Data Collection and Preprocessing Phase

Date	10 July 2024
Team ID	740015
Project Title	Credit card approval prediction using ML
Maximum Marks	6 Marks

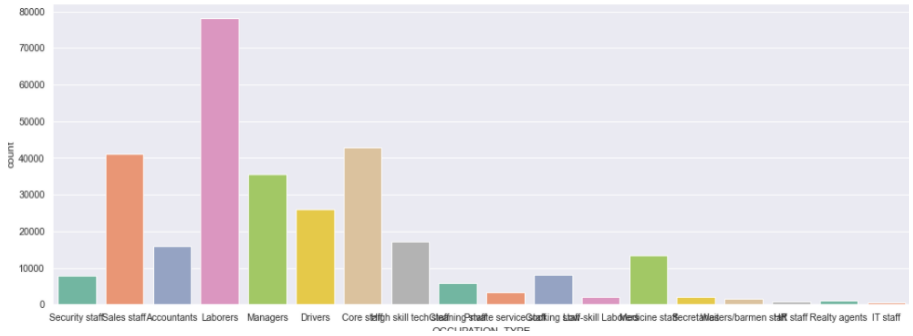
Data Exploration and Preprocessing Report

Dataset variables will be statistically analyzed to identify patterns and outliers, with Python employed for preprocessing tasks like normalization and feature engineering. Data cleaning will address missing values and outliers, ensuring quality for subsequent analysis and modelling, and forming a strong foundation for insights and predictions.

Section	Description
Data Overview	Dimension: 614 rows × 13 columns Descriptive statistics:

Feature	Count	Mean	Std	Min	25%	50%	75%	Max
ApplicantIncome	614	5403.46	6109.04	150	2877.50	3812.50	5795.00	81000
CoapplicantIncome	614	1621.25	2926.25	0	0.00	1186.50	2297.25	41667
LoanAmount	592	146.41	85.59	9	100.00	128.00	168.00	700
Loan_Amount_Term	600	342.00	65.12	12	360.00	360.00	360.00	480
Credit_History	564	0.842	0.365	0	1.00	1.00	1.00	1
Age	614	35.5	8.7	18	28.0	35.0	43.0	60
Dependents	614	0.5	0.7	0	0.0	0.0	1.0	3
Approval_Status	614	0.69	0.46	0	0.00	1.00	1.00	1

Univariate Analysis	

<table>
<tr><td></td><td> 
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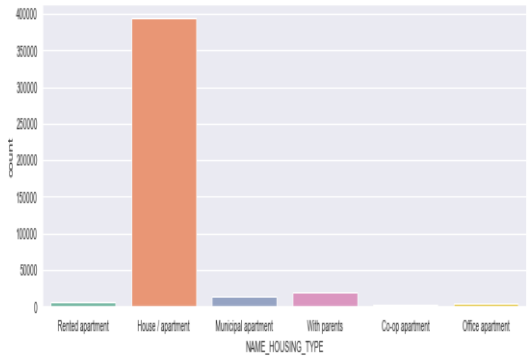
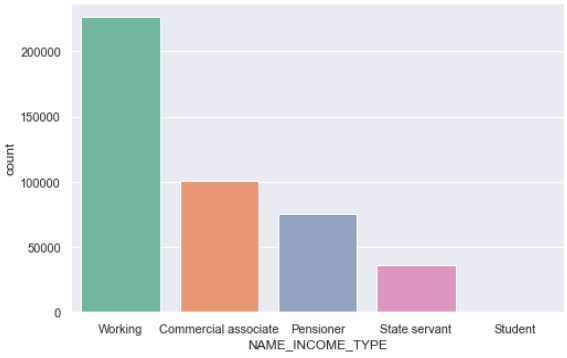
<tr><td>Bivariate Analysis</td><td> 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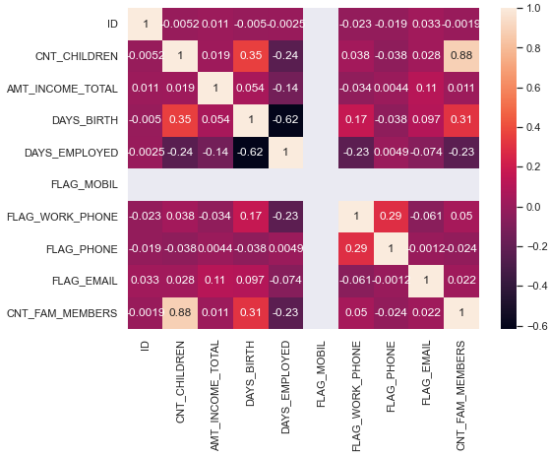
<tr><td>Multivariate Analysis</td><td> 
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Outliers and Anomalies	-
Data Preprocessing Code Screenshots	
Loading Data	
Handling Missing Data	
Data Transformation	
Feature Engineering	Attached the codes in final submission.
Save Processed Data	-

	ID	CODE_GENDER	FLAG_OWN_CAR	FLAG_OWN_REALTY	CNT_CHILDREN	AMT_INCOME_TOTAL	NAME_INCOME_TYPE	NAME_EDUCATION_TYPE	NAME_FAMILY_STATUS	NAME_HOUSING_TYPE	DAYS_BIRTH
0	5008804	M	Y	Y	0	427500.0	Working	Higher education	Civil marriage	Rented apartment	-12005
1	5008805	M	Y	Y	0	427500.0	Working	Higher education	Civil marriage	Rented apartment	-12005
2	5008806	M	Y	Y	0	112500.0	Working	Secondary / secondary special	Married	House / apartment	-21474
3	5008808	F	N	Y	0	270000.0	Commercial associate	Secondary / secondary special	Single / not married	House / apartment	-19110
4	5008809	F	N	Y	0	270000.0	Commercial associate	Secondary / secondary special	Single / not married	House / apartment	-19110

```
data['Gender'] = data['Gender'].fillna(data['Gender'].mode()[0])
data['Marital_Status'] = data['Marital_Status'].fillna(data['Marital_Status'].mode()[0])

# Replacing + with space for filling the NaN values
data['Dependents'] = data['Dependents'].str.replace('+', '')

data['Dependents'] = data['Dependents'].fillna(data['Dependents'].mode()[0])

data['Dependents'] = data['Dependents'].fillna(data['Dependents'].mode()[0])

data['Self_Employed'] = data['Self_Employed'].fillna(data['Self_Employed'].mode()[0])

data['ApplicantIncome'] = data['ApplicantIncome'].fillna(data['ApplicantIncome'].mean())

data['LoanAmount'] = data['LoanAmount'].fillna(data['LoanAmount'].mean())

data['Credit_History'] = data['Credit_History'].fillna(data['Credit_History'].mode()[0])
```

```
data['Gender'] = data['Gender'].map({'Female': 1, 'Male': 0})
data['Married'] = data['Married'].map({'Yes': 1, 'No': 0})
data['Dependents'] = data['Dependents'].map({'0': 0, '1': 1, '2': 2, '3+': 3})
data['Education'] = data['Education'].map({'Graduate': 1, 'Not Graduate': 0})
data['Self_Employed'] = data['Self_Employed'].map({'Yes': 1, 'No': 0})
data['Property_Area'] = data['Property_Area'].map({'Urban': 2, 'Semiurban': 1, 'Rural': 0})
data['Loan_Status'] = data['Loan_Status'].map({'Y': 1, 'N': 0})

# Performing feature scaling using StandardScaler
scaler = StandardScaler()
X_scaled = scaler.fit_transform(X)
```