

# **Lending Club Data Analysis and Modeling**



Capstone 2, Meskerem Goshime  
Springboard Data Science Program

September 22, 2022

# Data Wrangling and Data Cleaning

- I started with loan data from 2007-2015 with 72 columns and 759,339 rows.
- Columns with 50,00 or more missing values were dropped.
- After that, rows with missing values were dropped.
- Columns with redundant data were dropped.
- Null values were imputed with 0 where it made sense.
- Combined similar values in some columns.
- In the end I selected 10 columns based on my data exploration and using Feature Importance.

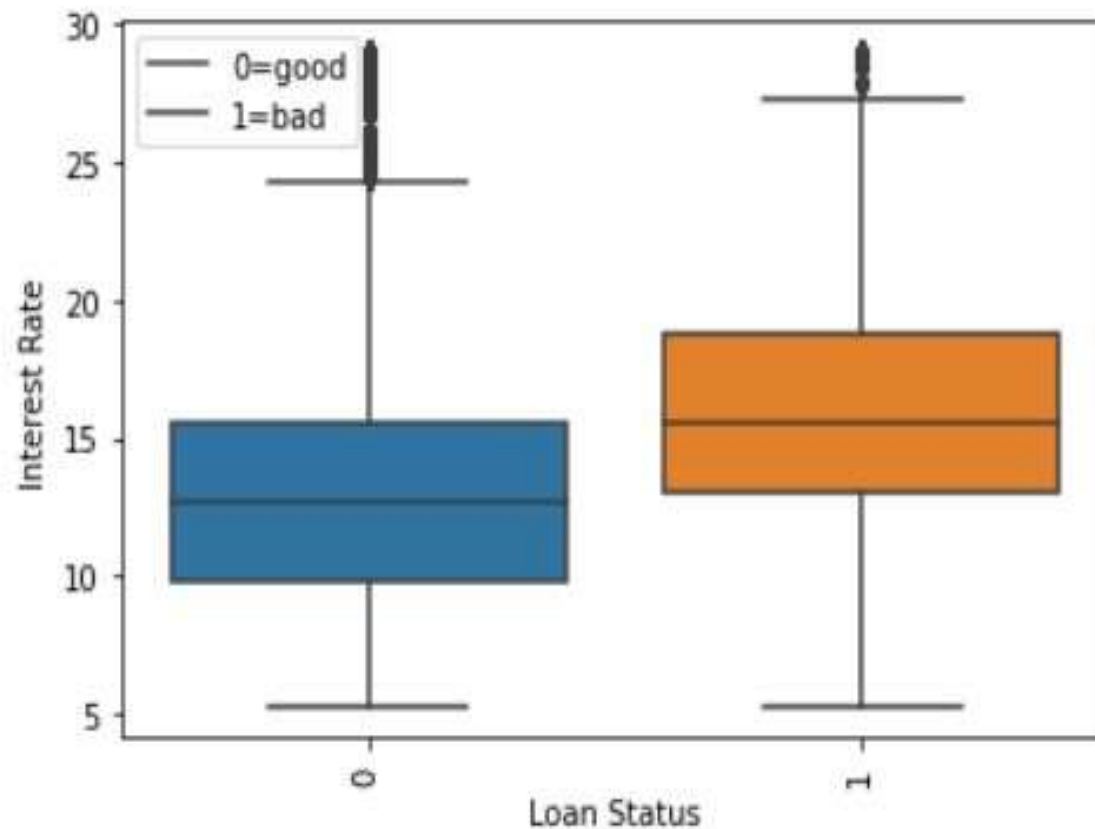
## Outliers Handling

- The most significant outliers were in annual\_inc and dti columns.
- Rows with values beyond the 99.7 percentile in the respective columns were removed.

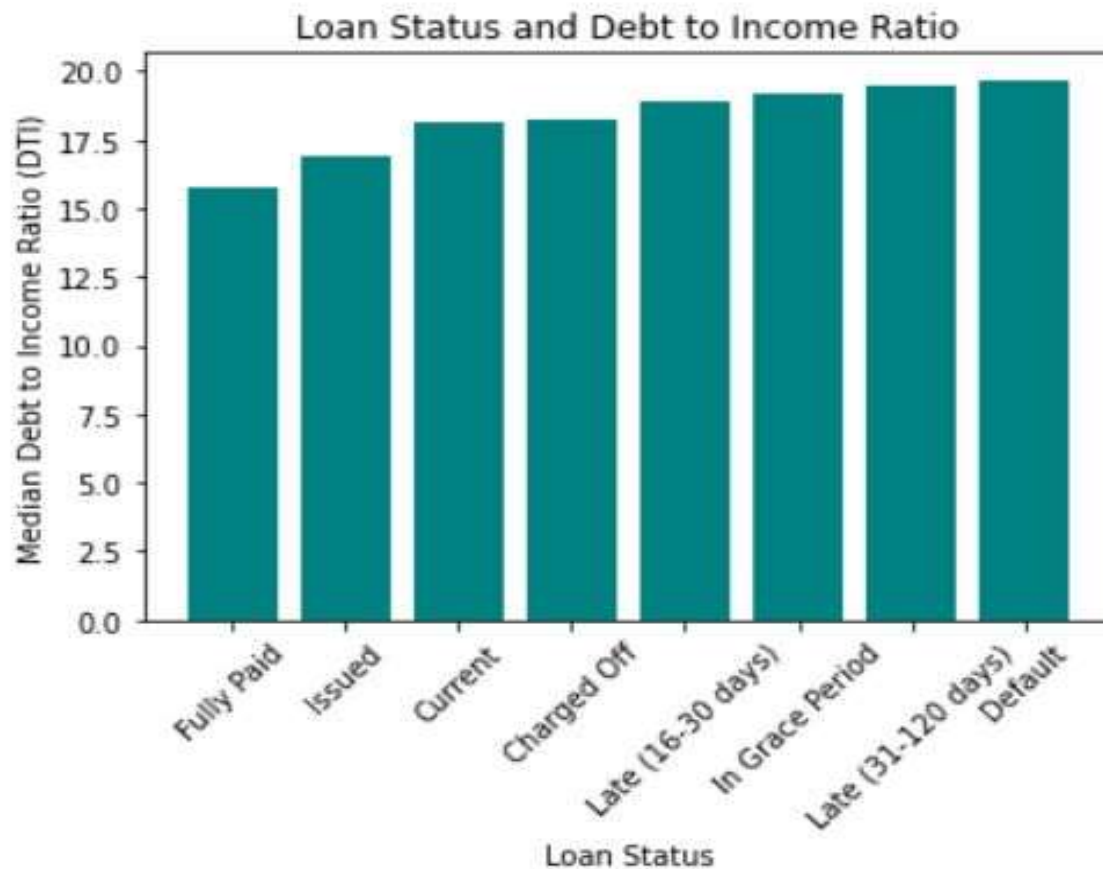
# Preprocessing & Training Data Development

- Target and Predictor Variables.
  - ◆ Loan status was chosen as the target variable (y).
  - ◆ The rest of the columns became the predictor variables (X).
- Grade and sub-grade columns were encoded as numeric columns.
- The numeric columns were standardized using StandardScaler.
- The Categorical columns were encoded using One Hot Encoding.
- The data was split into Training Set, X\_train, y\_train (80%) and Test Set, X\_test, y\_test (20%).

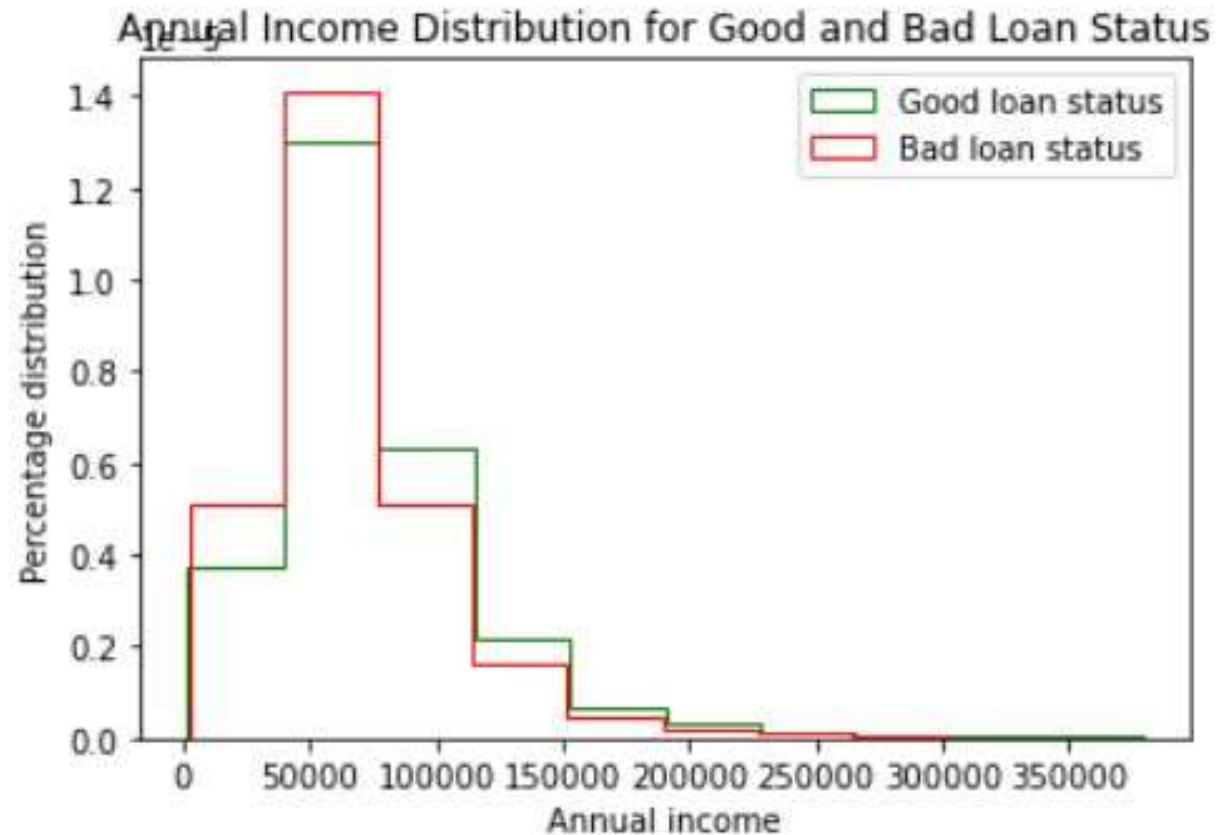
# EDA - Interest Rate of Borrowers in Bad Loan Status is Significantly Higher



# EDA - Bad Loan Statuses Correspond with Higher Median DTI Value



# EDA - Lower DTI Corresponds with Higher Annual Income



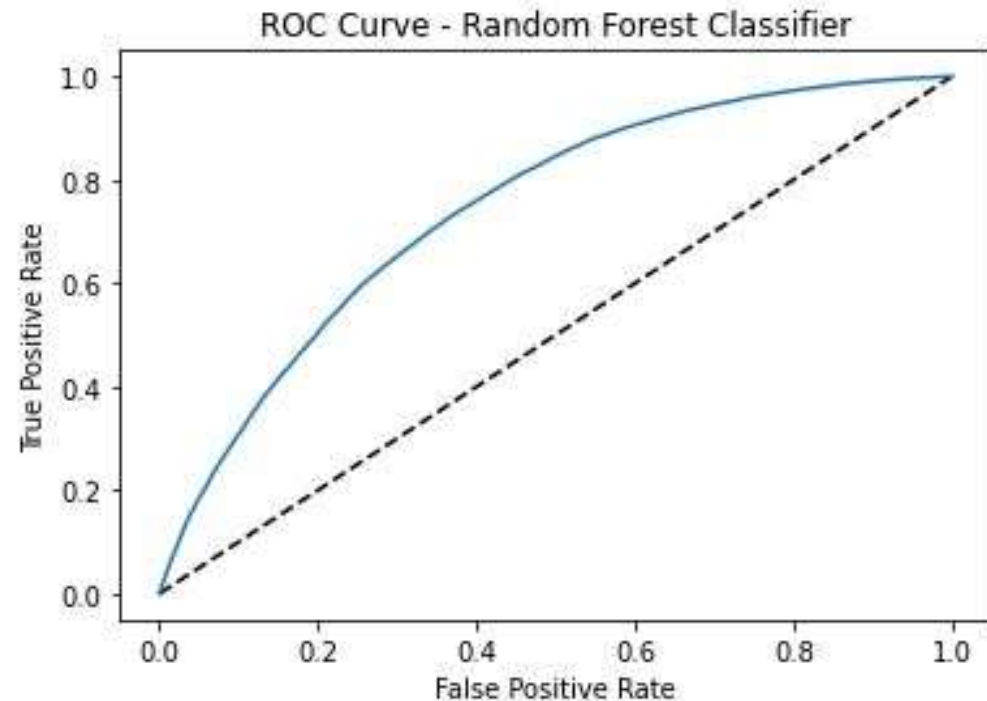
## EDA - Zip Codes with Highest Default Ratio

Zip Code	Loans in Bad Status	Loan Count	% in Bad Status
415xx	12	75	0.160
736xx	12	83	0.144
237xx	26	191	0.136
126xx	28	209	0.133
638xx	20	154	0.129
668xx	13	105	0.123



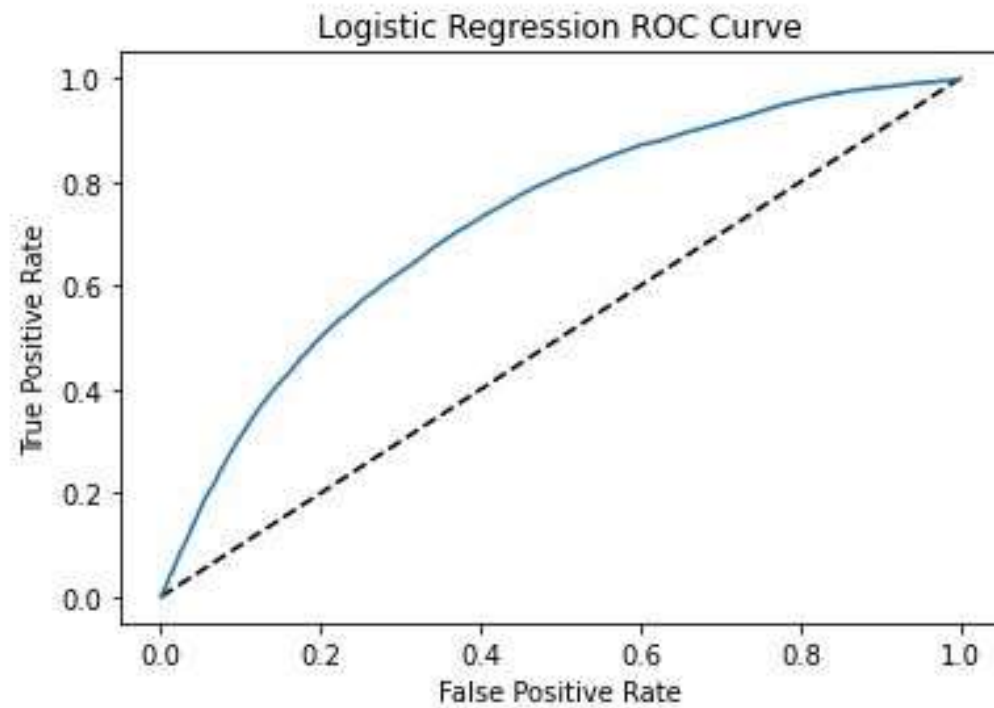
# Modeling - Random Forest Classifier

- Chosen n-estimator value: 500
- ROC/AUC Score: 0.74



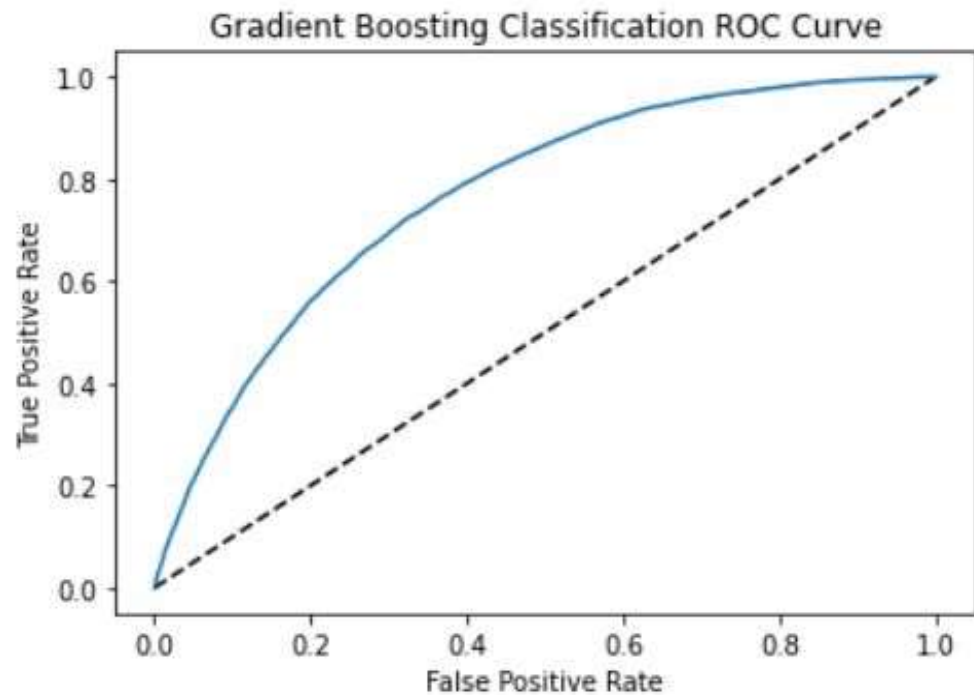
# Modeling - Logistic Regression

→ ROC/AUC Score: 0.72



# Modeling - gradient Boosting

- n\_estimator value: 600
- Max\_depth: 3
- ROC AUC Score: 0.77



# Project Files

Project Notebooks  
Model Metrics File  
Project Report

## Special Thanks

- For Husain Battiwala for making [the data available on Kaggle!](#)
- For Tony Paek for his amazing mentorship!
- For my husband and boys for their encouragement and support!