

Lending Club Case Study

Swapnil Anil Janorkar

ML C44

Objectives

- Help to decide whether to approve or reject the loan application by analyzing the past data
- Reduce the charged off loans accounts
- Increase the fully paid loans accounts

- Data cleanup (Columns & Rows)
- Outliers detection and removal
- Univariate Data Analysis
- Bivariate Data Analysis

Data cleanup

- Remove all columns containing more than 90% NaN values.
- Remove "id", "member_id" and "application_type" column
- Replace all NaN with 0
- Remove % sign from "int_rate" column
- Change the data type of "int_rate" column to float
- Remove all the records with employment status as "n/a"

Outliers detection and removal

- Boxplot “loan_amnt” and “annual_inc” columns to find the outliers
- Replace all loan amount greater than 30,000 with 30,000
- Replace all annual income greater than 100,000 with 100,000

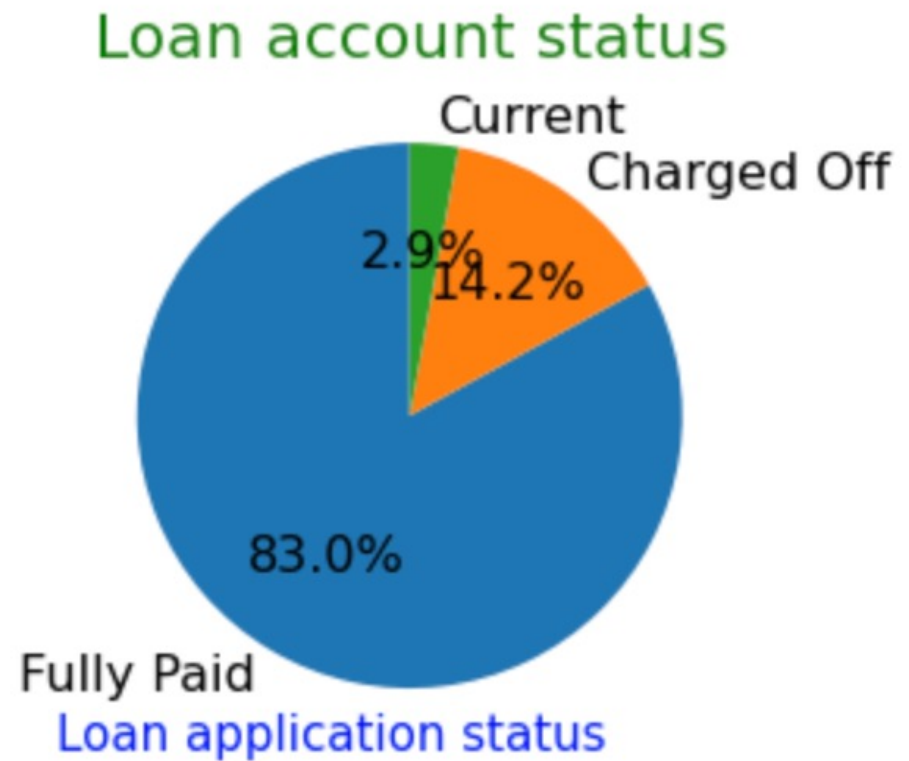
Univariate Data Analysis

- Loan Amount

- Total loan applications: 39717
- Average loan amount: 11124.74
- Minimum loan amount: 500
- Maximum loan amount: 30000

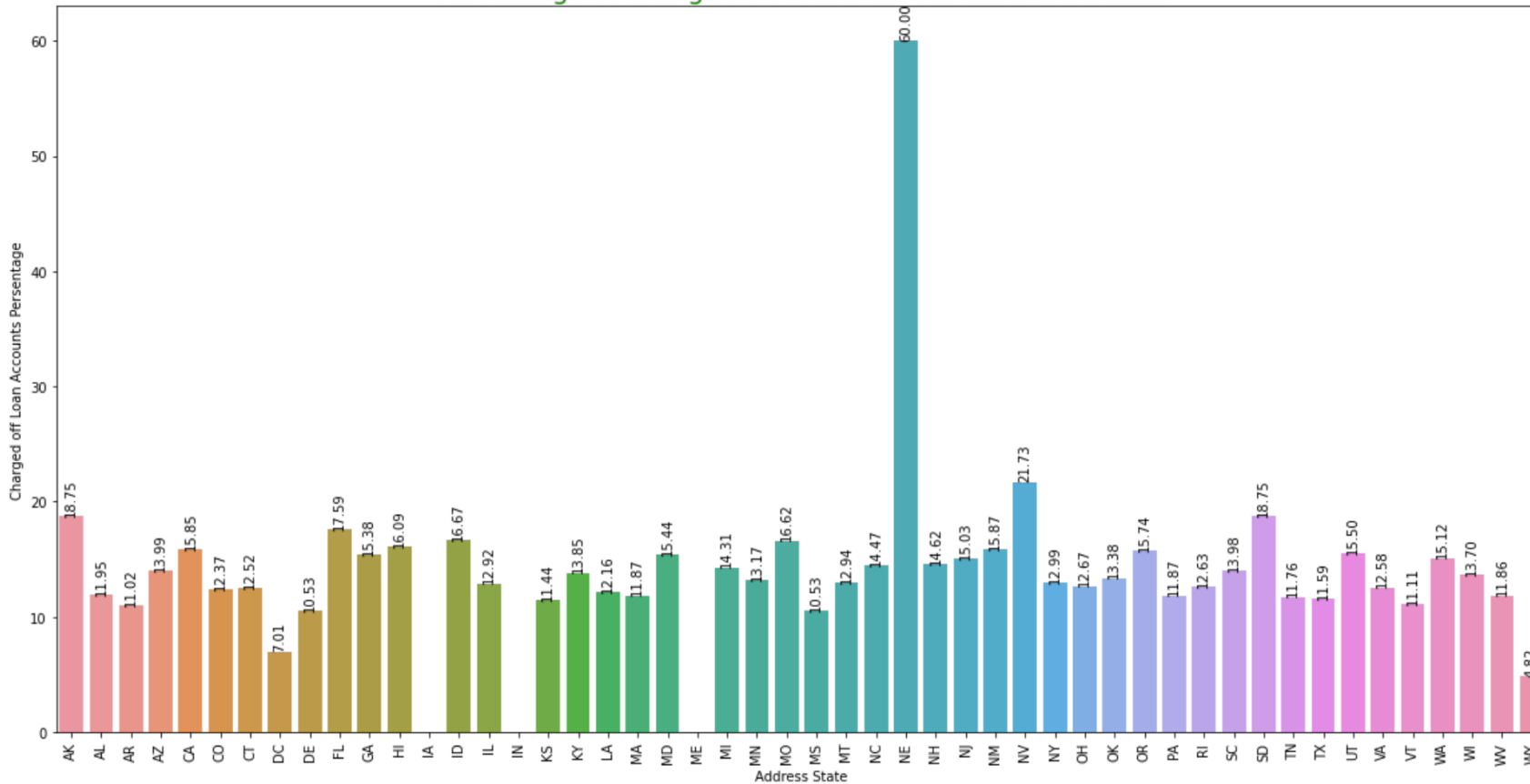
- Interest Rate

- Total loan applications: 39717
- Average interest rate: 12.02
- Minimum interest rate: 5.42
- Maximum interest rate: 24.59



Observation: Loan Application State

Percentage of charged off loans across different states



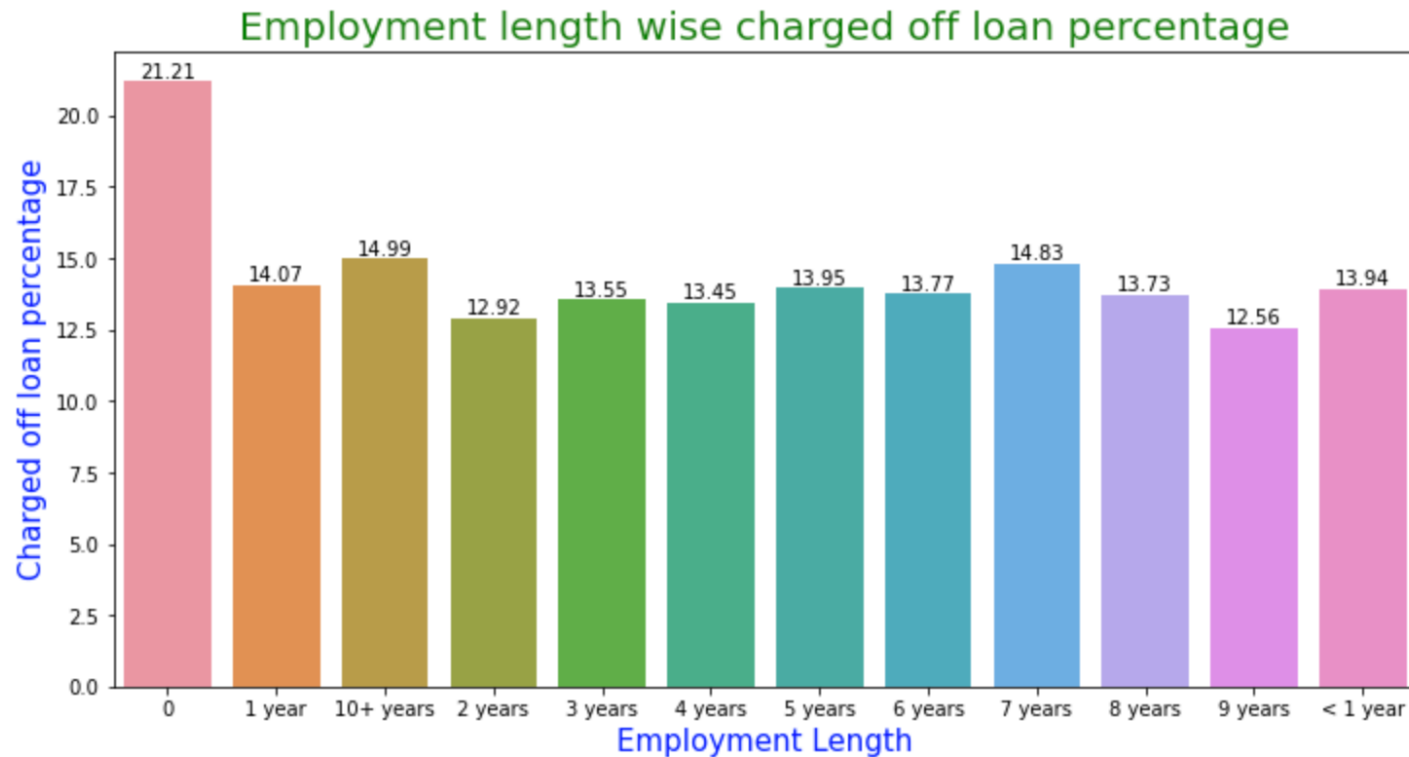
Charged Off loans

- Nebraska (60%)
- Nevada (21.73%)
- South Dakota & Alaska (18.75%)

Fully Paid loans

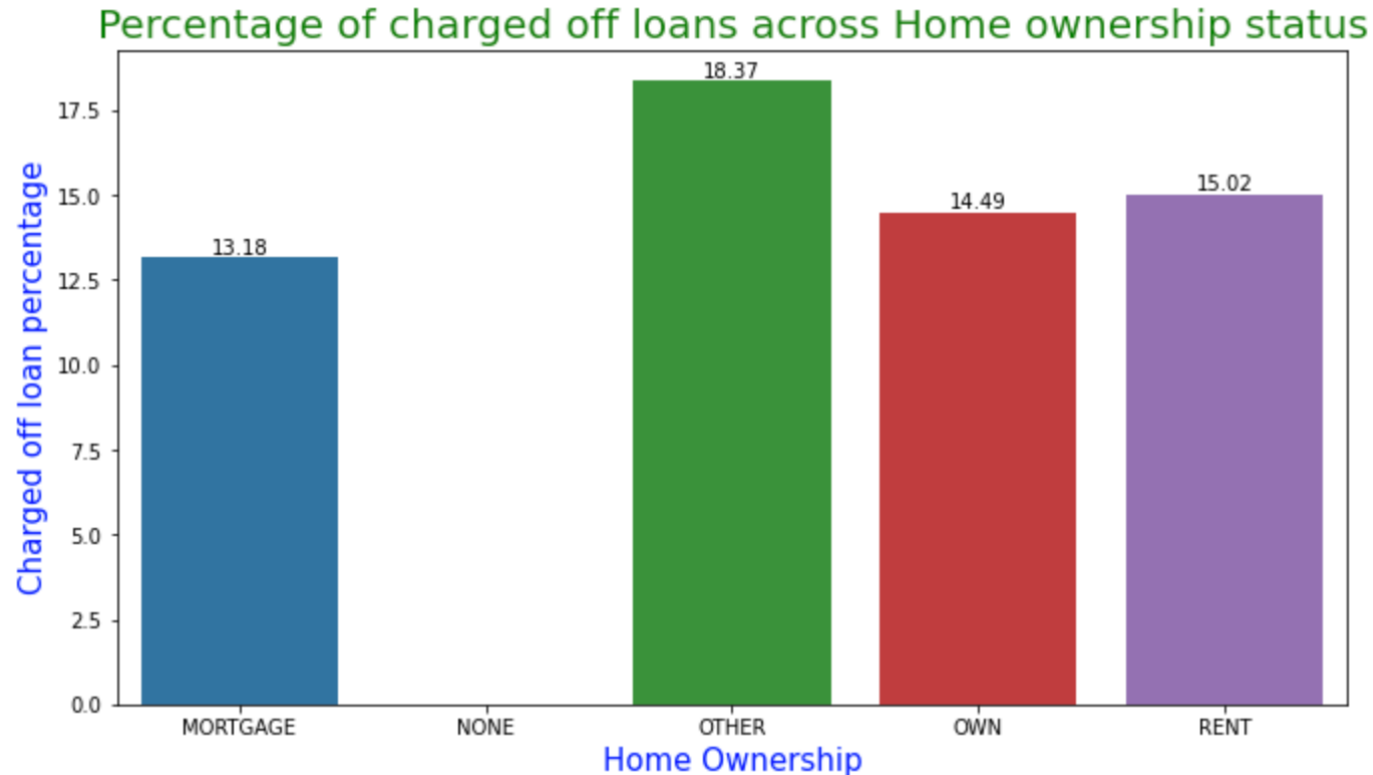
- Wyoming (95.18%)
- Washington D.C. (92.99%)
- Delaware & Mississippi (89.47%)

Observation: Employment Length



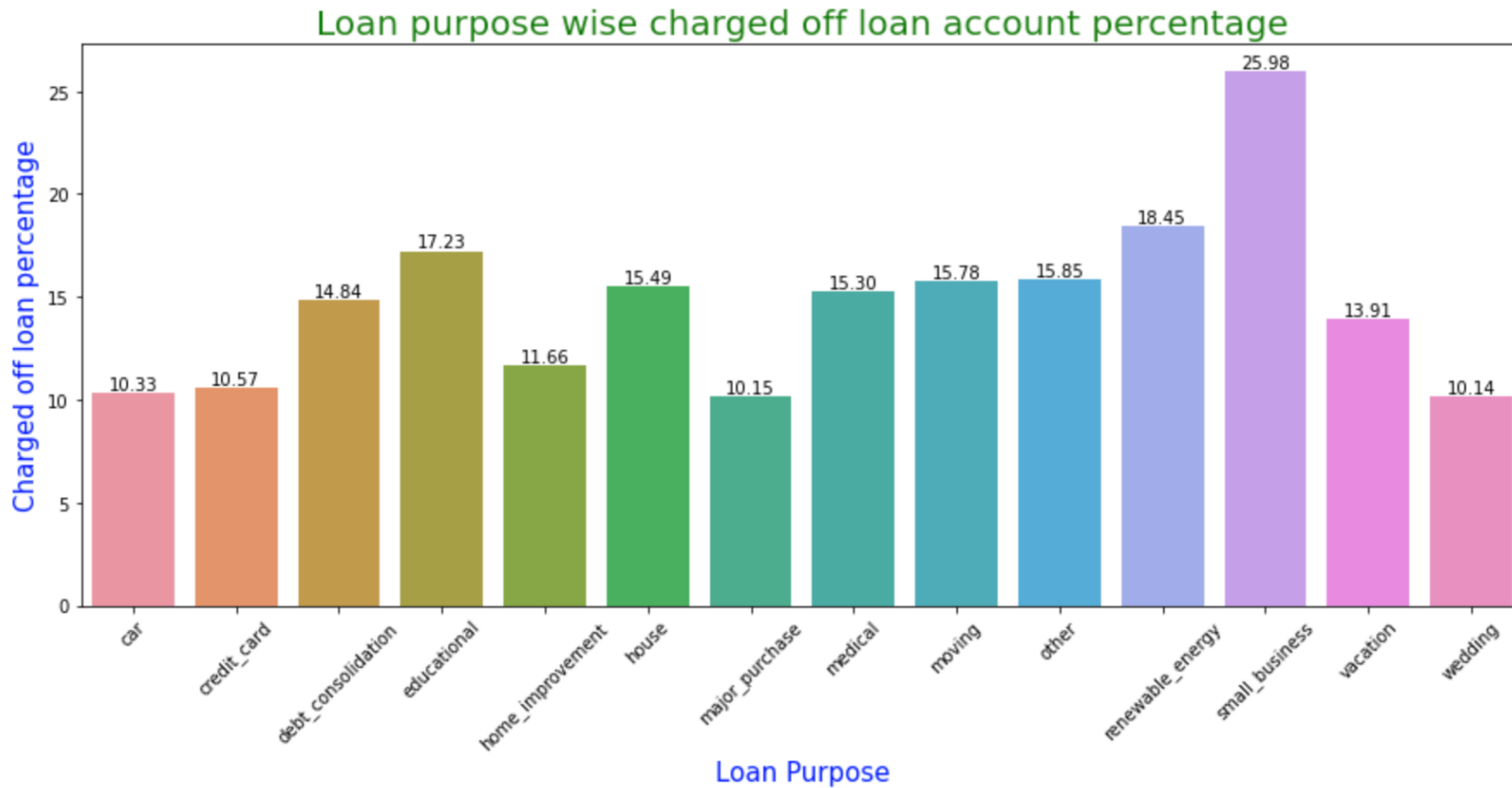
- Loan applicants without any work experience have charged off more than 21.21% of loans
- Loan account charged off % is relatively flat across other employment length categories.

Observation: Home Ownership



- Loan applicants with home ownership status as Other have charged off 18.37% of loans
- Loan account charged off % is relatively flat across other home ownership categories.

Observation: Loan Purpose



Charged Off loans

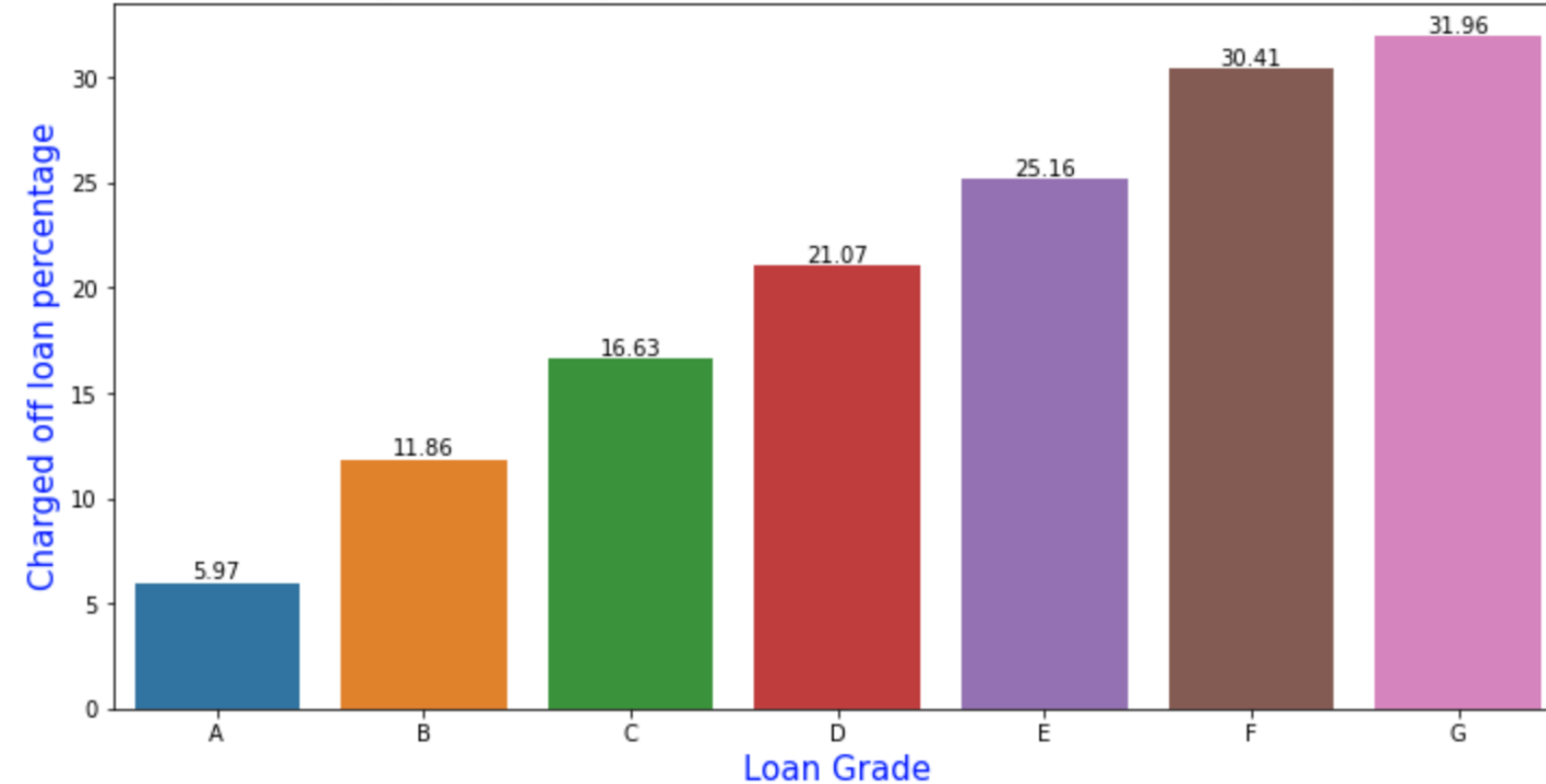
- Small Business (25.98%)
- Renewable Energy (18.45%)
- Educational (17.23%)

Fully Paid loans

- Wedding (89.86%)
- Major Purchase (89.85%)
- Car (89.67%)

Observation: Loan Grade

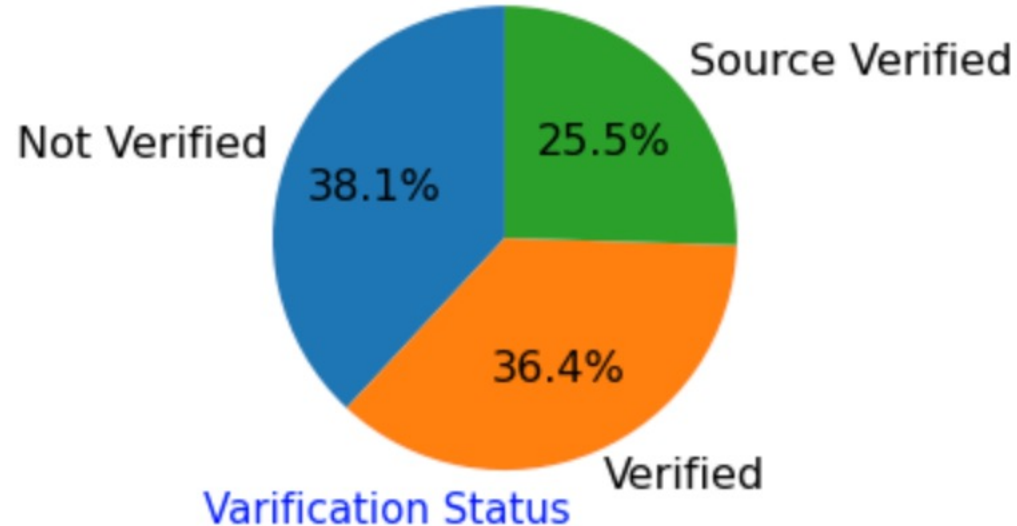
Percentage of charged off loans across different loan grades



- Charged Off loans
 - Grade G (31.96%)
 - Grade F (30.41%)
 - Grade E (25.16%)
- Fully Paid loans
 - Grade A (94.03%)
 - Grade B (88.14%)
 - Grade C (83.37%)

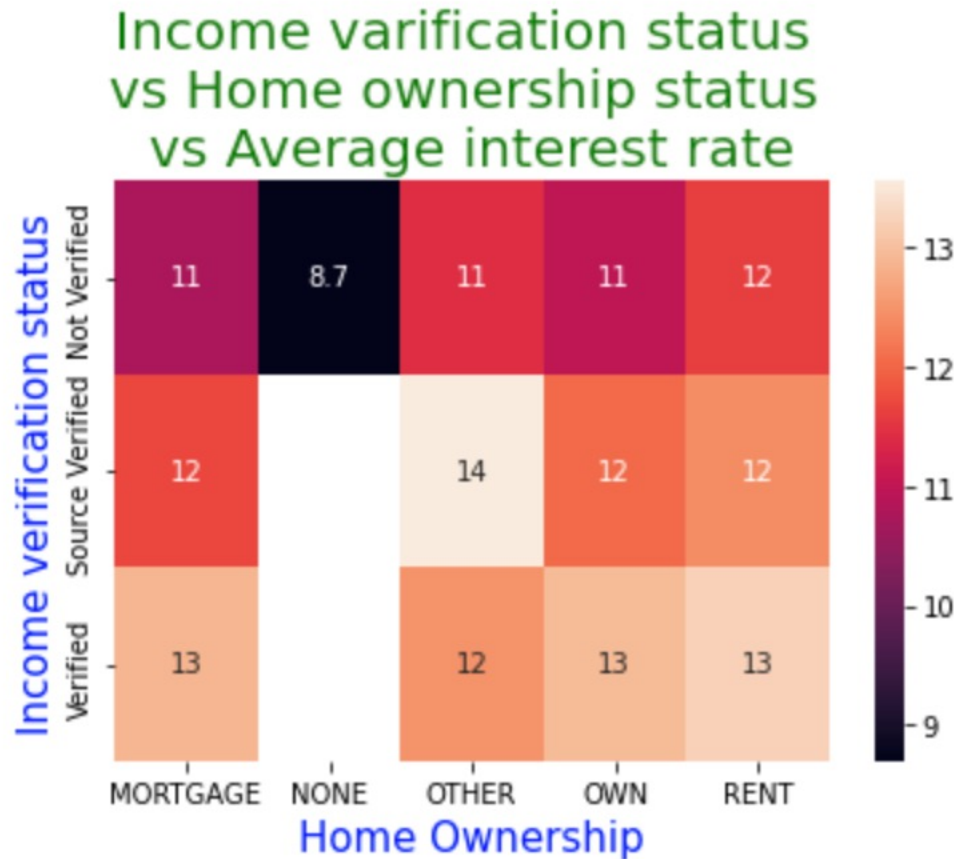
Observations: Income Verification

Income verification status of charged off loans



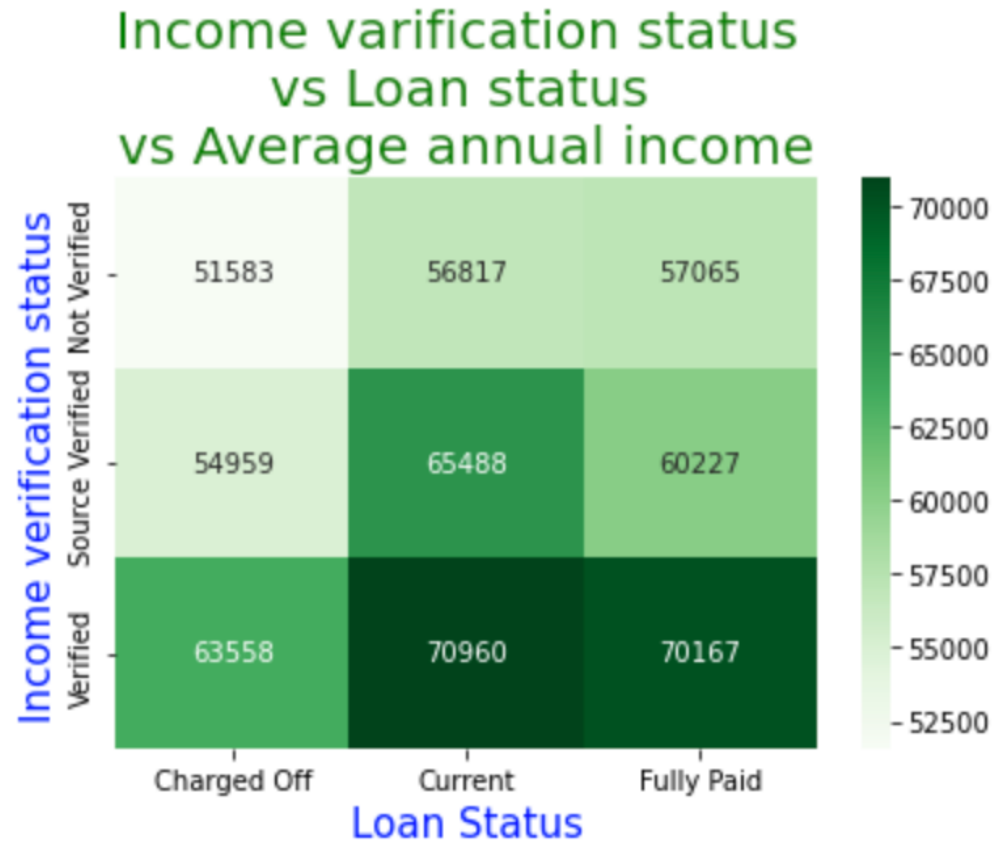
Not Verified income source loan accounts are more likely to be charged off than **Source Verified** loan accounts

Average Interest rate based on Verification Status and Home Ownership



- Not Verified income source loan accounts has lowest average interest rate across all loan account categories
- Verified income source loan accounts has highest average interest rate across all loan account categories

Average Annual income Vs Verification Status across all loans statuses



- Not Verified income source loan accounts has lowest average annual income across all loan account categories
- Verified income source loan accounts has highest average annual income across all loan account categories

Findings

- Loans applications more likely to be Charged Off
 - Loan applications from Nebraska, Nevada, South Dakota or Alaska
 - Loans given to Small Businesses, Renewable Energy and Educational purpose
 - Loans applications from Other home owners
 - Grade G, F, E loan application
 - Loan application from a person without any work experience or unemployed.
- Loan application more likely to be Fully Paid
 - Loan applications from Wyoming, Washington D. C. & Vermont
 - Loans taken for Wedding, Major Purpose or Car
 - Grade A, B, C loan applications

Recommendations

- Charge higher interest rates to loan applications having higher chances be Charged Off.
- Increase income source verification percentage of loan applications.
- Reject the loan applications having less than 50K annual income or without any work experience.
- Married person is more likely to be repay loans.

Thank You