Lending Club Data Analysis and Modeling

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Springboard Data Science Program

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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.

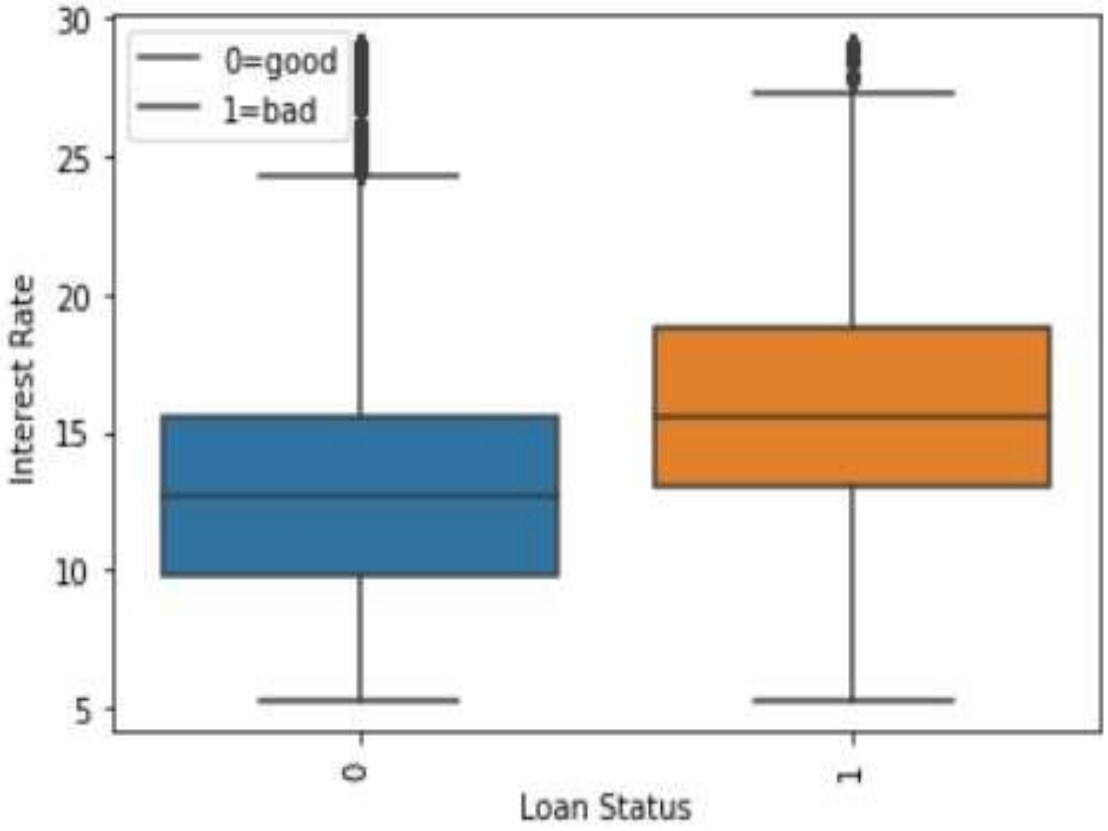
Outliers Handling

- ➔ 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.

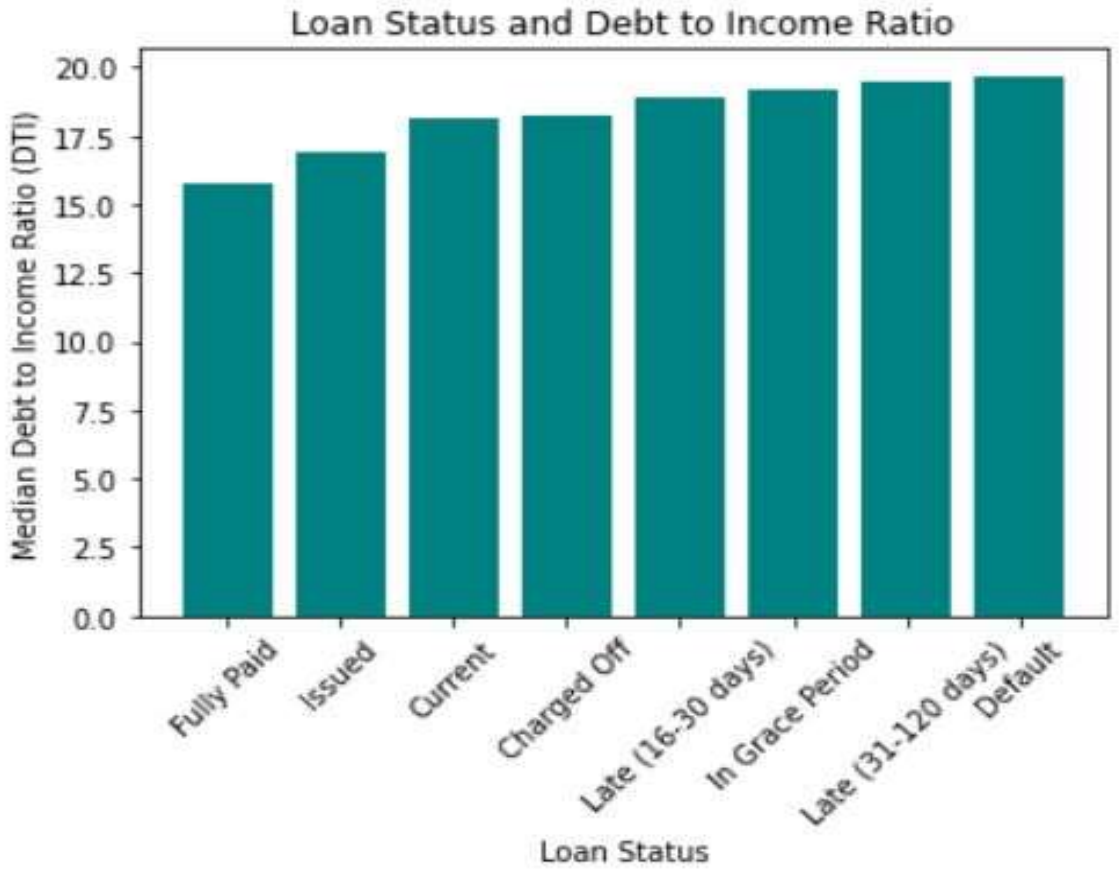
Preprocessing & Training Data Development

- 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 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%).

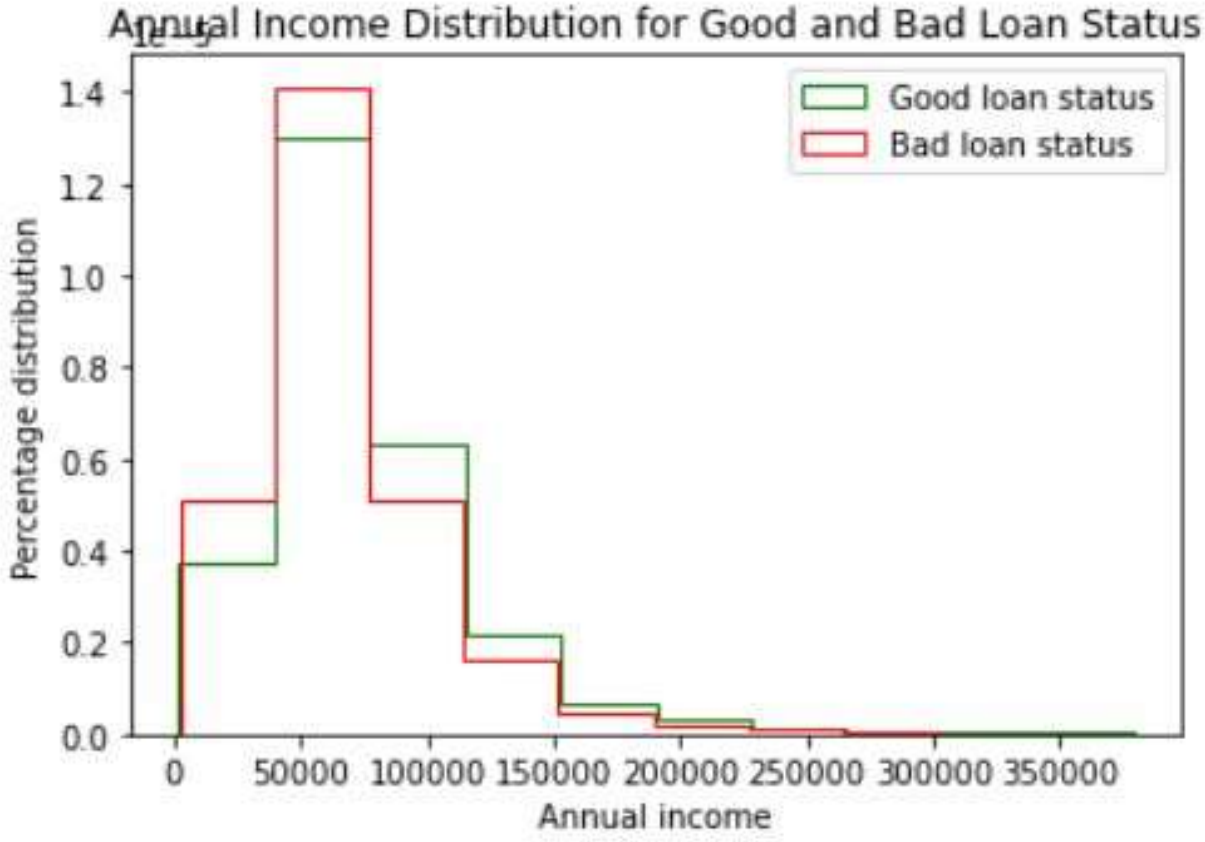
EDA - Interest Rate of Borrowers in Bad Loan Status is Significantly Higher



EDA - Bad Loan Statuses Correspond with Higher Median DTI Value



EDA - Lower DTI Corresponds with Higher Annual Income

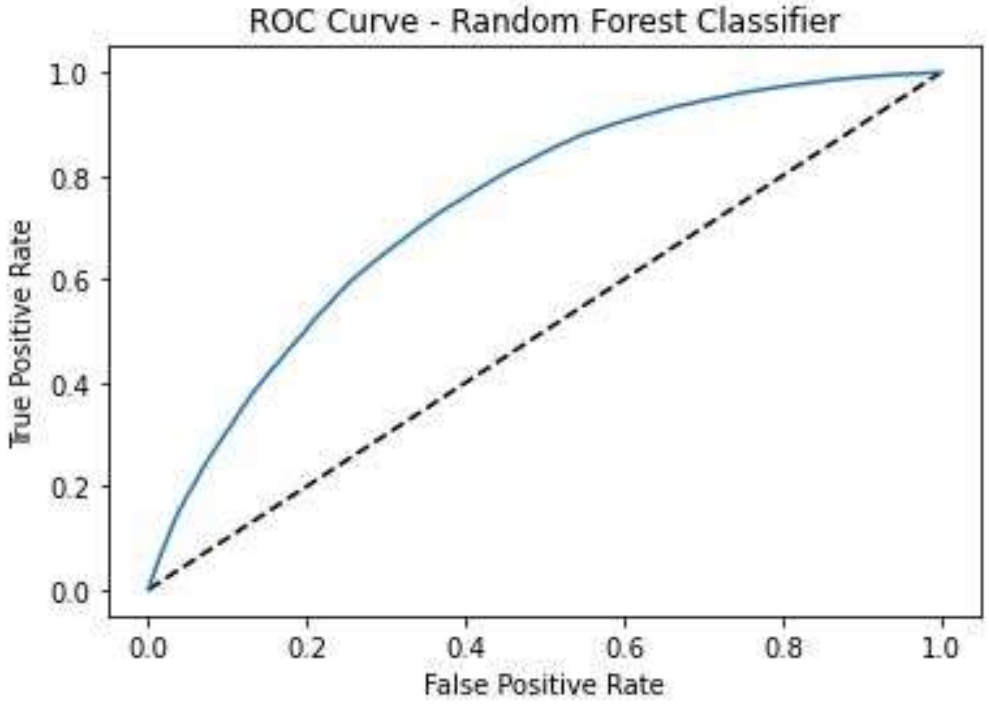


EDA - Zip Codes with Highest Default Ratio

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

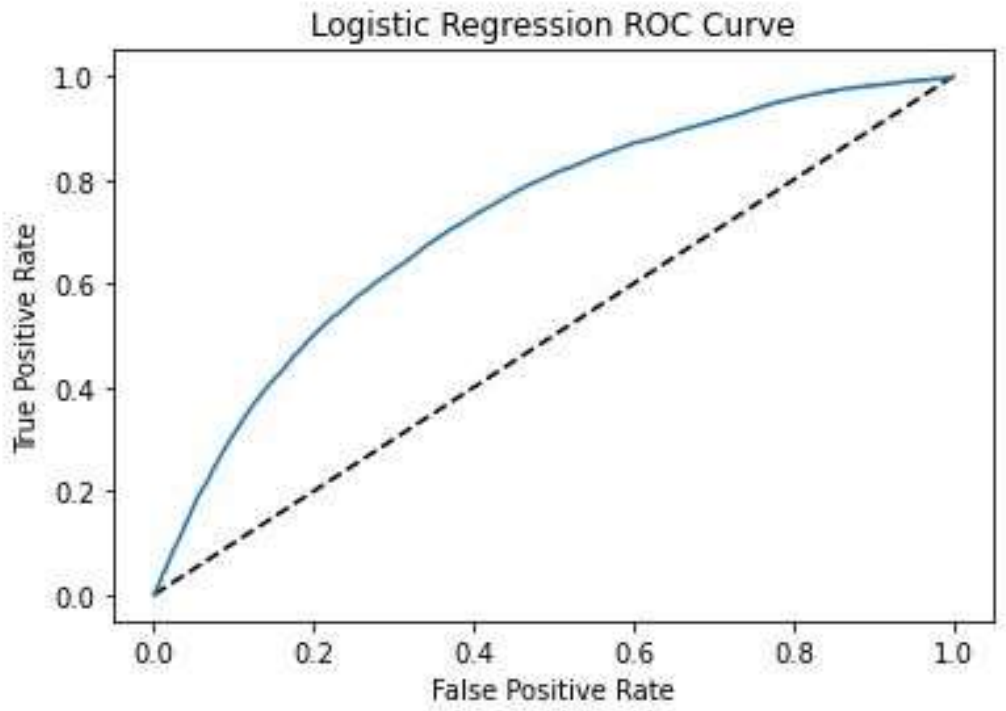
Modeling - Random Forest Classifier

- ➔ 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