Mini Project 4

By

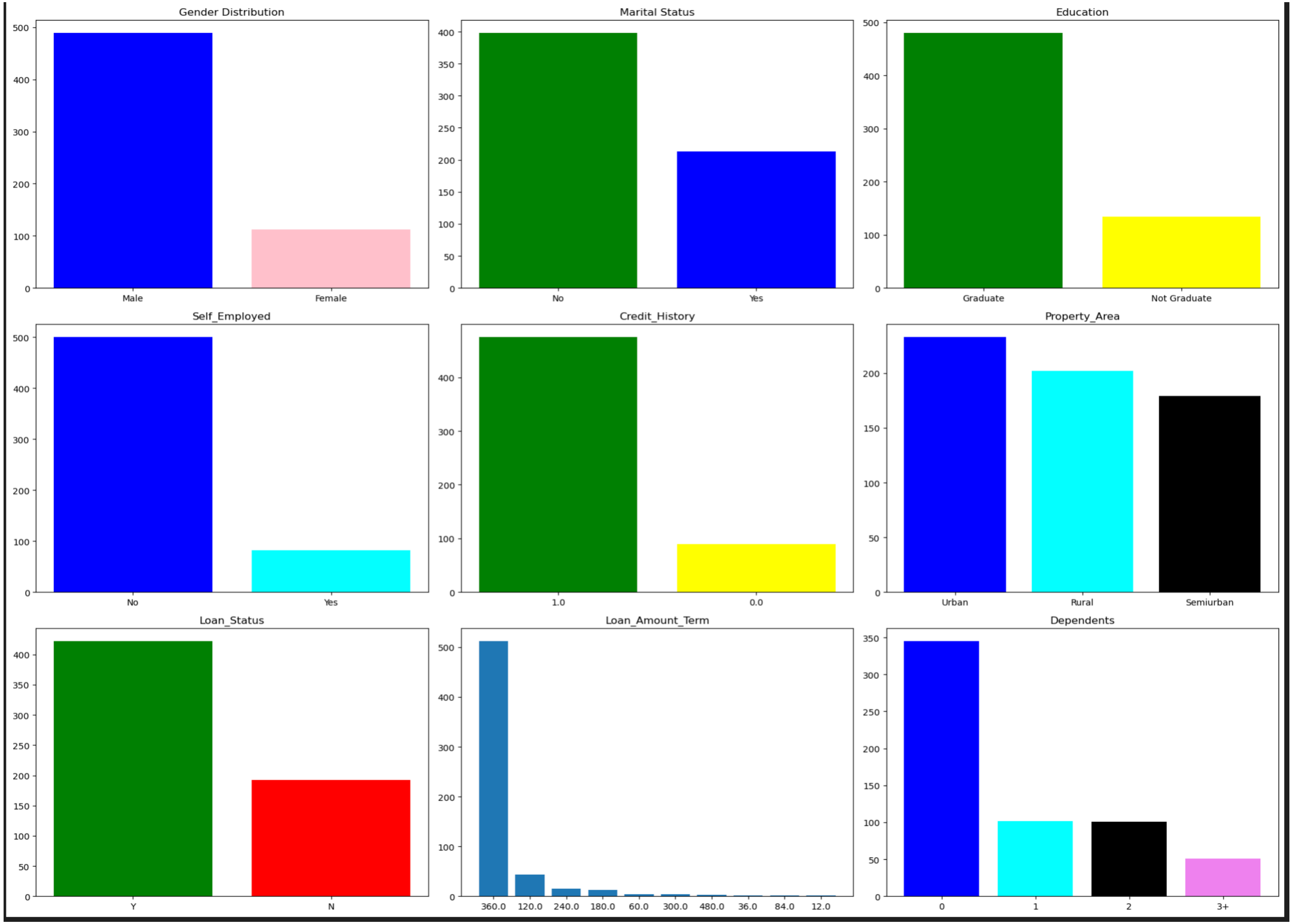
Ali Faisal Raza

Agenda

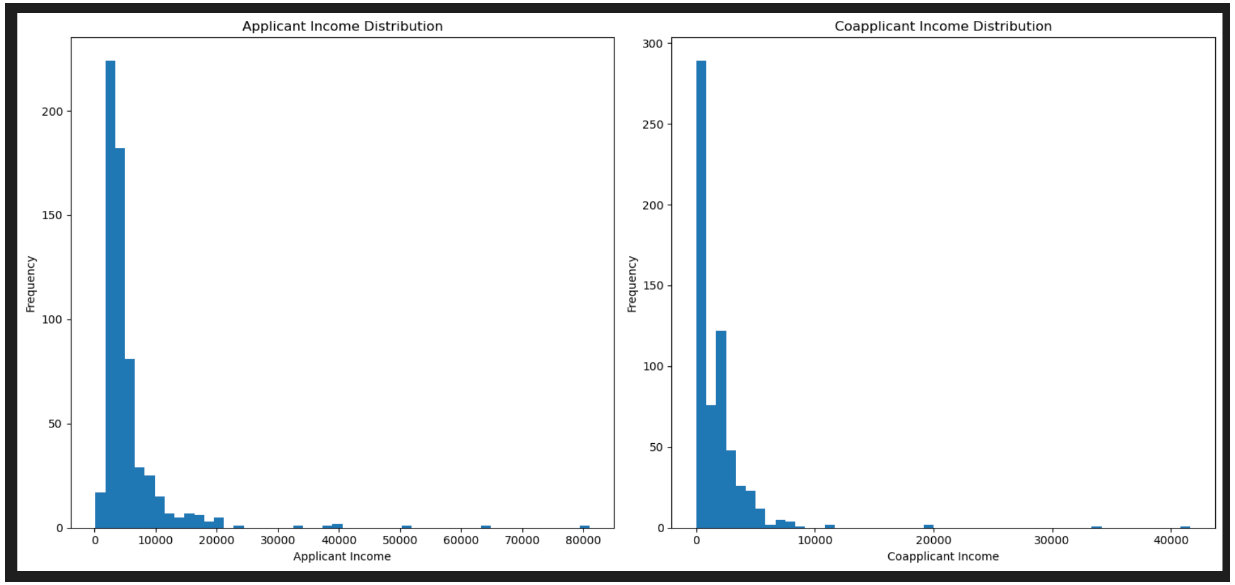
- Problem Formulation - Hypothesis
- Data Cleaning
- Final Feature Set
- Pipelining and Modeling – In progress
- Deployment of Model on Flask - upcoming
- Questions?

Notable Frequency Distributions

- Predominantly more males applicants than females.
- Majority are educated.
- Majority are salaried employees.
- Majority have no dependents.
- Majority possess credit history.
- The preference for property areas is evenly distributed.
- Majority loan terms are for 30 years.

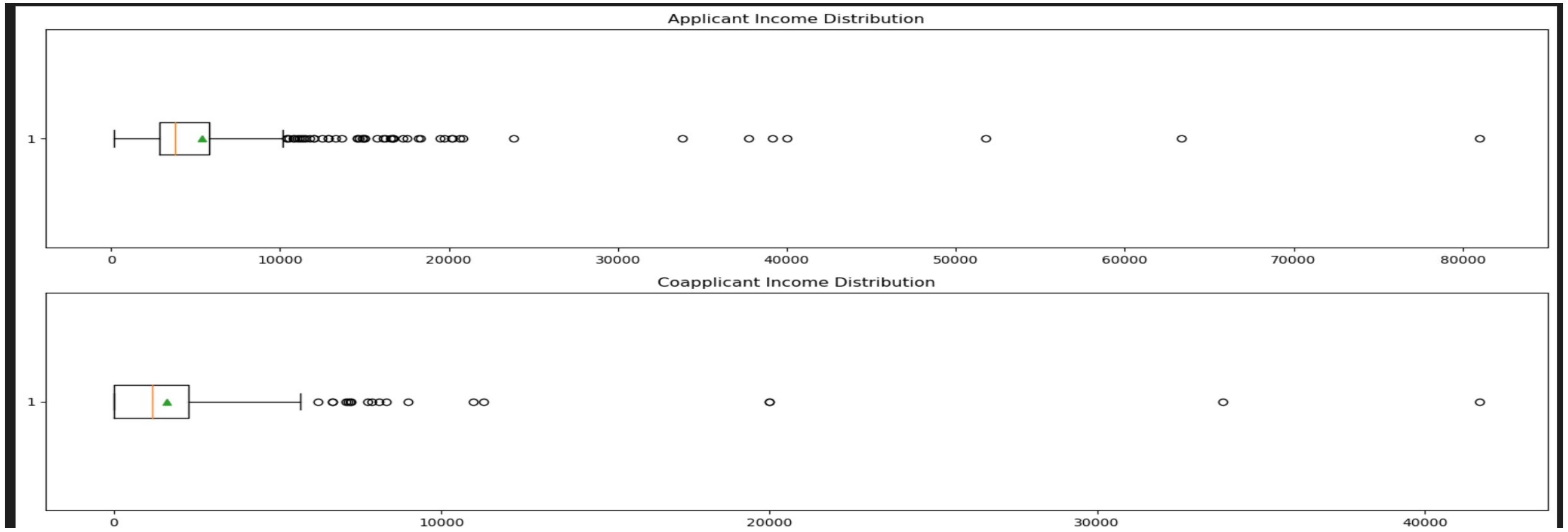


Nature of Income Distribution

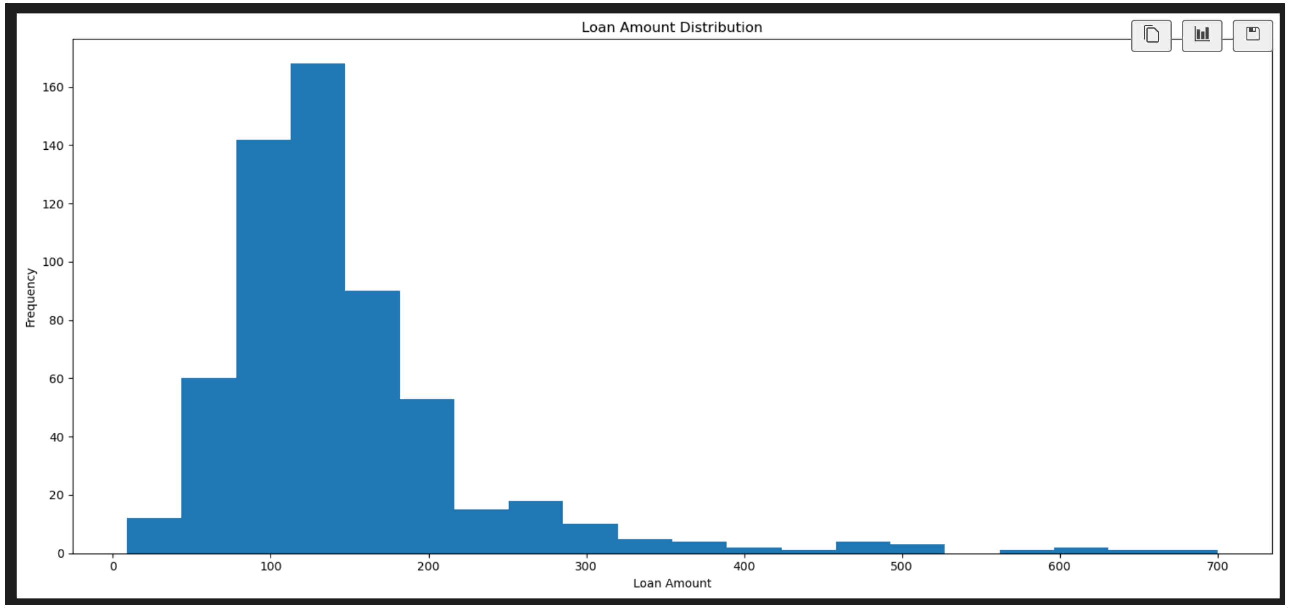


Skewed on left side.

Too many outliers.



Loan Amount Distribution



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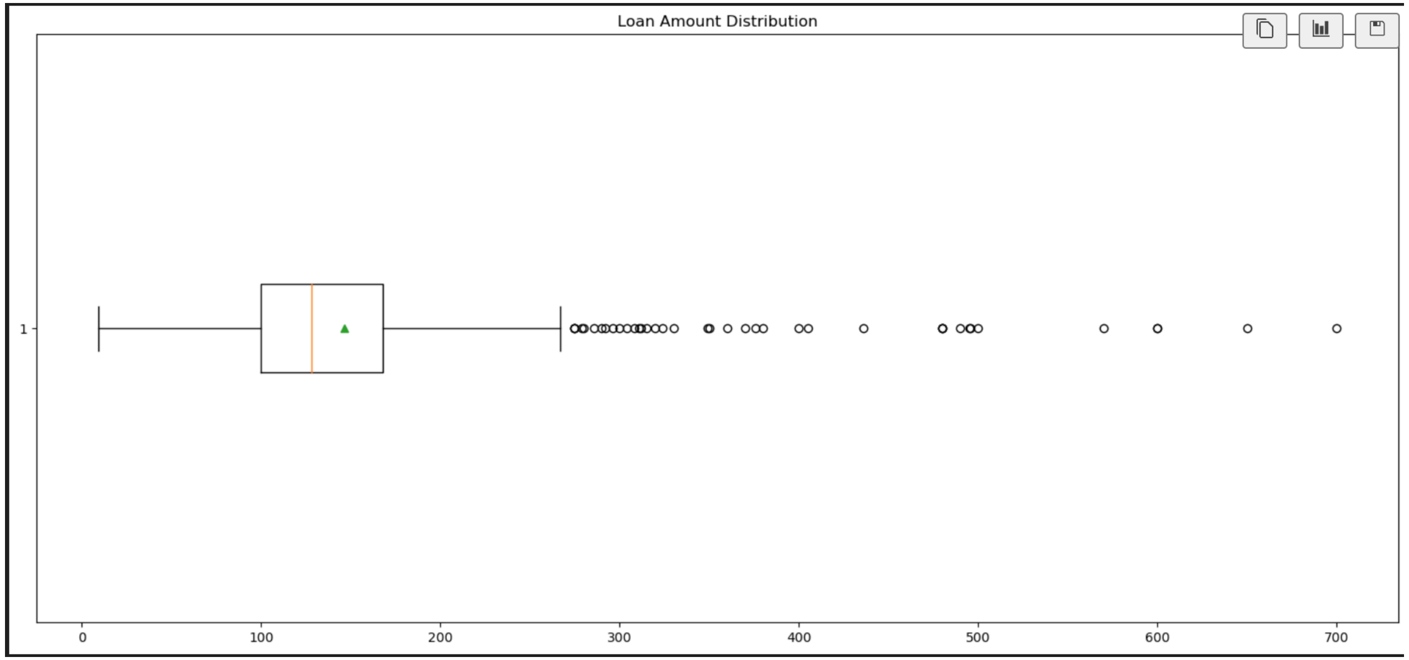


Too many outliers.

Problem Formulation and Hypothesis

To predict whether a customer is eligible for loan given his profile and requested loan amount and term.

Hypothesis:

a) Persons with high income have higher probability for loan approval.

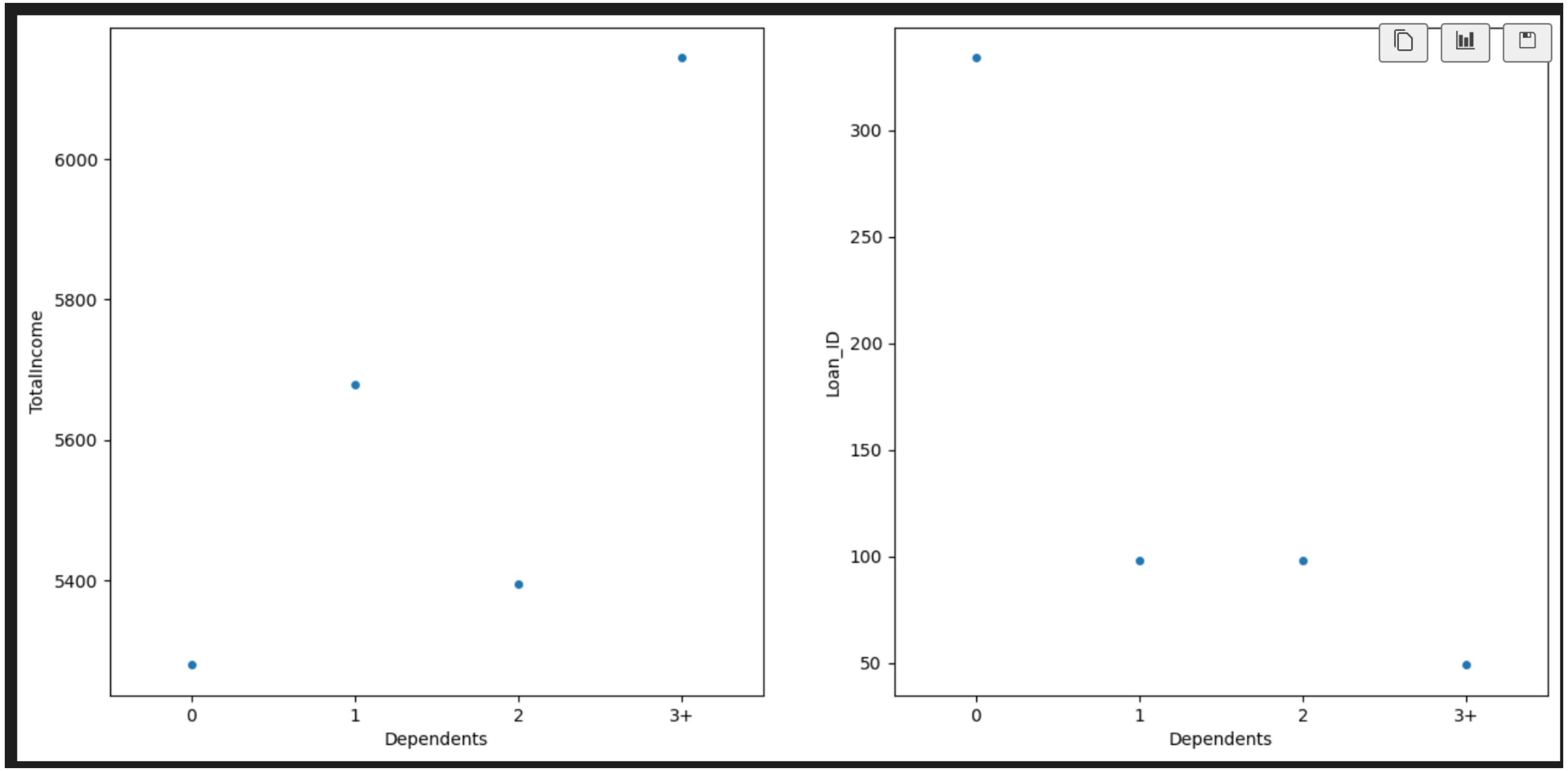
b) Person with existing credit history have higher probability for loan approval.

Data Cleaning – Imputing Missing Values

Technique:

- Correlate each affected category variable against income and infer pattern, if any.
- Impute most common value as default in case of no discernible trend.

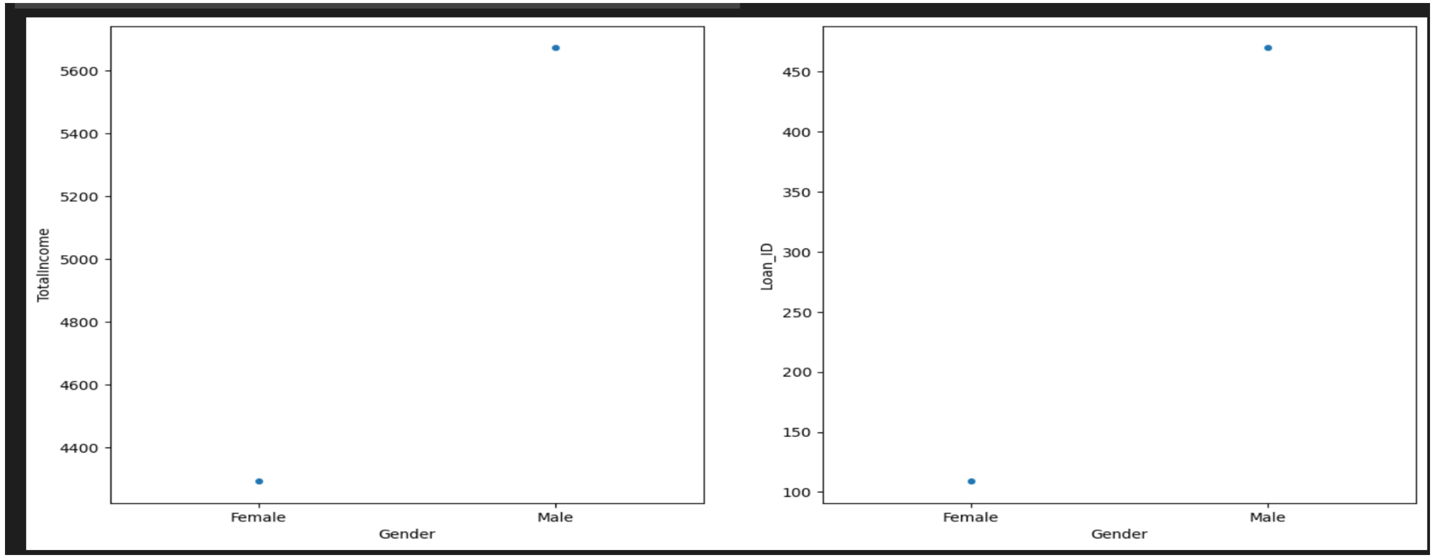
➢ Imputing missing ‘Dependents’ values



Assign all cases with total income higher than 6000 with 3+ dependents and rest with 0.

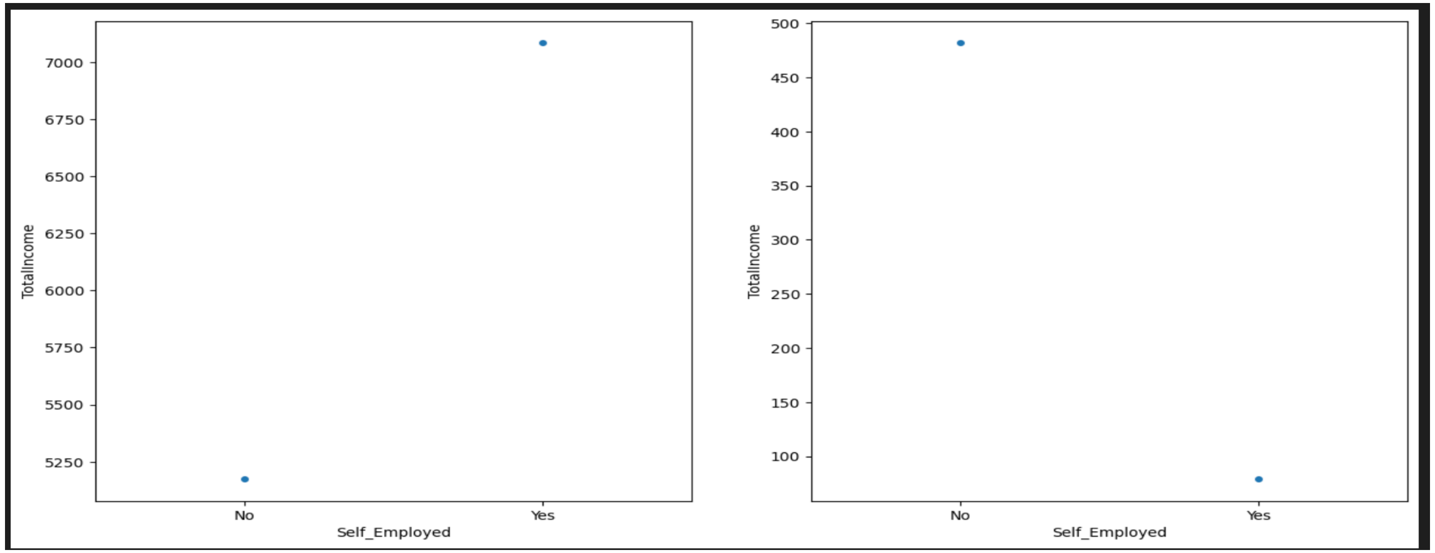
Data Cleaning – Imputing Missing Values

- Imputing ‘Gender’



Assign all cases with total income higher than 4600 under ‘Male’ bucket and rest under ‘Female’ bucket.

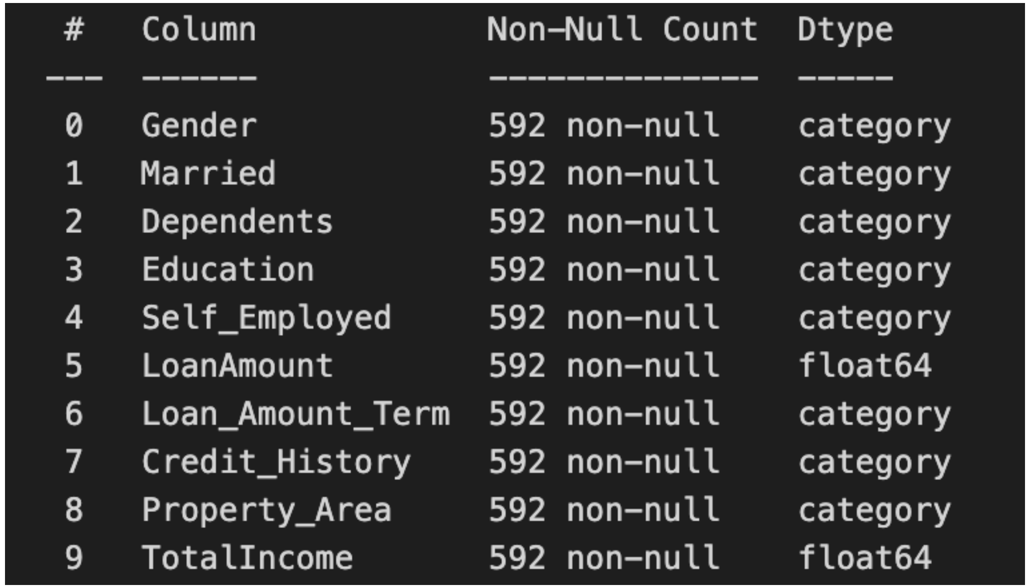
- Imputing ‘Self Employment’ factor



Assign all cases with total income higher than 6750 under ‘self-employed’ bucket and rest under ‘non self-employed’ bucket.

Final Feature Set

Input Features



```
 #   Column             Non-Null Count  Dtype
---  ------             --------------  -----
 0   Gender             592 non-null    category
 1   Married            592 non-null    category
 2   Dependents         592 non-null    category
 3   Education          592 non-null    category
 4   Self_Employed      592 non-null    category
 5   LoanAmount         592 non-null    float64
 6   Loan_Amount_Term   592 non-null    category
 7   Credit_History     592 non-null    category
 8   Property_Area      592 non-null    category
 9   TotalIncome        592 non-null    float64
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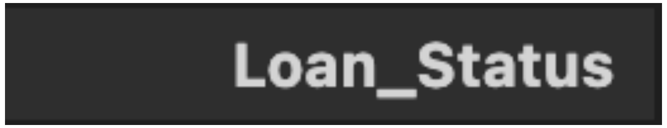
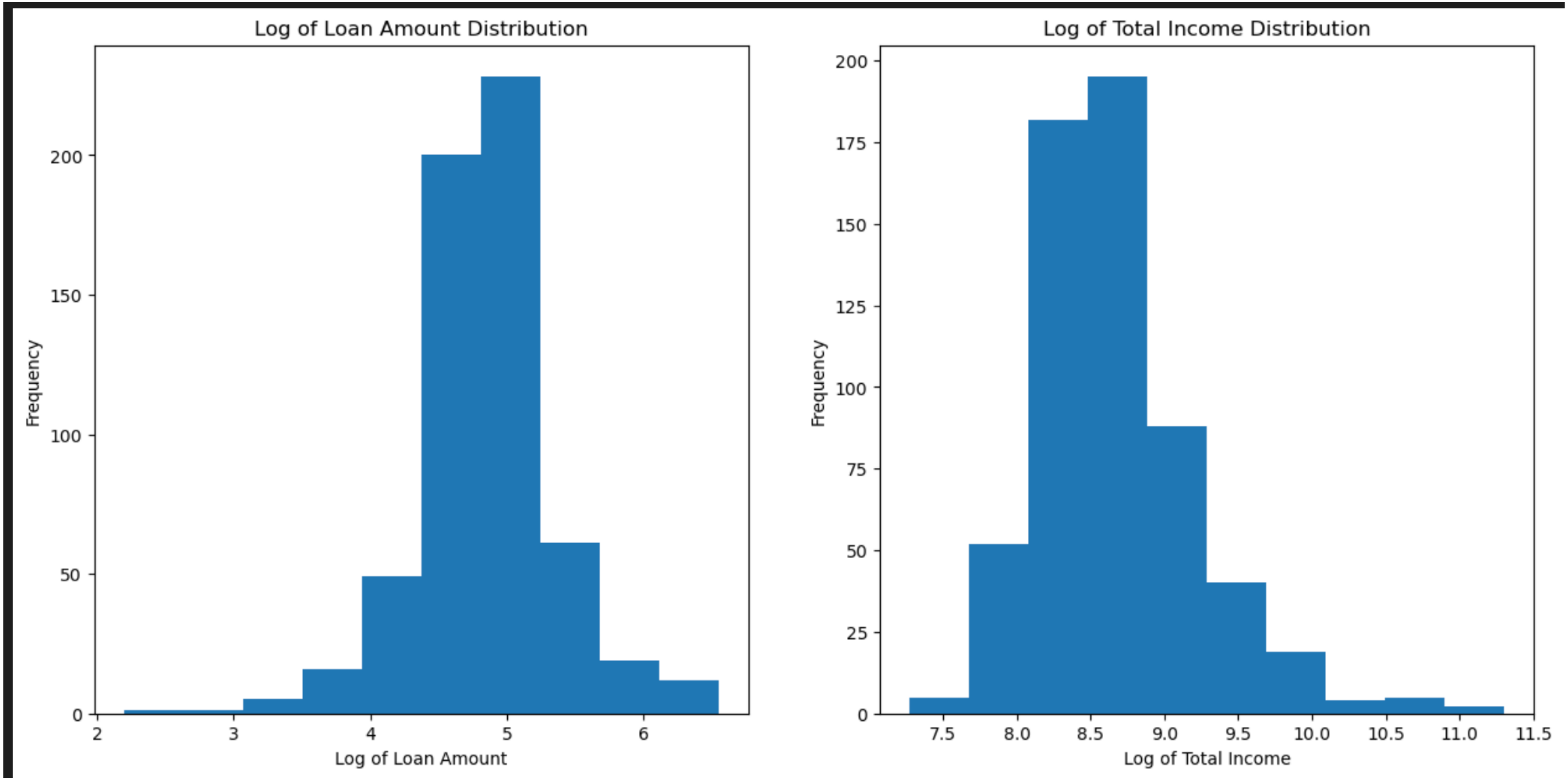
Target Variable



Loan_Status

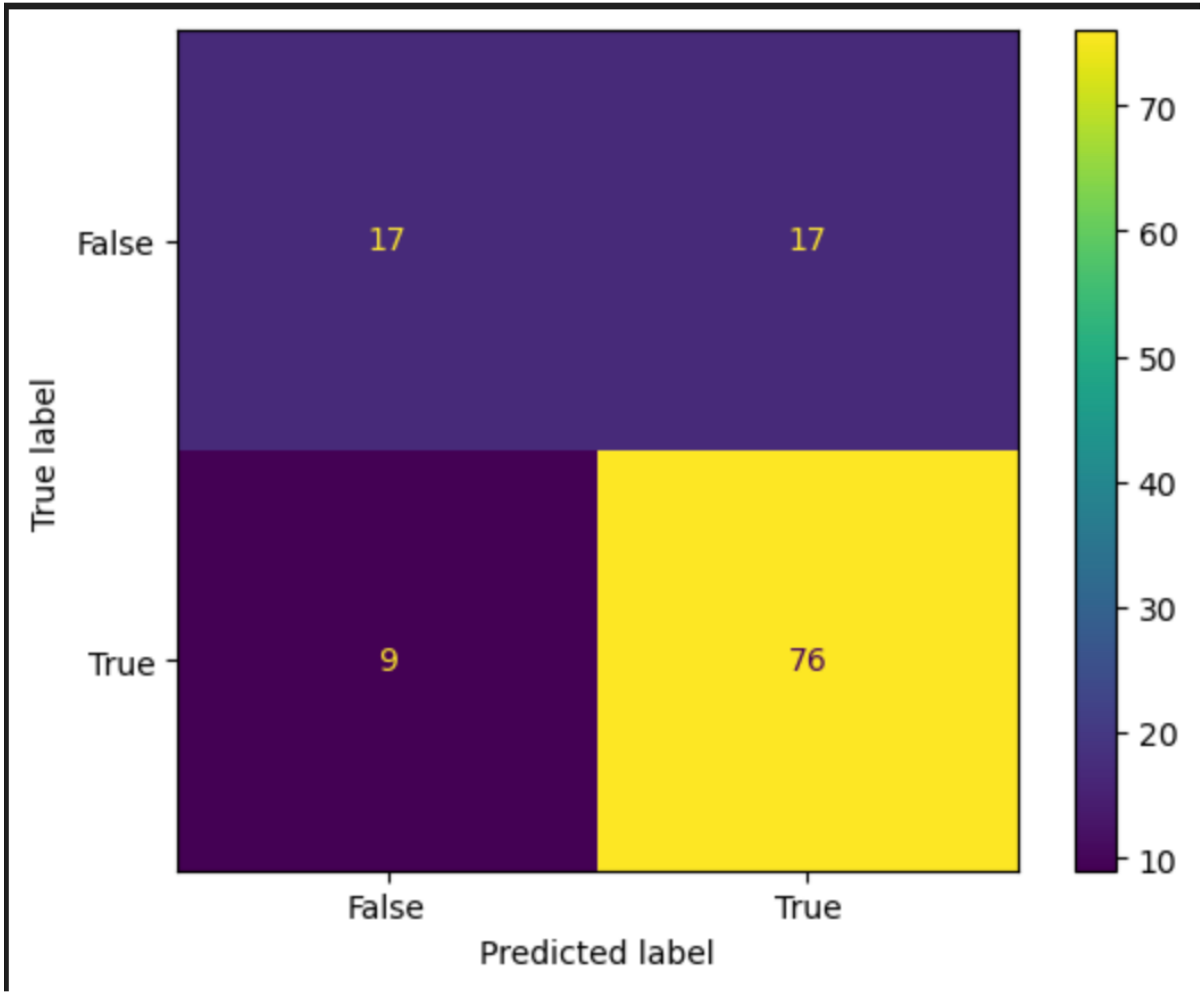
Applying Log Transformation on Income and Loan to approximate to normal distribution.



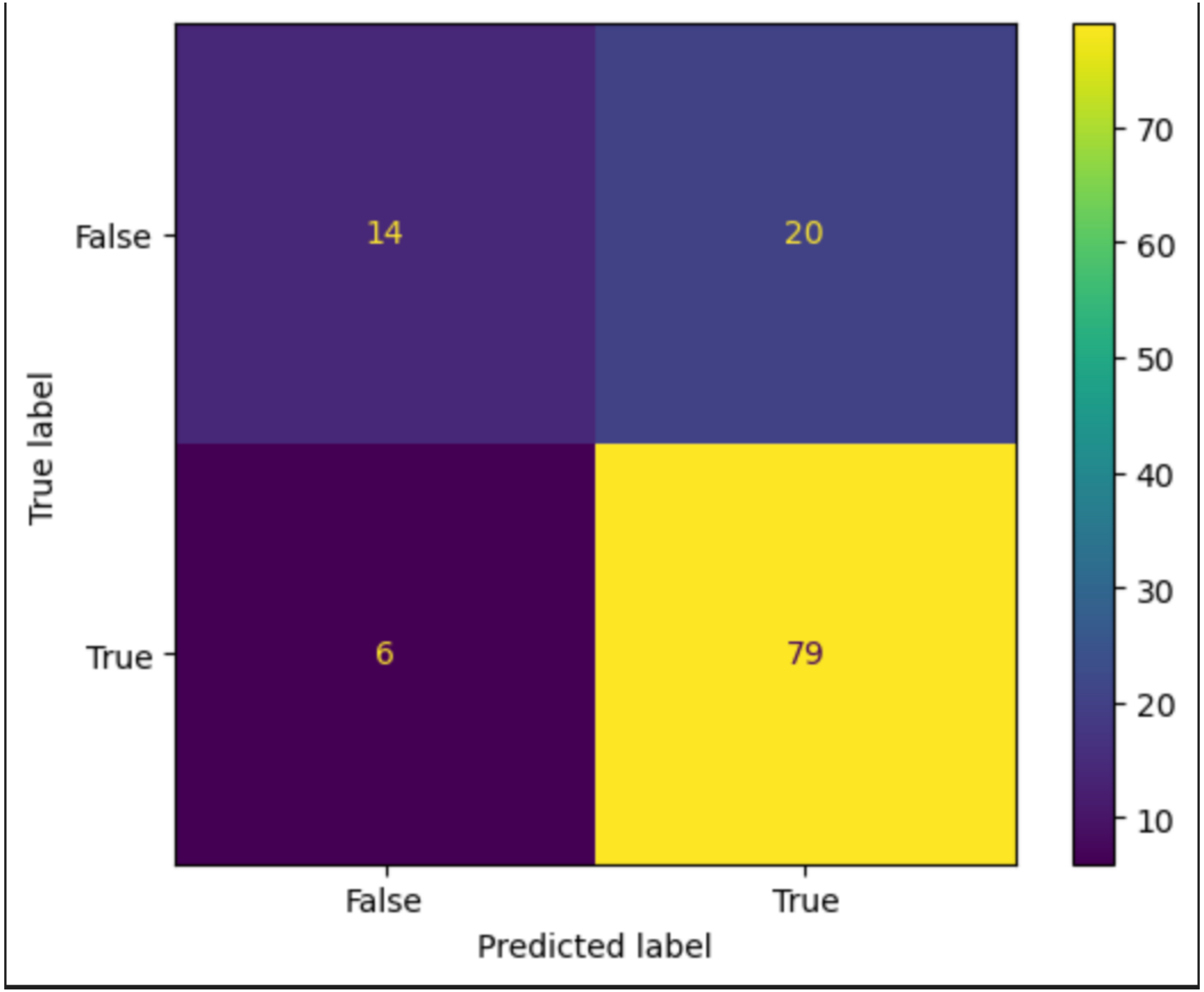
Applying Grid Search for Hyperparameter Tuning and Checking Model Accuracy

Model	Model Accuracy
Ridge Classifier	75.63%
Random Forest Classifier	78.15%
XGBoost Classifier	77.31%

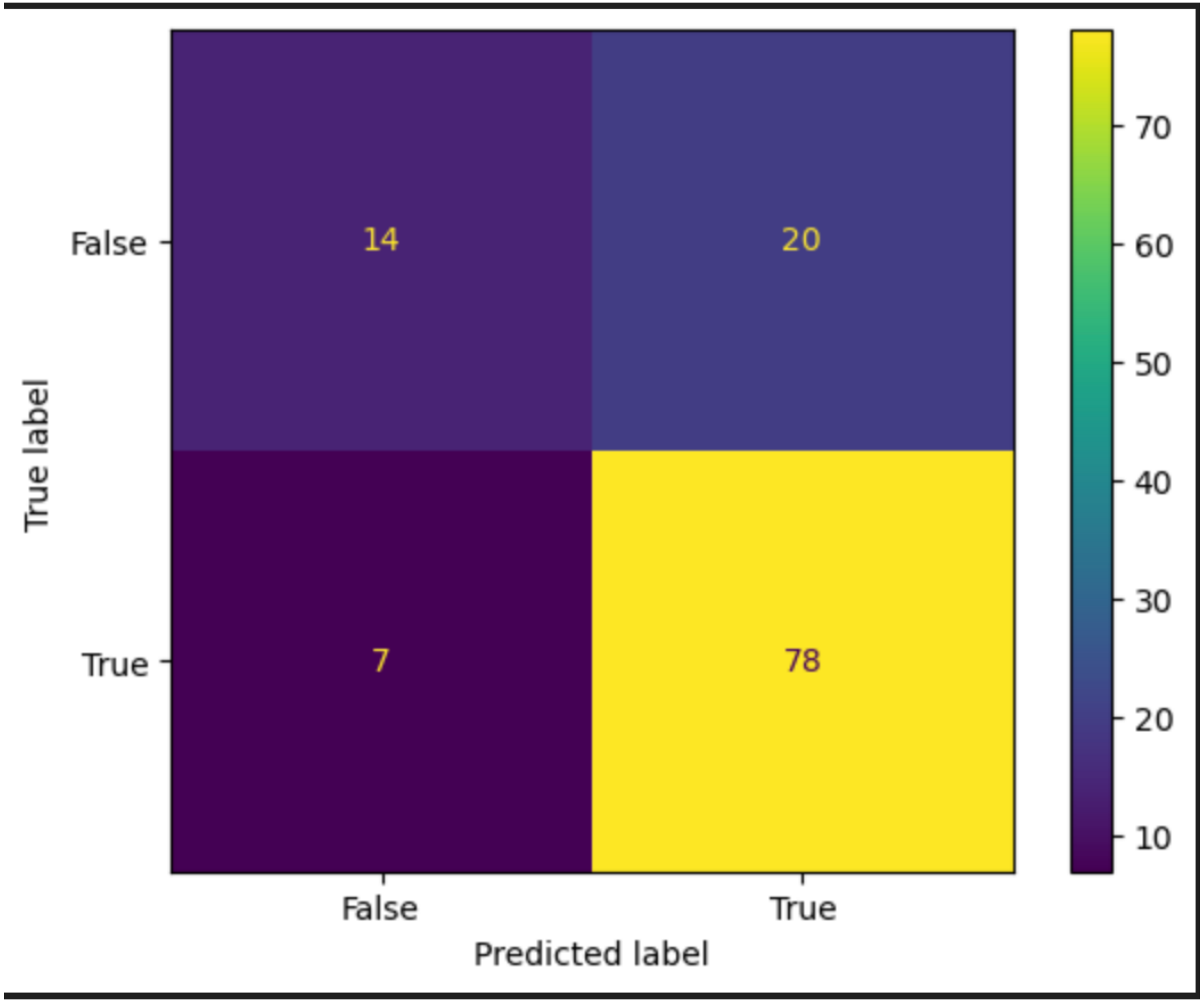
Confusion Matrix – Ridge Classifier



Confusion Matrix – Random Forest Classifier



Confusion Matrix – XGBoost Classifier



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