

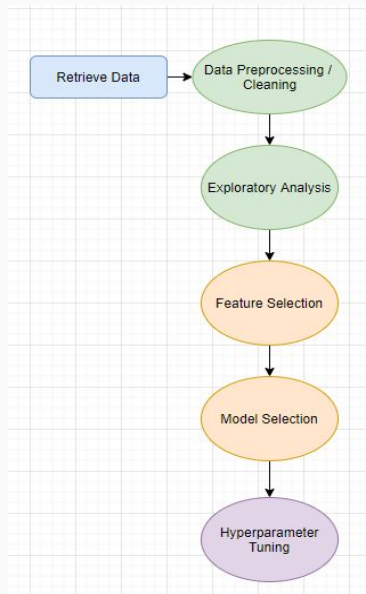
# Loan Eligibility

By: Sunny Bhandal

# Introduction

Predicting the loan eligibility of customers using supervised learning.

- **Potential Benefits:**
  - Reduce time by implementing an online approval system.
  - Opportunity to sell more products to those customers who are approved.



# Hypotheses

- Does a person's education level affect their chances of getting a loan?

- Potentially significant feature (9% difference).

Loan_Status	N	Y
Education		
Graduate	134	331
Not Graduate	47	80

- Does gender play a role in the approval of a loan?

- Potentially insignificant.

Gender	Female	Male
Loan_Status		
N	36	140
Y	73	330

- Does credit history play a role in the approval of a loan?

- Potentially significant (79% with credit history get approved).

Loan_Status	N	Y
Credit_History		
0.0	82	7
1.0	110	415

# Bias

Upsampling because of the size of the dataset.

- The dataset mostly contains male customers (81%).
- The dataset mostly contains customers that are not self-employed (86%).
- The dataset mostly contains customer who have graduated (79%).
- The dataset mostly contains customers with a credit history (85%).

# Data Handling

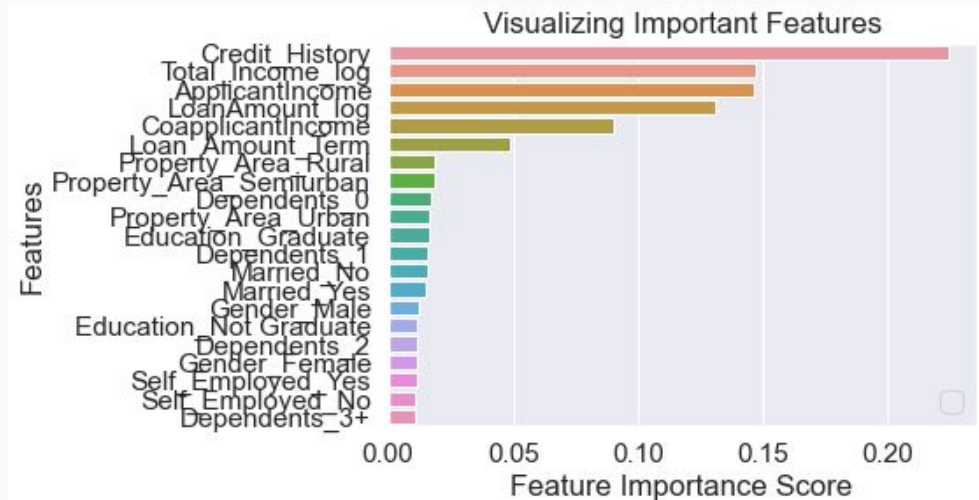
- Use mean/mode methods to fill missing data.
- Log transformations on numerical data that is highly skewed.
- Standard Scaler transformation on the remaining numerical data.
- Create subsamples based on different criteria to limit bias (gender, education, etc.).
- Encode categorical variables.

# Initial Results

**Model Accuracy:** 78.4%

**Classifier:** Random Forest Classifier

**Feature Importance:**



# Adjusted Model

**Model Accuracy:** 73.0%

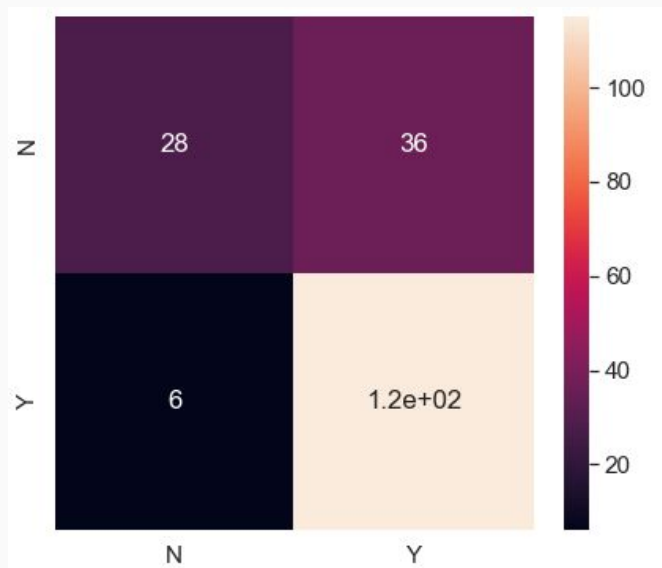
**Classifier:** Random Forest Classifier

**Selection Method:** SelectKBest

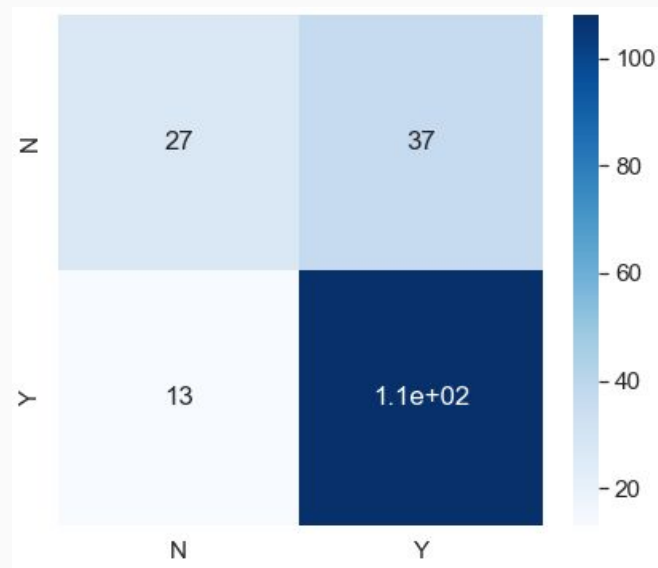
- Performance is worse without all variables.

# Comparisons

Before



After





# Deployment Model

**Model Accuracy:** 71.4%

**Classifier:** Random Forest Classifier



# Deployment Model

Data:

```
json_data = {'Gender': 'Female',  
             'Married': 'Yes',  
             'Dependents': '2',  
             'Education': 'Graduate',  
             'Self_Employed': 'No',  
             'ApplicantIncome': 3500.0,  
             'CoapplicantIncome': 4000.0,  
             'LoanAmount': 160.0,  
             'Loan_Amount_Term': 360.0,  
             'Credit_History': 1.0,  
             'Property_Area': 'Urban'}
```

Output:

[[0.27, 0.73]]

(73% chance of approval)

# Challenges

- PIPELINES
- Time (handling errors, bias, model performance)

# Conclusion

Credit History and Total Income were the most significant features for predicting loan approval.