If the verification proves satisfactory, the process moves forward. However, if discrepancies are found, or certain criteria are not met, the application might get rejected. The bank ensures that the reasons for rejection are clearly communicated to the borrower.

Innovative tools like Precisa, with their real-time bank statement analysis, offer a 360-degree view of the applicant's financial health.

8. Sanctioning of Personal Loan

This is the final stretch. Once the loan officer gets a green signal from the verification team, the loan agreement is prepared. This document has all the details like:

- Terms and conditions
- Loan amount
- Tenure
- Interest rate
- Any additional charges

9. Loan Disbursal

Upon agreement, the bank moves swiftly to disburse the loan amount, which is typically reflected in the borrower's bank account within 24 hours.

Final Thoughts

Personal loans are very popular in India and even abroad. So, if you're planning to apply for loans, it's good to keep the above steps of verifying bank statements for loan approval in mind.

The entire process might seem daunting. Yet, understanding this journey, from initial application to eventual disbursal, equips borrowers to prepare better.

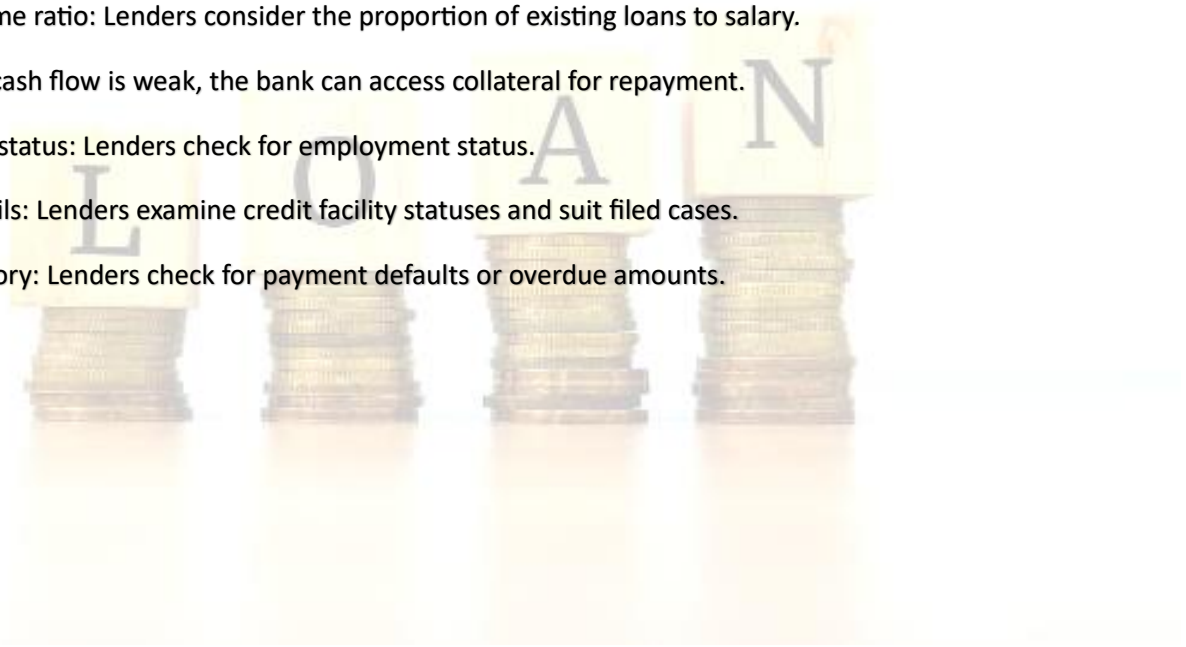
LOAN APPROVAL INTRODUCTION:

The loan approval process is a series of steps that a lender takes to determine whether to approve a loan application:

- Application: The applicant completes an application and submits required documents.
- Underwriting: The lender assesses the applicant's creditworthiness and other factors.
- Decision: The lender approves or denies the application. If approved, both parties sign a contract.
- Closing: The lender advances the loan proceeds, and the borrower agrees to repay the loan amount plus interest.

Factors that lenders consider when evaluating a loan application include:

- Credit history: A good credit score and report is a positive indicator of credit health.
- Income: Lenders check for a steady income.
- Debt-to-income ratio: Lenders consider the proportion of existing loans to salary.
- Collateral: If cash flow is weak, the bank can access collateral for repayment.
- Employment status: Lenders check for employment status.
- Account details: Lenders examine credit facility statuses and suit filed cases.
- Payment history: Lenders check for payment defaults or overdue amounts.



LOAN APPROVAL OBJECTIVE:

Step 1: Gathering and Submitting Application & Required Documentations

The first step in obtaining any loan is to complete an application and submit the required documents. Required documents will vary based on the type of loan, size and complexity of the operation requesting the loan. Typically, the smaller the loan, the fewer documents are required. The most common documents required from applicants include: personal financial statements, authorization to release credit, the last 2-3 years of financial statements or tax returns, and copies of legal entity documents. Once the application and required documents are received by the lender, the loan moves on to the next step in the process: loan underwriting.

Step 2: Loan Underwriting

When a loan moves into underwriting, the analyst assigned to work on the request will typically evaluate the loan utilizing some form of the Five C's of Credit: Character, capital, capacity, collateral and conditions. Items that will be considered when doing this evaluation will include credit scores, repayment history (both direct and with other lenders), cash reserves available, cash flow / earnings from employment or business operation, amount of personal down payment being offered, overall economic conditions, specific industry conditions and the collateral being offered. The time in loan underwriting will vary based on the complexity of the request; that is, the more parties or entities involved the longer it takes to assemble the information in order to make a decision.

Step 3: Decision & Pre-Closing

Once a decision is made on the loan request, a response is provided to the applicants as quickly as possible. If the loan was approved, the terms and conditions of the approval are also communicated to the applicant at this point. If the terms and conditions are acceptable to both the applicant and the lender, the next step is to order an appraisal, survey, title insurance, loan documents and any other required items. Once those items are received, they are reviewed to ensure that they meet the requirements of the loan approval. If everything is in order, then closing is scheduled.

Step 4: Closing

Once you make it to this point, the anxiety and stress associated with waiting and gathering required items is essentially done. The closing of a loan typically occurs at either the lender's office, the title insurance company or an attorney's office. At closing, the required loan documents as well as any transaction specific documents are signed and funds are disbursed in accordance with the approval. Typically, copies of all the documents signed will be provided to both the lender and the applicant.

Step 5: Post Closing

Finally, the loan transaction is typically wrapped up and welcome information will be sent. This message will include information about the institution, how to access your account and when and where to make payments. You will also receive post-closing documents that include information about the benefits of being a member of a cooperative, the benefits of patronage and its impact on your rate.

DESCRIPTION OF DATA SET:

Import Libraires:

Import Liabaries

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import plotly.express as px
import datetime
import warnings
warnings.filterwarnings('ignore')
```

To import all libraries of numpy for numerical array and pandas for advance tabular formation and matploitlib,seaborn,plotly for visualization.

Import Data Set:

Import Data

```
df_loan = pd.read_csv('loan_sanction_test.csv')
```

```
df_loan
```

	Loan_ID	Gender	Married	Dependents	Education	Self_Employed	ApplicantIncome	CoapplicantIncome	LoanAmount	Loan_Amount_Term	Credit_History	Prope
0	LP001015	Male	Yes	0	Graduate	No	5720	0	110.0	360.0	1.0	
1	LP001022	Male	Yes	1	Graduate	No	3076	1500	126.0	360.0	1.0	
2	LP001031	Male	Yes	2	Graduate	No	5000	1800	208.0	360.0	1.0	
3	LP001035	Male	Yes	2	Graduate	No	2340	2546	100.0	360.0	NaN	
4	LP001051	Male	No	0	Not Graduate	No	3276	0	78.0	360.0	1.0	
...	...	...	...	...	...	...	...	...	...	...	...	
362	LP002971	Male	Yes	3+	Not Graduate	Yes	4009	1777	113.0	360.0	1.0	
363	LP002975	Male	Yes	0	Graduate	No	4158	709	115.0	360.0	1.0	
364	LP002980	Male	No	0	Graduate	No	3250	1993	126.0	360.0	NaN	Se
365	LP002986	Male	Yes	0	Graduate	No	5000	2393	158.0	360.0	1.0	
366	LP002989	Male	No	0	Graduate	Yes	9200	0	98.0	180.0	1.0	

To import all the data of data set loan csv file but some column and rows have nan values present now.

Shape:

Checking the Shape

```
df_loan.shape
```

```
(367, 12)
```

Columns= 12, rows =367

Info of Data:

Info about data

```
df_loan.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 367 entries, 0 to 366
Data columns (total 12 columns):
 #   Column             Non-Null Count  Dtype  
---  ------             --------------  -----  
 0   Loan_ID            367 non-null    object 
 1   Gender             356 non-null    object 
 2   Married            367 non-null    object 
 3   Dependents         357 non-null    object 
 4   Education          367 non-null    object 
 5   Self_Employed      344 non-null    object 
 6   ApplicantIncome    367 non-null    int64  
 7   CoapplicantIncome  367 non-null    int64  
 8   LoanAmount         362 non-null    float64
 9   Loan_Amount_Term   361 non-null    float64
 10  Credit_History     338 non-null    float64
 11  Property_Area      367 non-null    object 
dtypes: float64(3), int64(2), object(7)
memory usage: 34.5+ KB
```

There are 12 columns.

Numerical Column Value:

Description of Numerical Columns in Data

```
df_loan.describe().transpose()
```

	count	mean	std	min	25%	50%	75%	max
ApplicantIncome	367.0	4805.599455	4910.685399	0.0	2864.00	3786.0	5060.0	72529.0
CoapplicantIncome	367.0	1569.577657	2334.232099	0.0	0.00	1025.0	2430.5	24000.0
LoanAmount	362.0	136.132597	61.366652	28.0	100.25	125.0	158.0	550.0
Loan_Amount_Term	361.0	342.537396	65.156643	6.0	360.00	360.0	360.0	480.0
Credit_History	338.0	0.825444	0.380150	0.0	1.00	1.0	1.0	1.0

It have contains all the values of mean, median mode,std.

Inspect and Cleaning:

Check null values:

```
df_loan.isnull().sum()
```

```
Loan_ID               0
Gender               11
Married               0
Dependents           10
Education             0
Self_Employed        23
ApplicantIncome       0
CoapplicantIncome     0
LoanAmount            5
Loan_Amount_Term      6
Credit_History       29
Property_Area         0
dtype: int64
```

I have contain null values.

Duplicated Values:

```
df_loan.duplicated().sum()
```

```
0
```

I have contain 0 duplicated values.

Nunique Values:

```
df_loan.nunique()
```

```
Loan_ID              367
Gender                 2
Married                2
Dependents             4
Education              2
Self_Employed          2
ApplicantIncome      314
CoapplicantIncome    194
LoanAmount           144
Loan_Amount_Term      12
Credit_History         2
Property_Area          3
dtype: int64
```

I have a nunique values present in data.

Dropna Command:

```
df_loan.dropna(axis=1,inplace=True)
```

I am using dropna command to drop the entire nan values columns.

Re Check Shape ,Info& Describe:

```
df_loan.shape
```

```
(367, 6)
```

```
df_loan.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 367 entries, 0 to 366
Data columns (total 6 columns):
 #   Column             Non-Null Count  Dtype
---  ------             --------------  -----
 0   Loan_ID            367 non-null    object
 1   Married            367 non-null    object
 2   Education          367 non-null    object
 3   ApplicantIncome    367 non-null    int64
 4   CoapplicantIncome  367 non-null    int64
 5   Property_Area      367 non-null    object
dtypes: int64(2), object(4)
memory usage: 17.3+ KB
```

```
df_loan.describe()
```

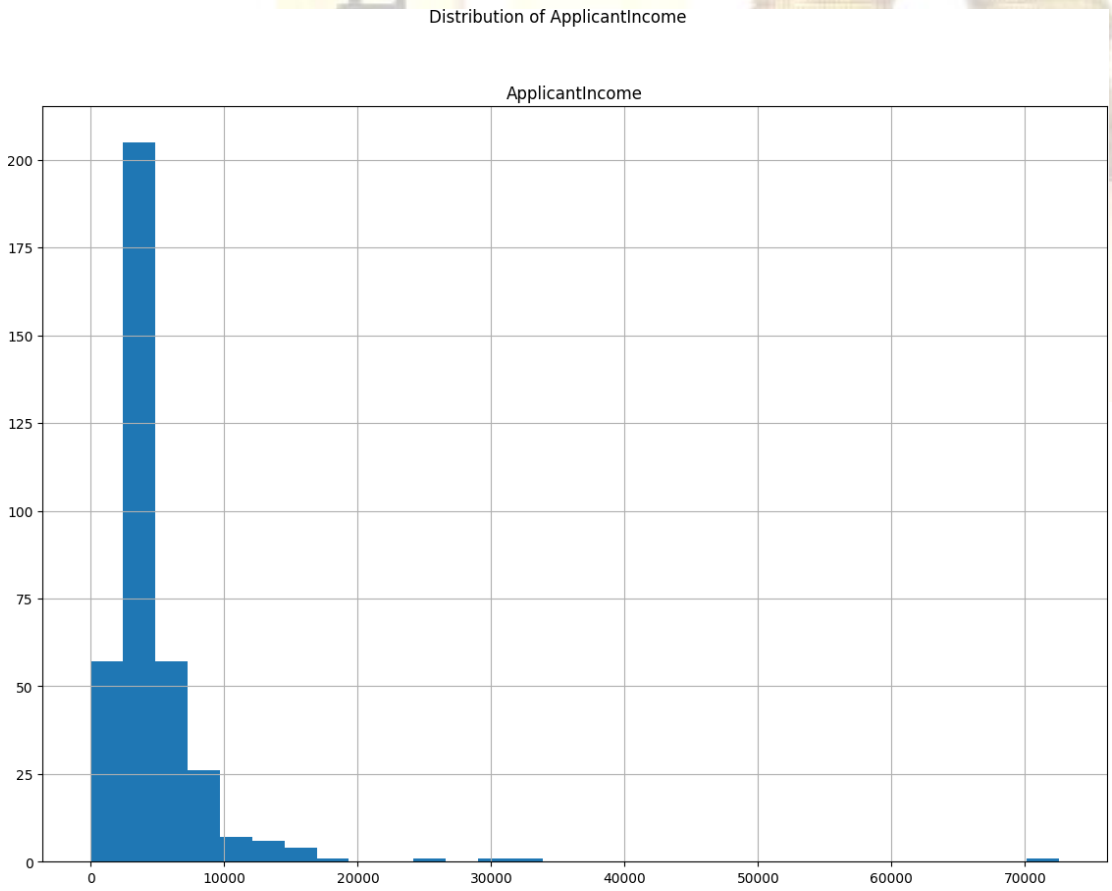
	ApplicantIncome	CoapplicantIncome
count	367.000000	367.000000
mean	4805.599455	1569.577657
std	4910.685399	2334.232099
min	0.000000	0.000000
25%	2864.000000	0.000000
50%	3786.000000	1025.000000
75%	5060.000000	2430.500000
max	72529.000000	24000.000000

All values are changed now after the using dropna command to give out new values.

Data Visualization:

Histogram:

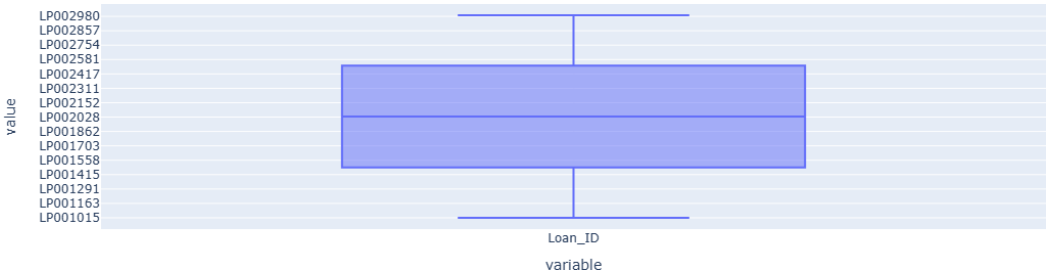
```
df_loan[['ApplicantIncome']].hist(bins=30, figsize=(14, 10))
plt.suptitle('Distribution of ApplicantIncome')
plt.show()
```



It shows the value of loan applicant according to the income of applicant in the histogram increases and decreases according to income.

Boxplot:

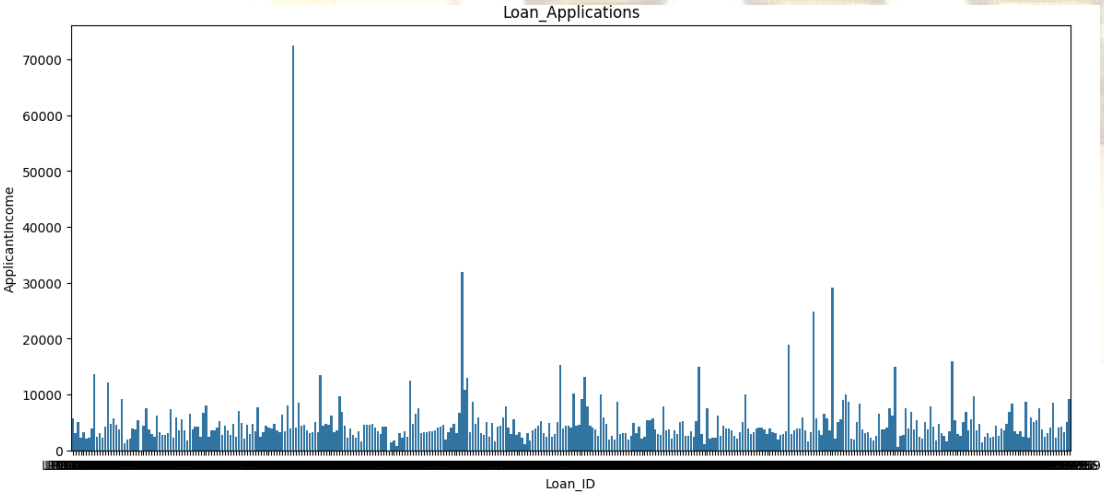
```
px.box(df_loan.Loan_ID)
```



It shows according to the Loan_id to mean ,median and mode.

Bar Plot:

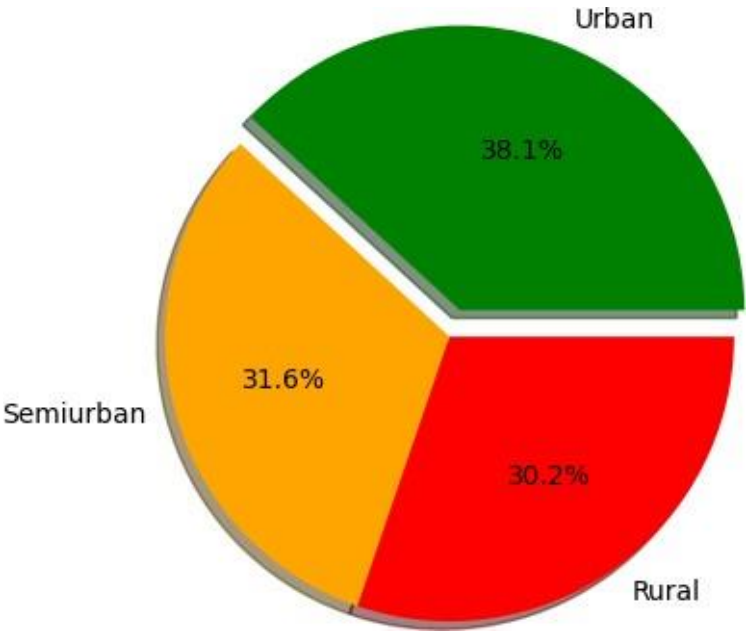
```
plt.figure(figsize=(14,6))
sns.barplot(df_loan,x='Loan_ID',y='ApplicantIncome')
plt.title('Loan_Applications')
plt.show()
```



It shows the no of Loan applications according to Loan_id as per Applicant Income.

Pie Chart:

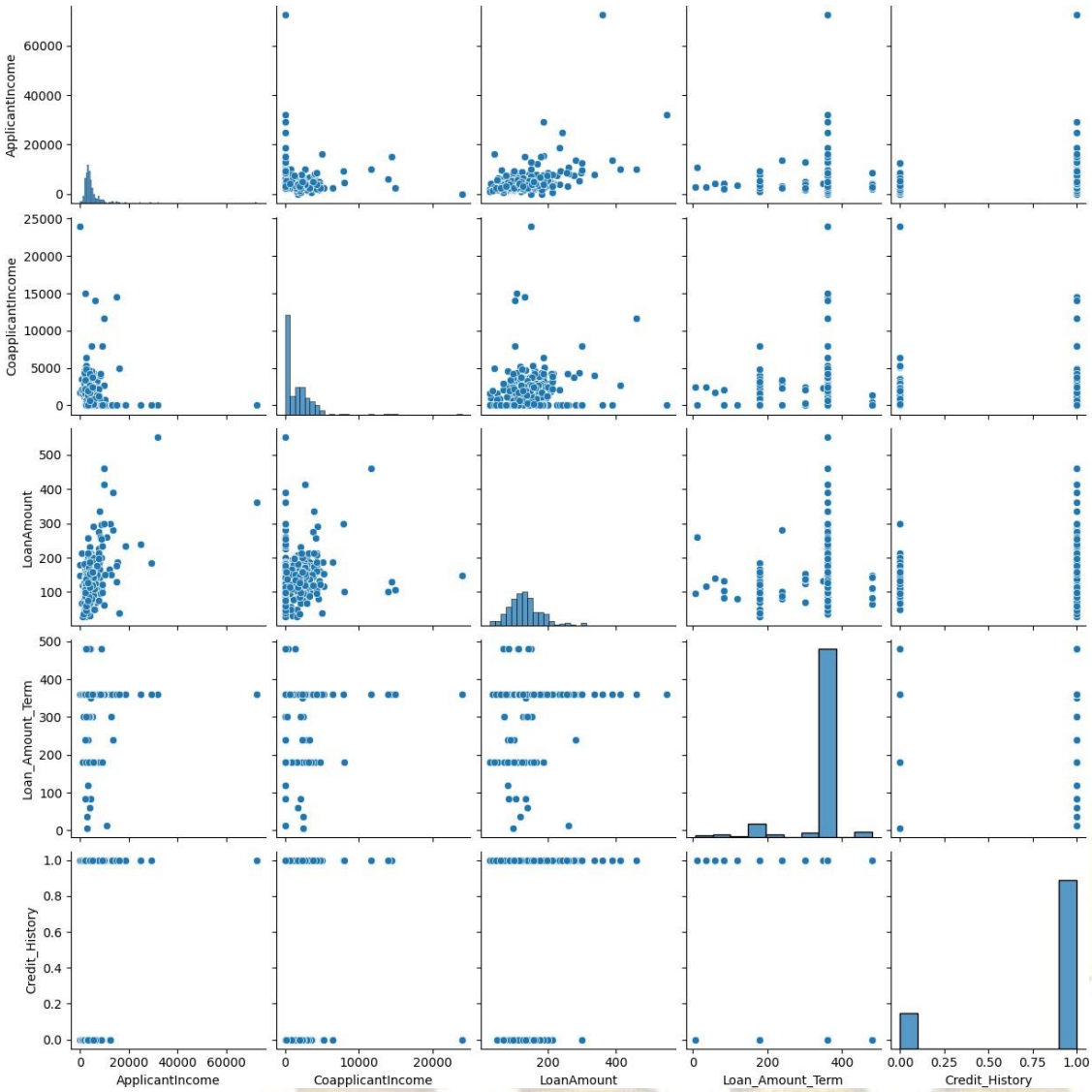
```
plt.pie(df_loan.Property_Area.value_counts(),labels=df_loan.Property_Area.value_counts().index,autopct='%1.1f%%',colors=['g','orange','r'],
        explode=[0.1,0,0],shadow=True)
plt.show()
```



It shows the property of every loan applicant as per the data set available in accordance of area shows in pie chart

Pair Plot:

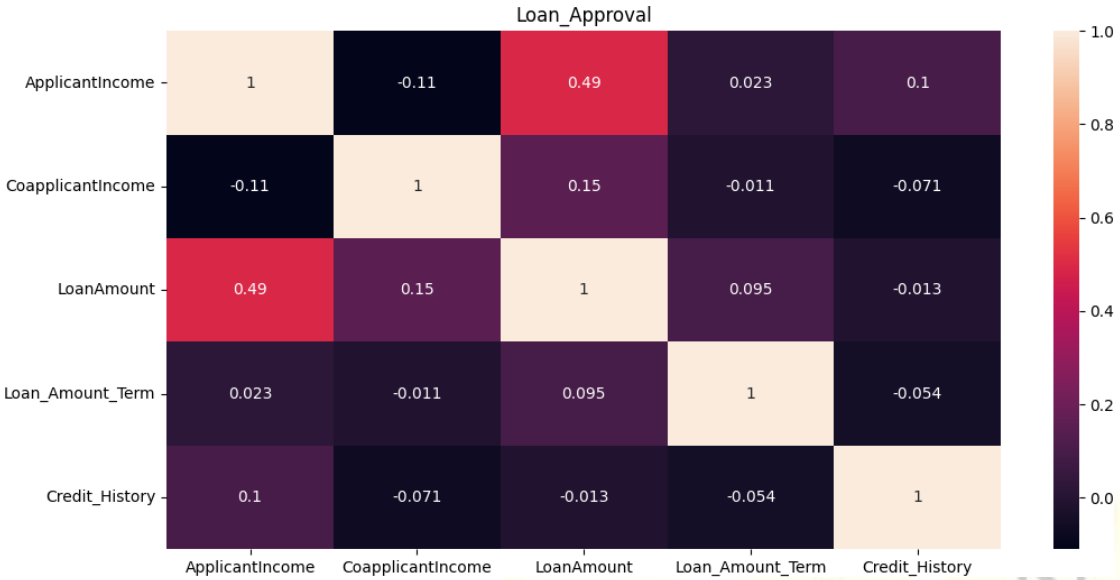
```
sns.pairplot(df_loan)
plt.show()
```



It shows all combination of all graphs in the pair plot.

Heat Map:

```
# If we want to visualize the correltion we need to create a HeatMap...
plt.figure(figsize=(12, 6))
sns.heatmap(df_loan.corr(numeric_only = True), annot=True,)
plt.title("Loan_Approval")
plt.show()
```



It shows the relation between Loan Approval all columns coordinate values each other.

Conclusion:

After the documents are verified, the lender will review the application and decide whether to approve or reject the loan. The lender will consider various factors such as the borrower's credit score, income, employment status, and loan amount before approving the loan.