Lending Club case study

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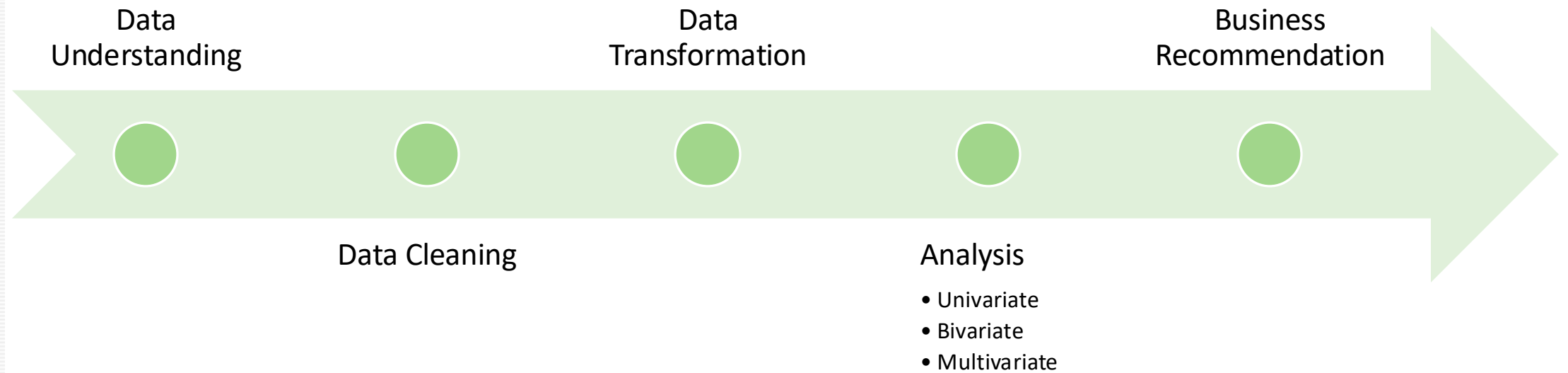
  - Avoid Financial Loss

Problem Statement

To understand the driving factors (or driver variables) behind loan default, i.e. the variables which are strong indicators of default

- Analyse the Lending applicants data of Lending Club from 2007 to 2011

- Minimise the risk of losing money while lending to urban customers

- Avoid Financial loss by not lending to applicants likely to default

- Identify the Patterns for applicants likely to default
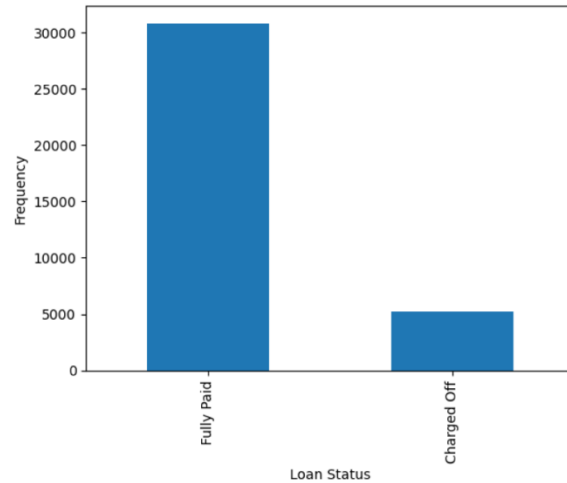
Main Objective

- Avoid Business loss by lending to applicants who are likely to repay the loan

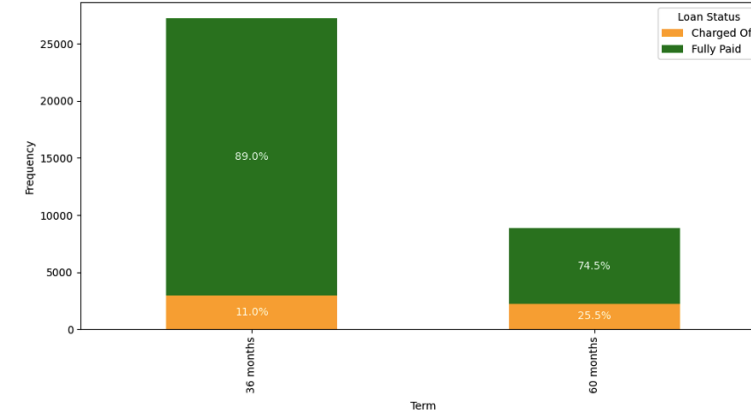- Avoid Financial Loss by rejecting applicants who are likely to default

Our Approach

Data
Understanding

Data
Transformation

Business
Recommendation

Data Cleaning

Analysis

- Univariate
- Bivariate
- Multivariate

Univariate Analysis

Bar Plot of Loan Status

From above graph we can derive that 85.47% - full repaid the loan and 14.53% - Charged-off

Bar Plot of Employee Length
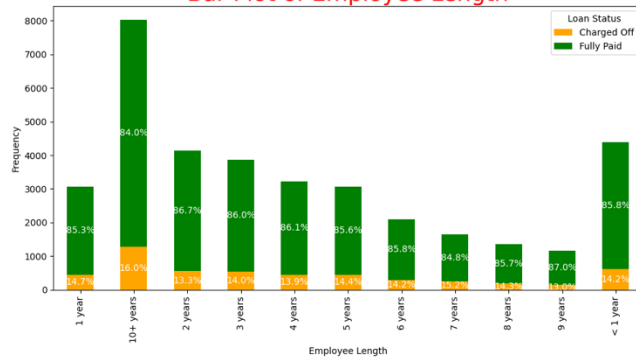
Approximately 15% of the applicants charge off irrespective of employee length.
It is safe to assume that Employee length does not impact the loan repayment.
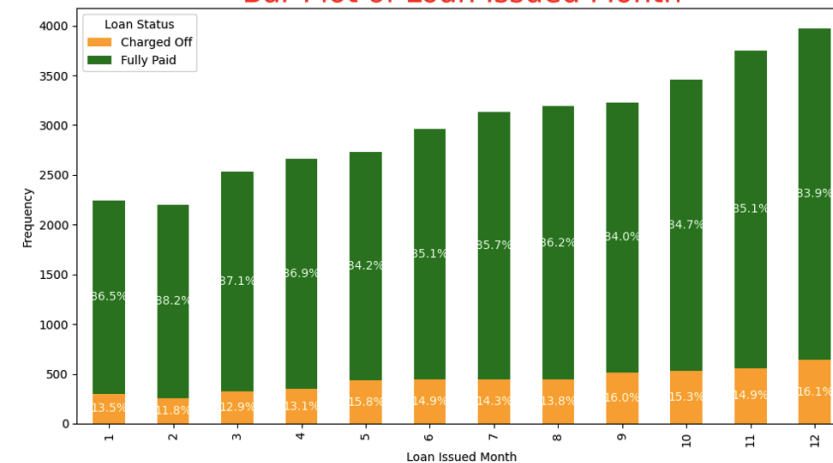
Bar Plot of Term

89% of applicants with term-36months fully repay the loan, whereas only 74.5% of applicants with term-60 months fully repay the loan. Lend Money to applicants at short terms, here:36 months to avoid financial loss
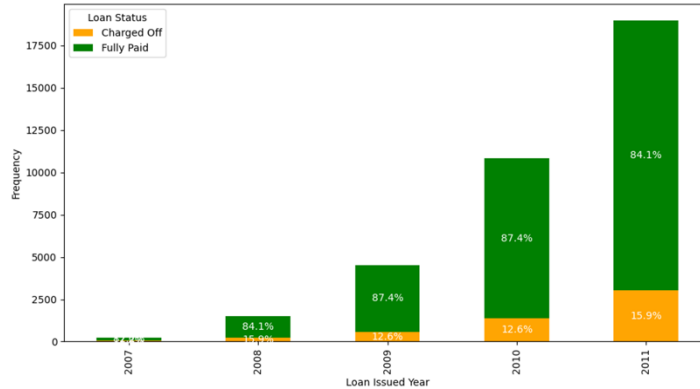
Bar Plot of Loan Issued Month

The applicants who charged OFF is less in the months of January-April. Applicants taking loan in November or December default the highest. The reason for this could be Holiday(Black Friday, Christmas) season
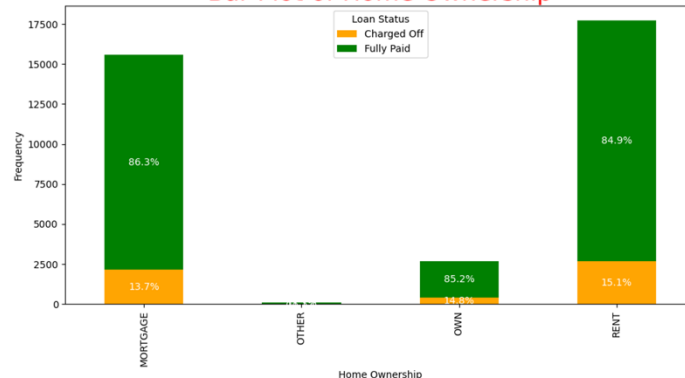
Univariate Analysis

Bar Plot of Loan Issued Year

Approximately every year 15% of the applicants charge-off
It is safe to assume that Employee length does not impact the loan repayment. From above graph we can derive that 85.47% - full repaid the loan and 14.53% - Charged-off
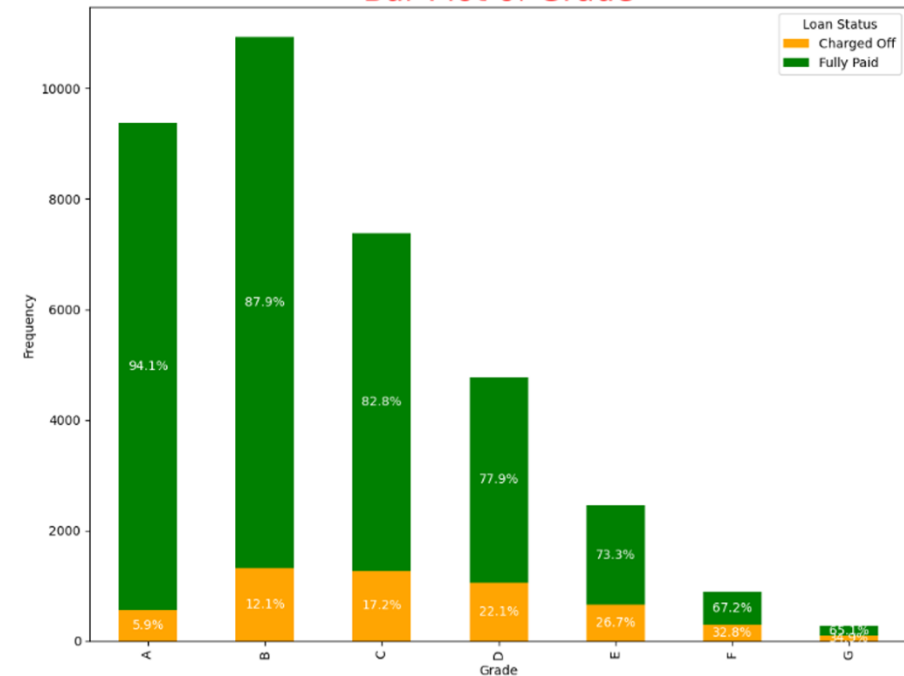
Bar Plot of Home Ownership

Approximately in all categories of Home Ownership 14% of the applicants charge-off

It is safe to assume that Home Ownership does not impact the loan repayment.

Bar Plot of Grade

Number of applicants who charge-off is significantly less when LC Grade is A,B. Number of applicants who charge-off is significantly higher when LC Grade is E,F and G.
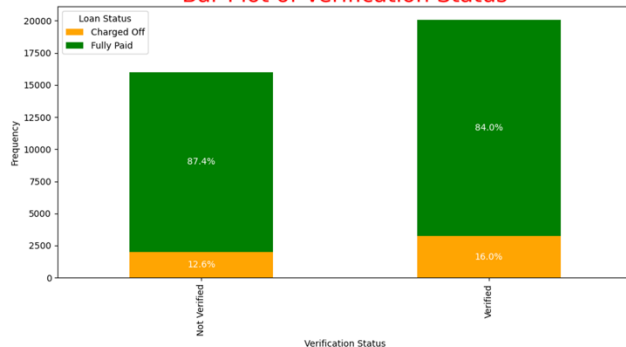
Lend Money to people who are in LC Grade A and B to avoid business loss

Lend Money to applicants who are in LC Grade C and D with shorter term – 36 months to reduce defaulters as per our earlier analysis.
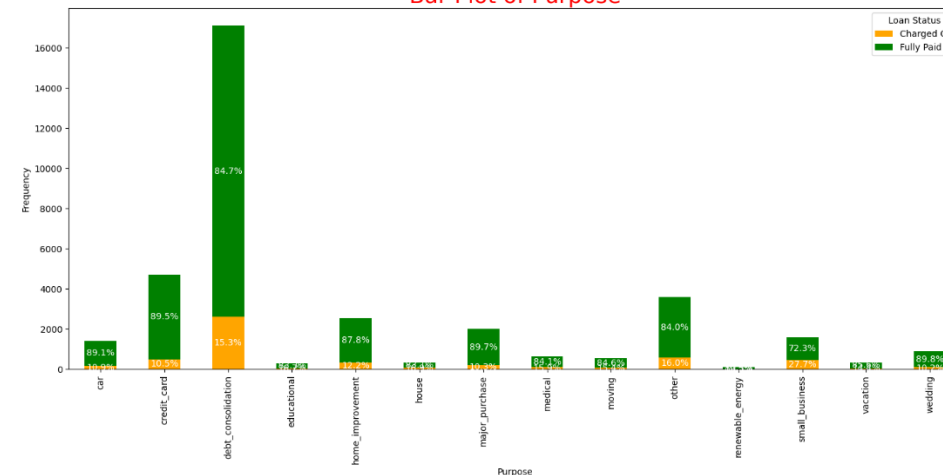Reject applicants whose LC Grade are E,F and G

Univariate Analysis

Bar Plot of Verification Status

Non-verified applicants are repaying the loan better than Verified applicants. But It cant be considered as a driving factor as the difference is not very significant
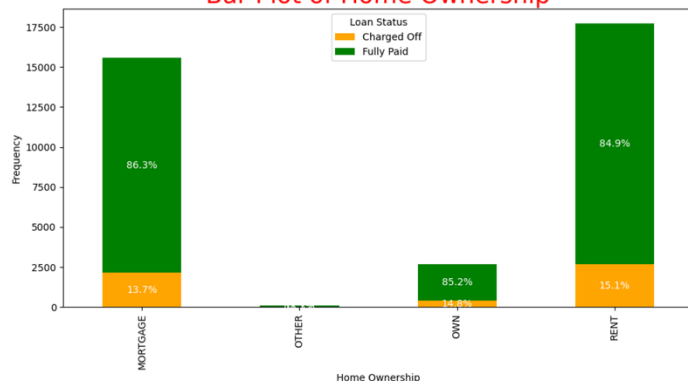

Bar Plot of Purpose

Applicants taking loan for small Business and renewable energy default the most.
For applicants in small Business and renewable energy provide loans with the shorter term to avoid financial losses
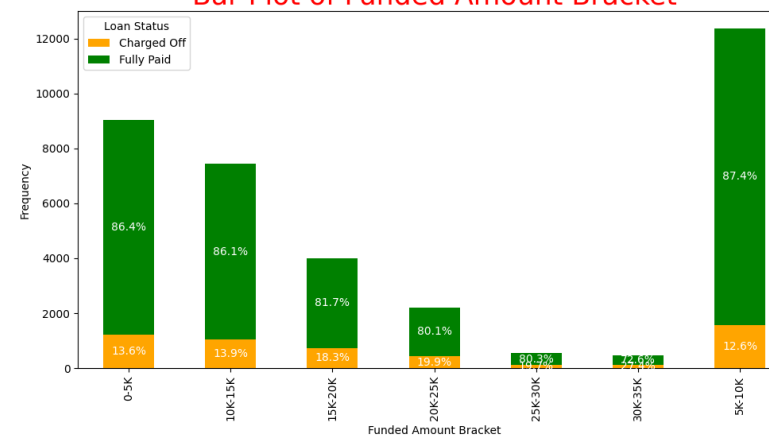

Bar Plot of Home Ownership

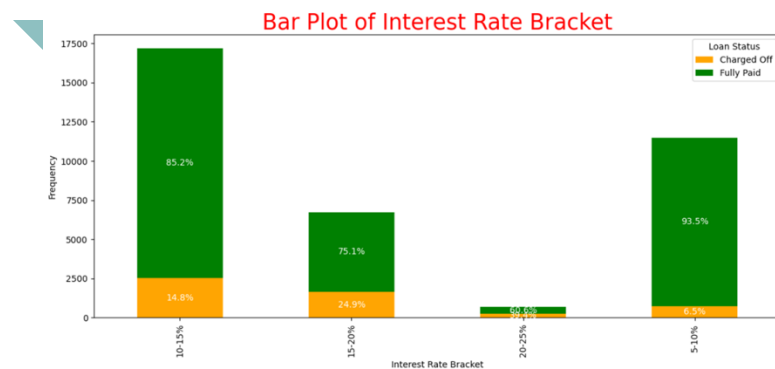Approximately in all categories of Home Ownership 14% of the applicants charge-off

It is safe to assume that Home Ownership does not impact the loan repayment.
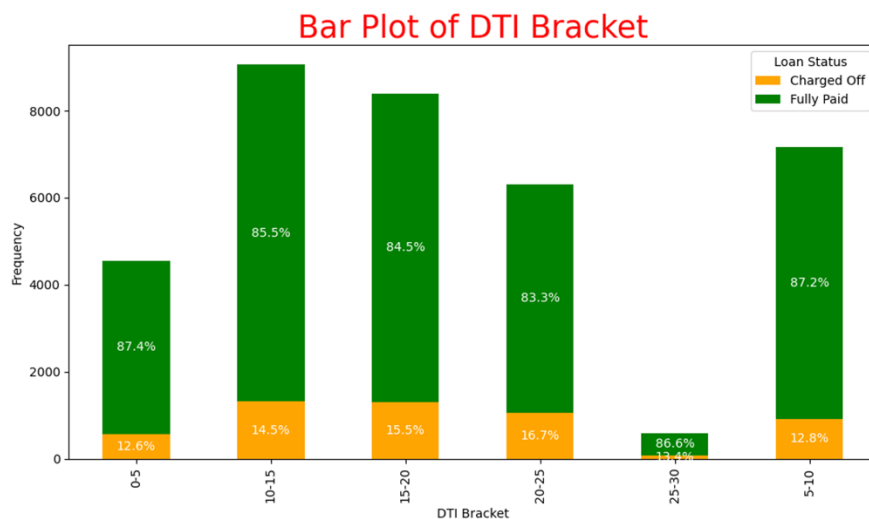

Bar Plot of Funded Amount Bracket

The funded amount is directly proportional to applicants being charged off.
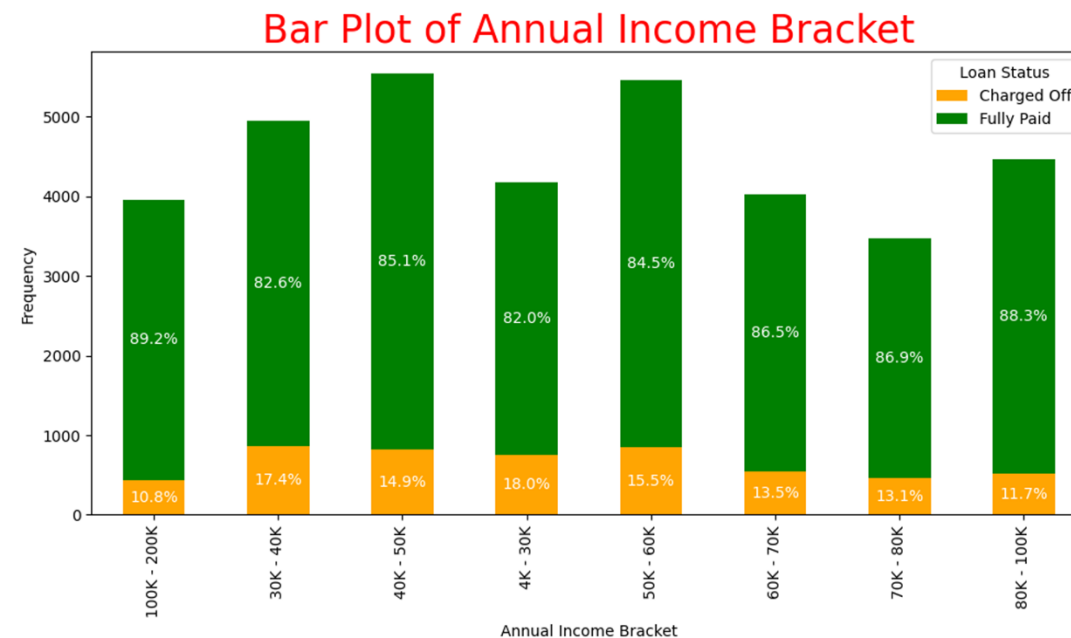
Univariate Analysis

Bar Plot of Interest Rate Bracket

The Interest Rate is directly proportional to applicants being charged OFF

Bar Plot of Annual Income Bracket

The Applicant's annual income is inversely proportional to applicants being charged OFF
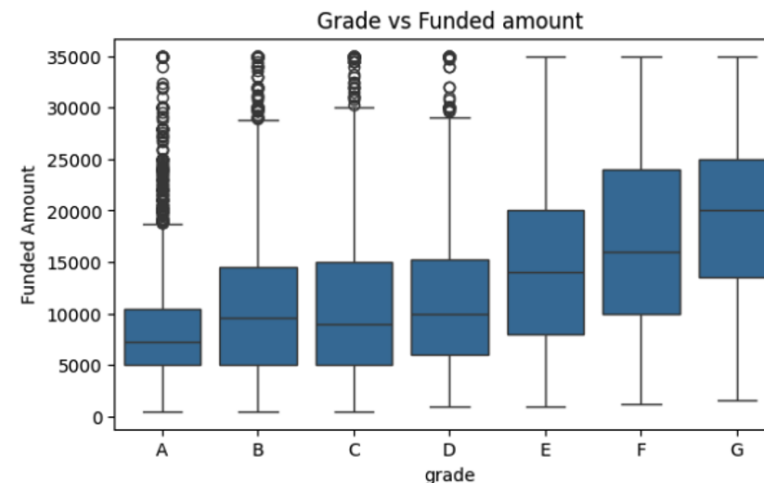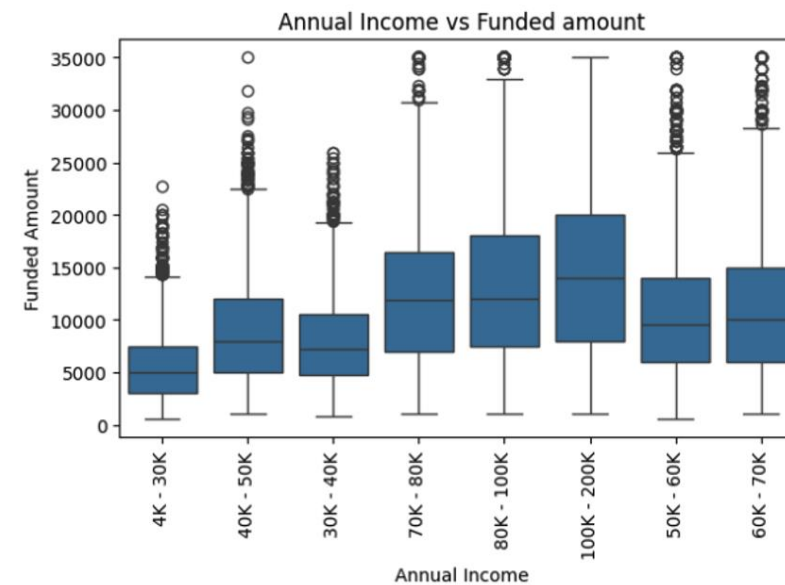

Bar Plot of DTI Bracket

The Debt-to-Income Ratio is directly proportional to applicants being charged OFF
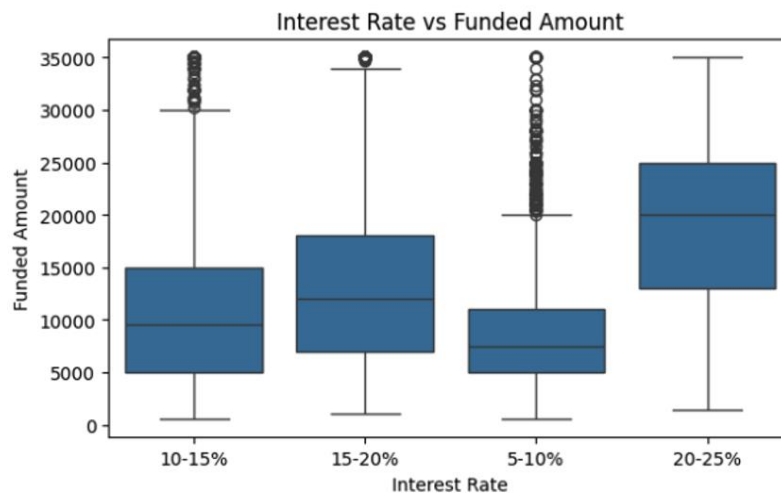
Bivariate Analysis
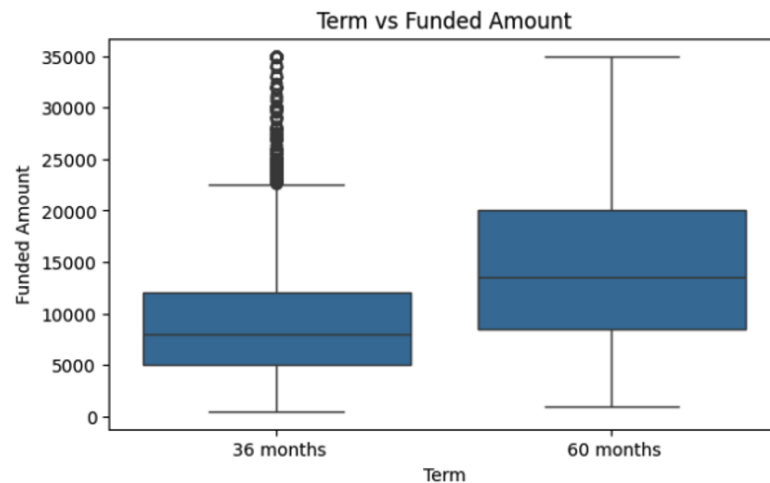
Funded Amount is directly proportional to term of the loan. Funded Amount is directly proportional to Grades
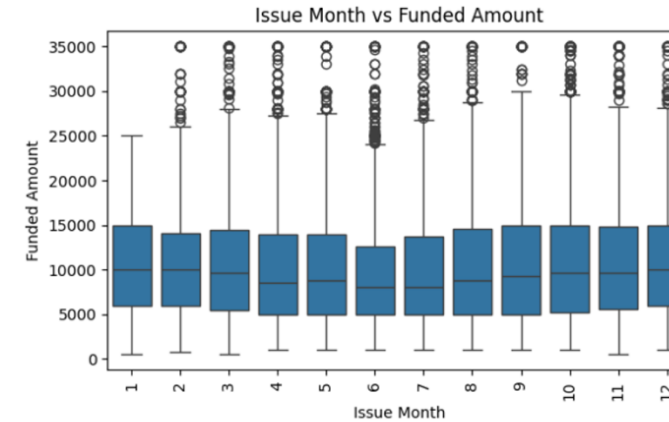

Funded Amount is directly proportional to interest rate. Funded Amount is directly proportion to Annual income

Bivariate Analysis
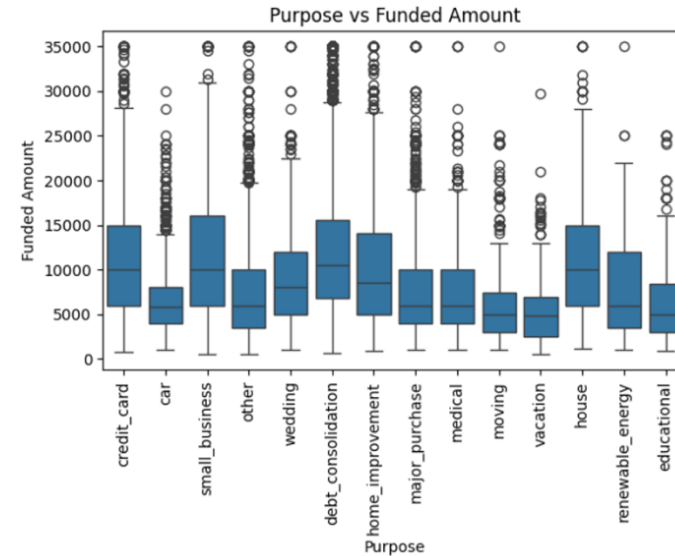
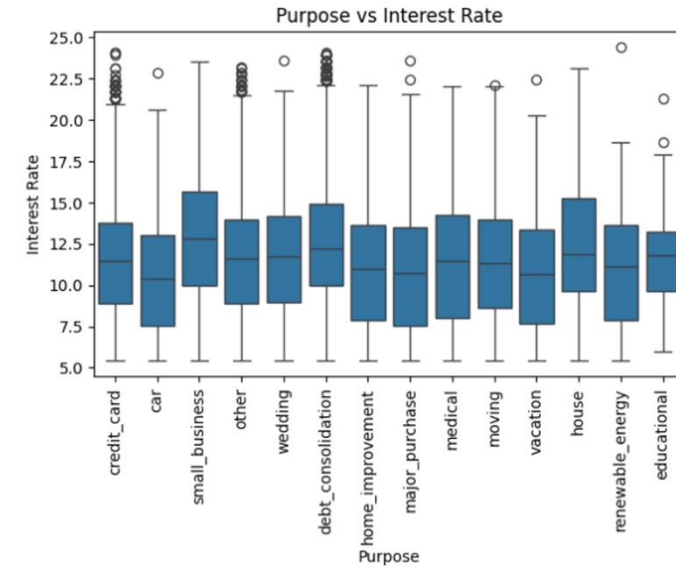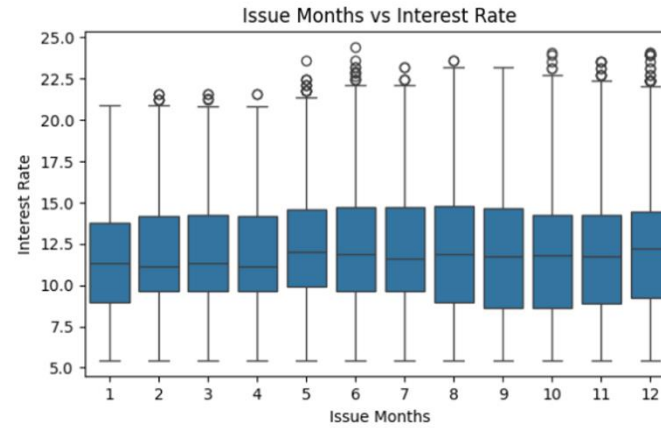Funded Amount is higher for purposes like - Small business, debt-consolidation, credit card and home improvement. Funded Amount is does not vary across months
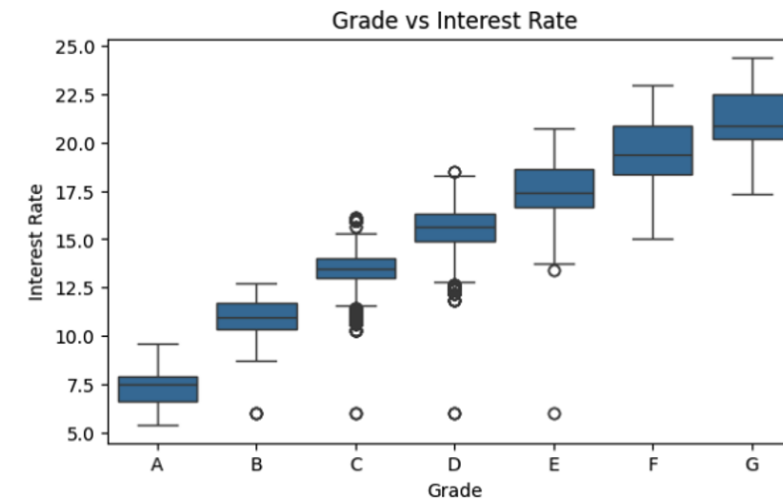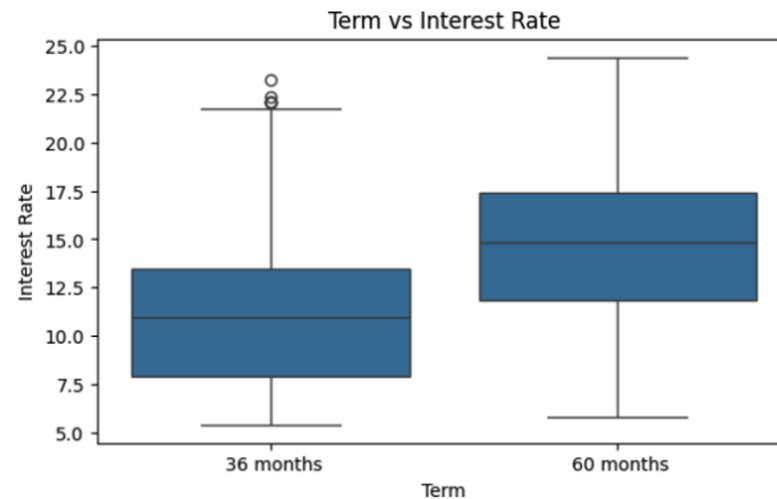
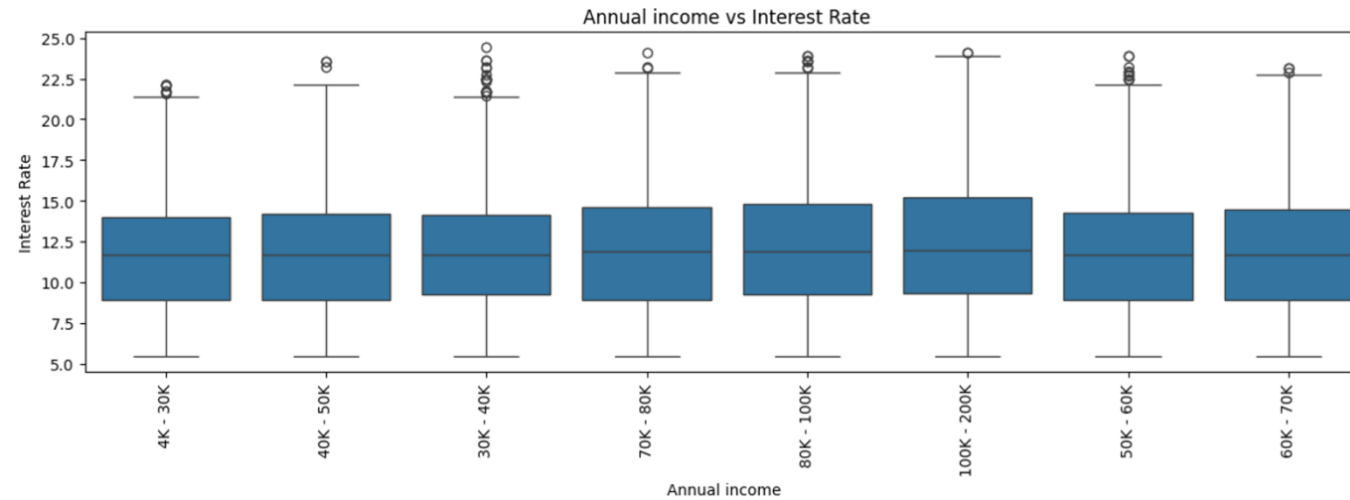Interest Amount is directly proportional to Term and Grade

Bivariate Analysis

Interest rate is higher for small business, debt consolidation and house. Interest rate doesn't vary across months

Interest rate doesn't vary across annual income

Multivariate Analysis

Multivariate Analysis: Annual Income vs Interest Rate by Loan Status

Loan Status
• Fully Paid
• Charged Off
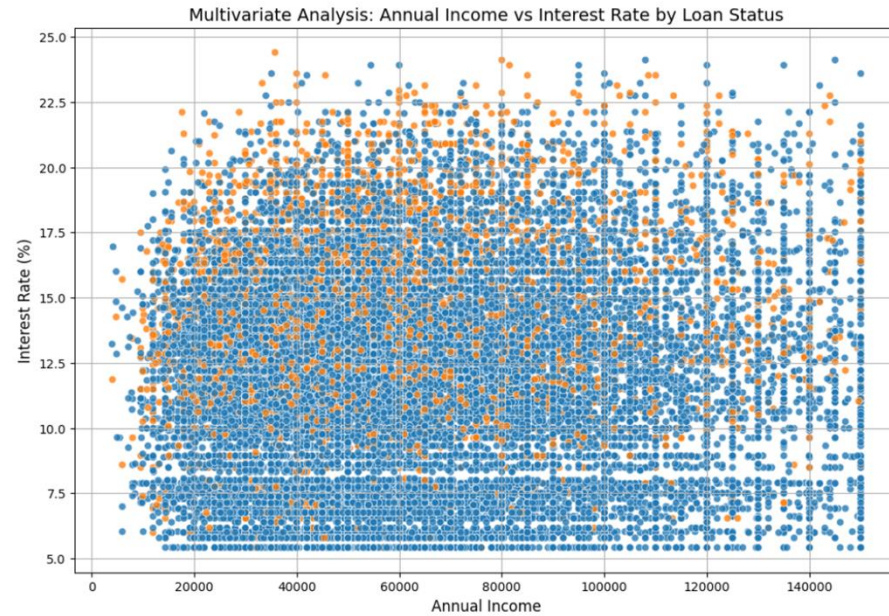
The applicants tend to Charged OFF as the Interest Rate increases

The applicants tend to pay off Loans are higher for the Interest Rate is less than or equal 10% across their Annual Income

The Interest Rate 10% to 15% Charged OFF gradually decreases as Annual Income increases

Above 17.5% Interest Rate, the Applicants across all the Annual Income Bracket tend to Charged OFF

Multivariate Analysis: Funded Amount vs Interest Rate by Loan Status

Loan Status
• Fully Paid
• Charged Off
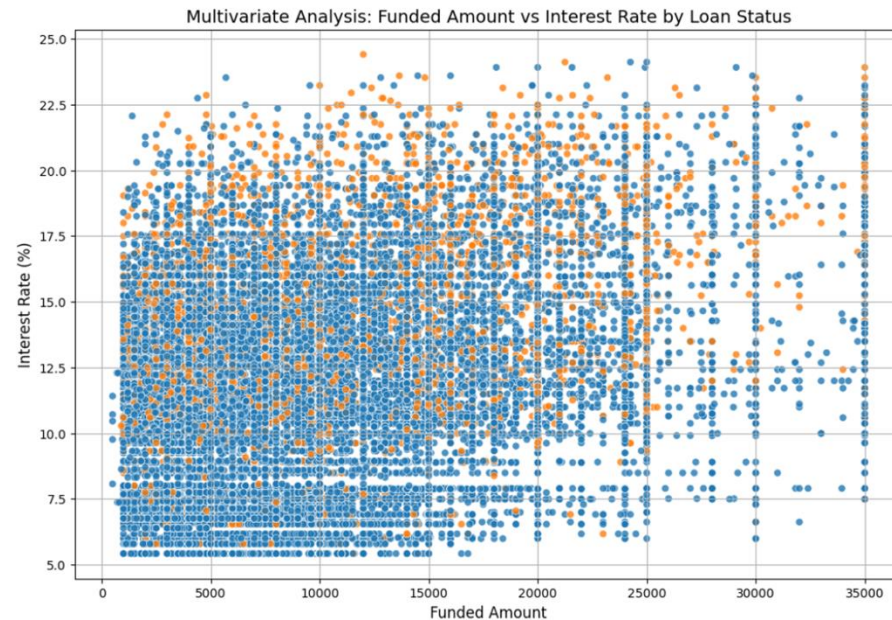
Applicants tend to pay off loans as long as the amount and the interest rate are less

for an example: the funded amount is as high as 35000 and the interest rate is 10%.

The Charged OFF increases when the interest rate is above 15%

Multivariate Analysis

Multivariate Analysis: Annual Income vs Funded Amount by Loan Status

Interest Rate and DTI by Loan Status
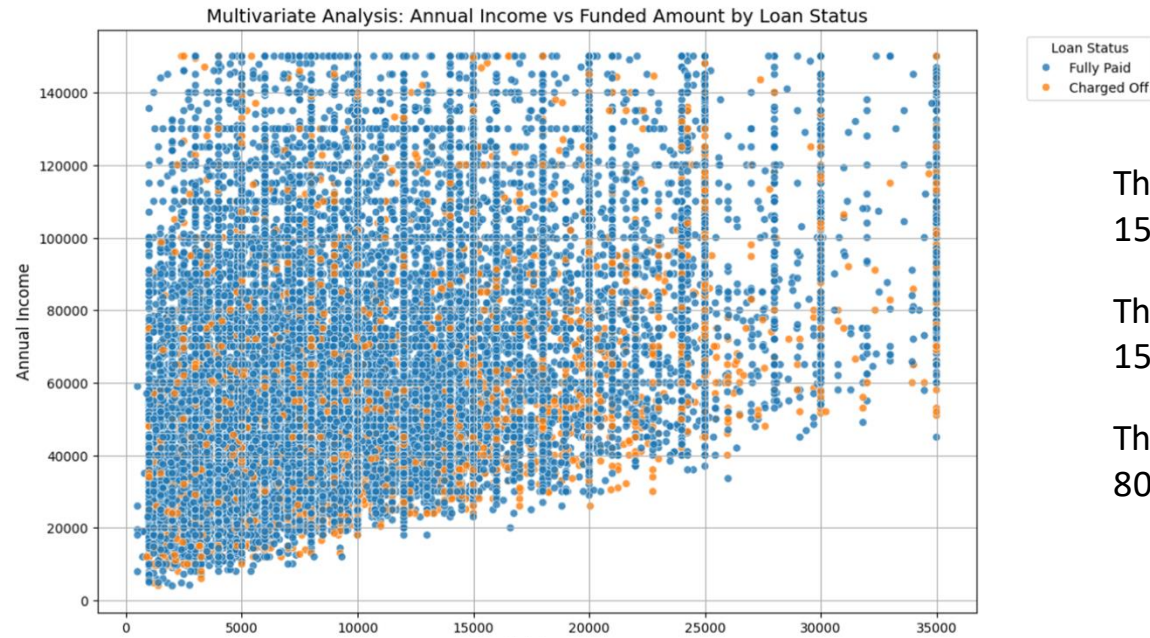
The applicants pay off the loan when the funded amount is less than 15000

The applicants Charged OFF when the funded amount is more than 15000 and the annual income is less than 80000

The applicants pay off the loan when their annual income is more than 80000 and the funded amount is as high as 35000
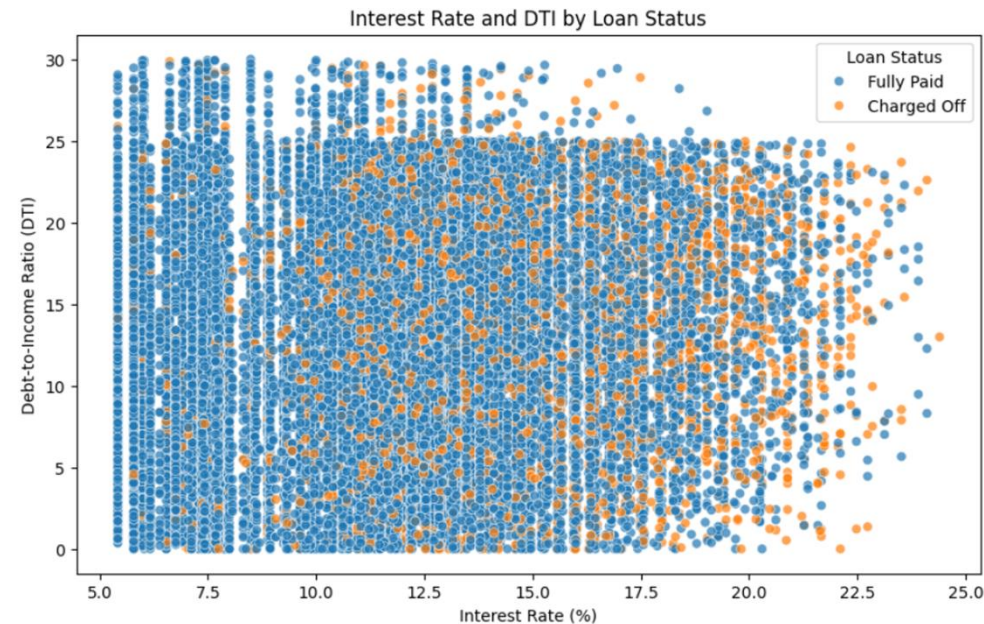
When interest rate is low, applicant across all DTIs are paying off the loans.

The applicants Charged OFF when the interest rate increases across all DTIs

Business Recommendations

◤ Avoid Business Loss

- Funded Amount: When lend loans with amounts > 15000 - consider lending when 1. The interest rate is less than 10% 2. Annual Income is above 80000

- Interest Rate: Though you lend loans with interest rates above 15% - consider lending when 1. Funded Amount should be less than 15000. 2. Annual Income is above 80000

- Annual Income: When lending to people with low income - consider lending when 1. Consider purpose is not home improvement, renewable energy, small business, or wedding. 2. Term should be 36 months

- DTI: When lending to people with DTI above 10 - consider lending when 1. Interest rate is low - below 10% 2. Term should be 36 months, Grade either A or B

- Purpose: When lending for small business, renewable energy, debt consolidation, and home improvement 1. The term should be 36 months. 2. DTI should be less than 10

- Grade: When lending to people in Grades E, F, and G- consider lending when 1. Interest rate is below 10% 2. The term should be 36 months

- Term: When lending for 60 months, the interest rate should be below 10%. Funded Amount should be less than 15000

Business Recommendations

Avoid Financial Loss

- Funded Amount: Lend loans with smaller amounts (below 15000) to avoid financial loss, as they are highly paid off rather than charged OFF

- Interest Rate: Lend loans with lesser interest rates - below 10% to avoid financial loss, as they are highly being paid off rather than charged off.

- Annual Income: Lend loans to people with income above 80000 as they are highly paying off the loans in most situations

- DTI: Lend loans to people with DTI below 10 as they are highly paying off the loans in most situations.

- Purpose: Lend loans to people in categories other than small business, renewable energy, debt consolidation, and home improvement as they do not charge off much.

- Grade: Prioritise lending loans to people in Grades A and B. Second priority can be C and D

- Term: Lend loans for a shorter term - 36 months

Thank you