Lending Club Case Study

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Overview

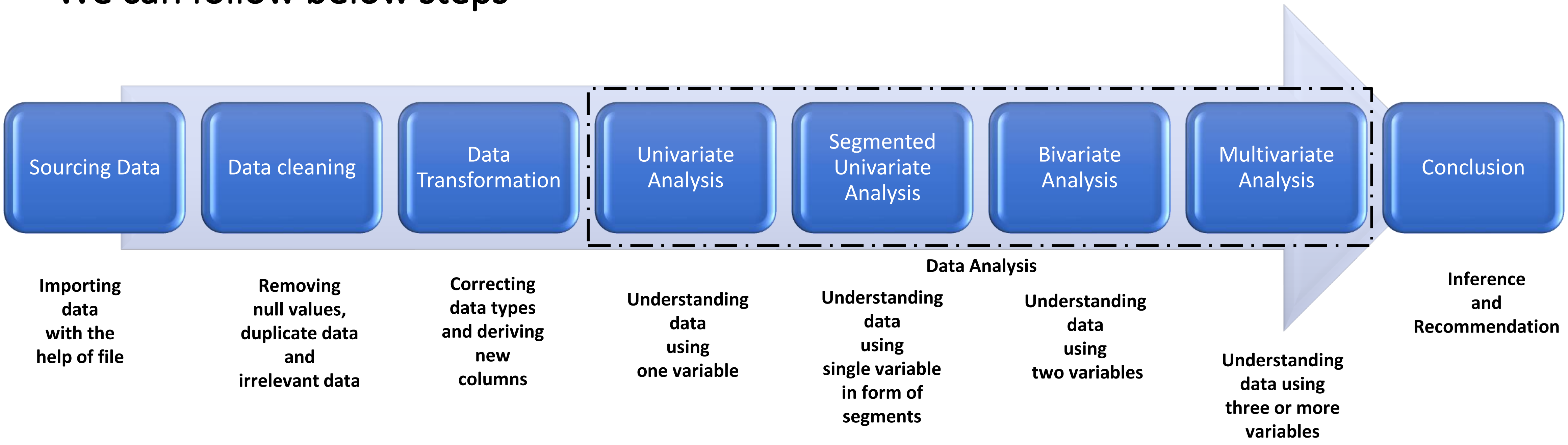
- This case study explores how a finance company can use data analysis to make better loan approval decisions.
- By examining past loan data, we aim to identify factors that predict whether a borrower will default.
- This helps the company reduce financial losses by avoiding risky loans.

Problem Statement

- The finance company wants to minimize losses from loan defaults by identifying high-risk applicants.
- The goal is to understand which factors indicate a borrower is likely to default, so the company can make informed decisions on loan approvals.

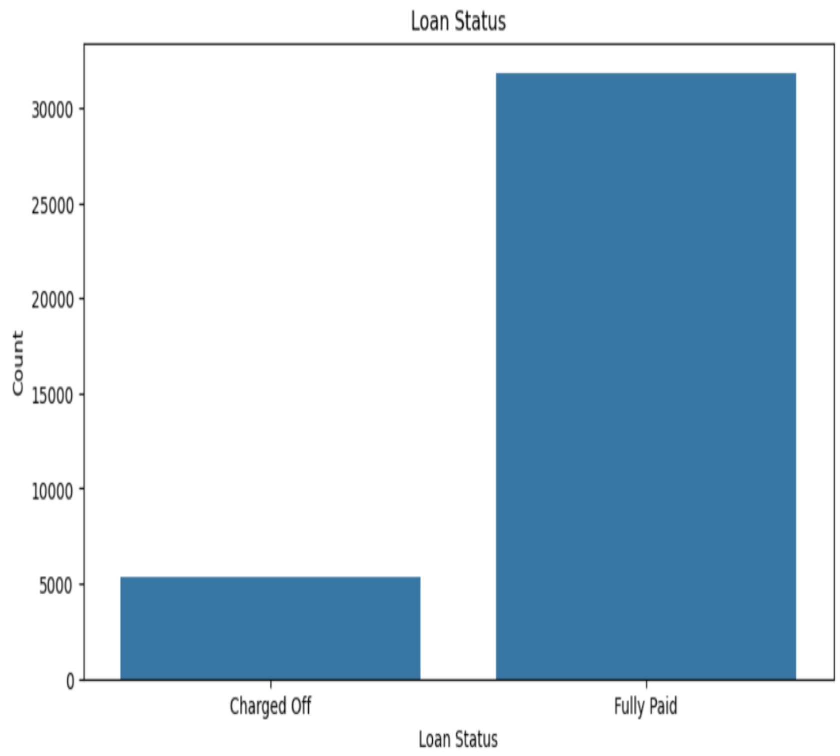
Approach

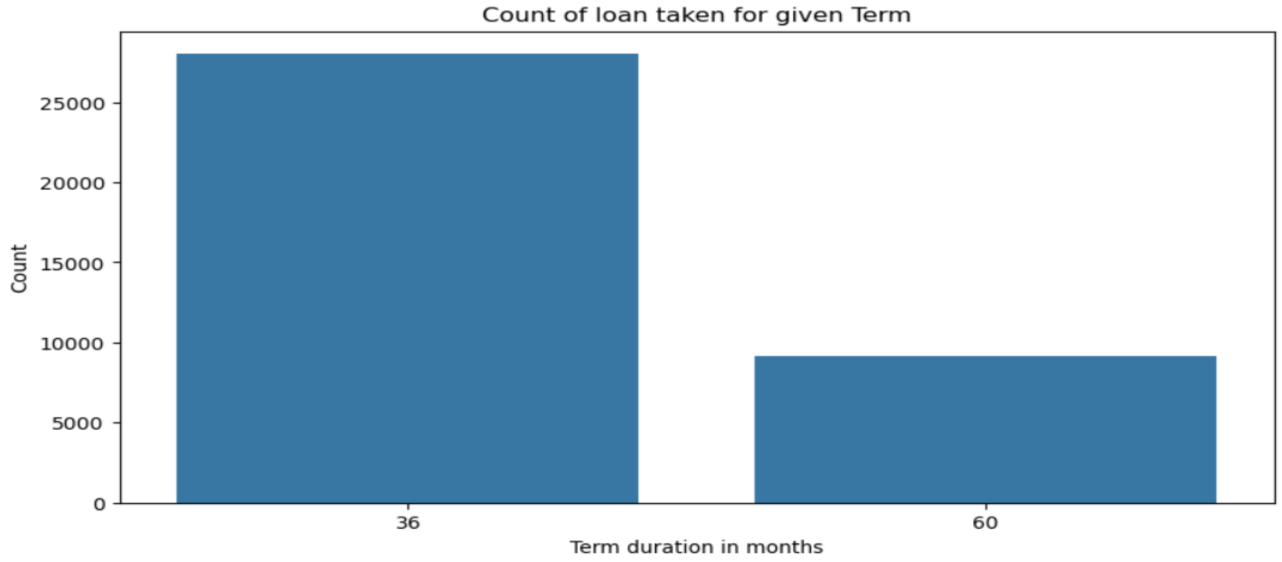
- By utilizing Exploratory Data Analysis (EDA), we can understand how different consumer and loan attributes influence loan defaults.
- By identifying key indicators of default, the company can improve its risk assessment processes and reduce credit losses.
- We can follow below steps

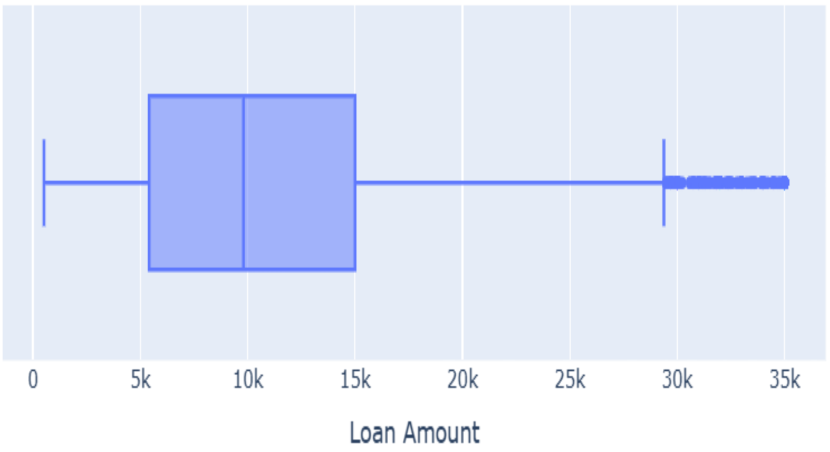


Univariate Analysis

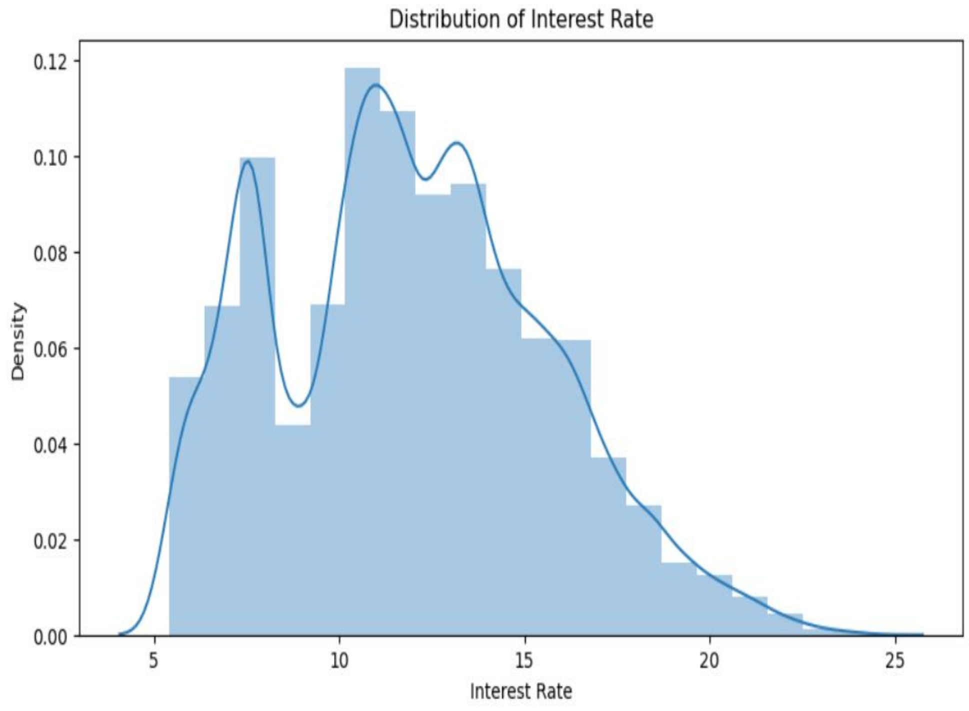
- Defaulter loans are low in number compared to fully paid
- The loan amount varies from 500 to 35000 with a mean of 9800.
- More people have taken loan for 36 months compared to 60 months

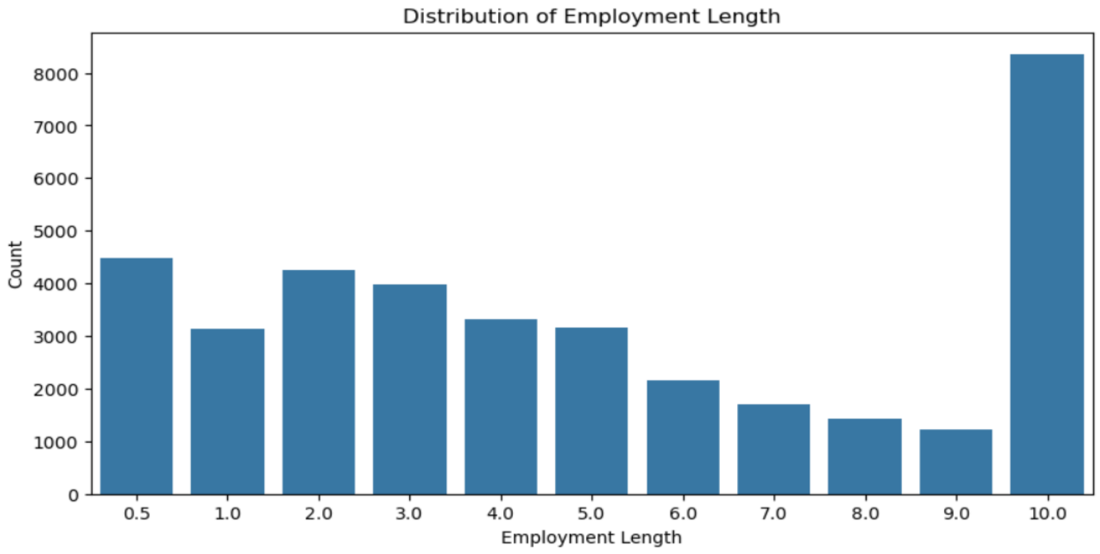


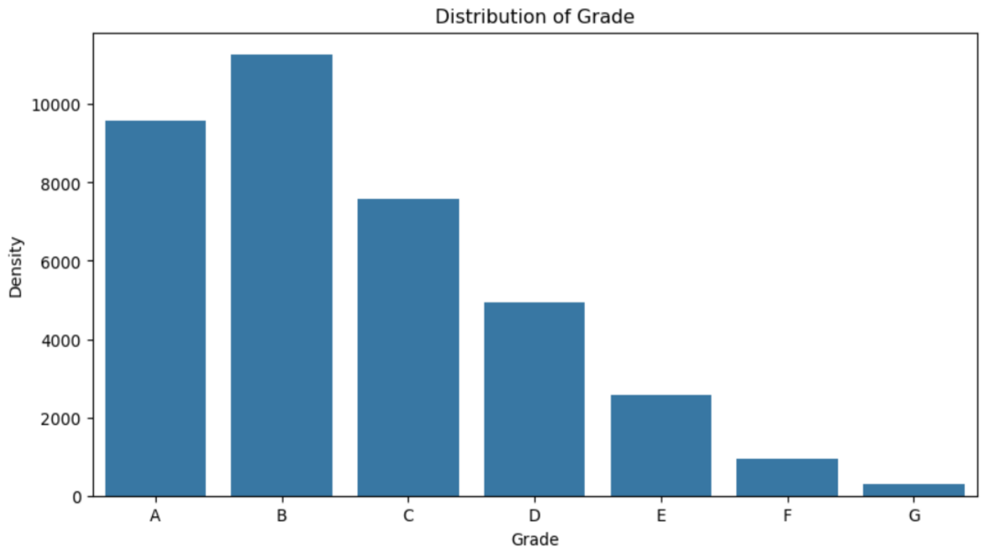




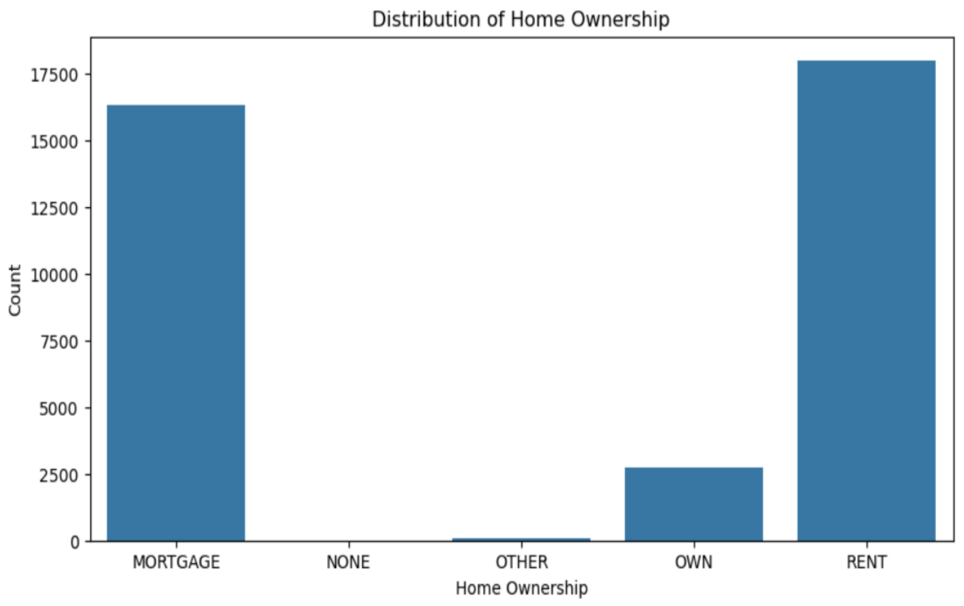
- More people have taken loan around 10%-15% and 7.5%
- Large amount of loans has been taken by higher grade people. i.e Grade A and Grade B
- More loans are taken by people having 10+ years of years

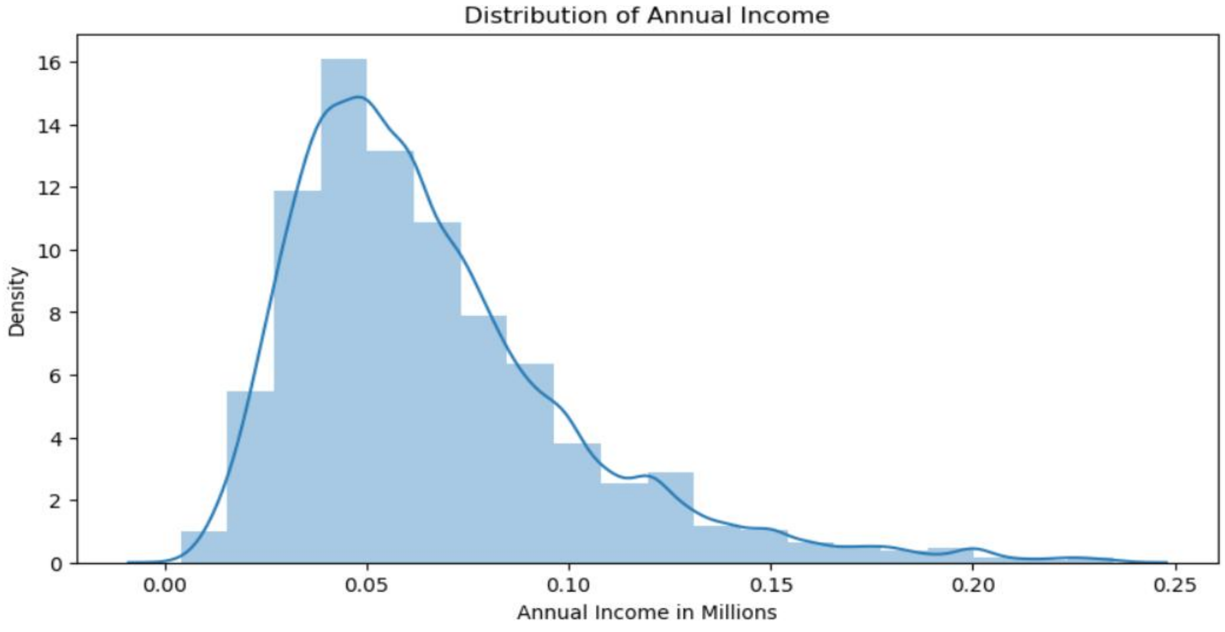


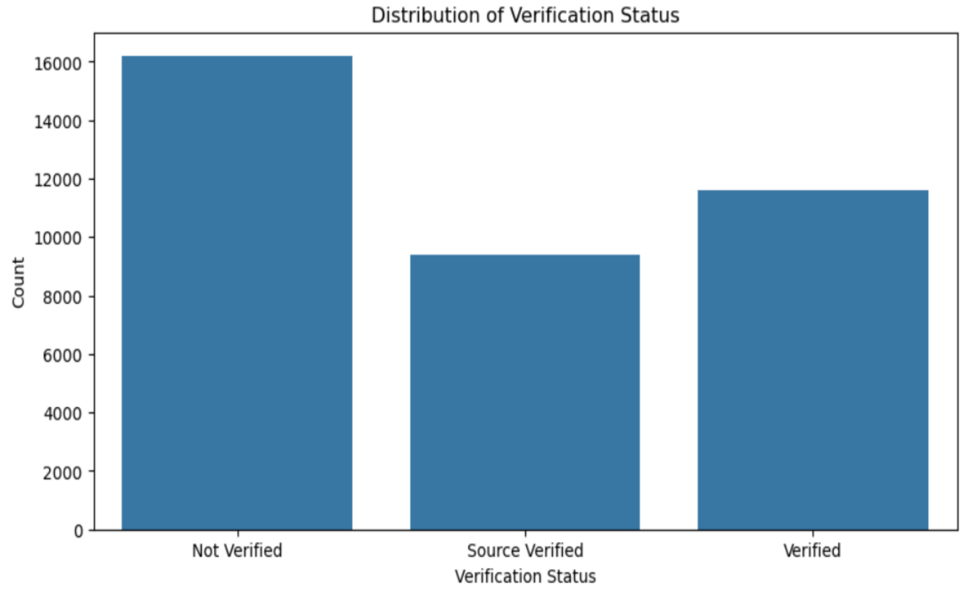




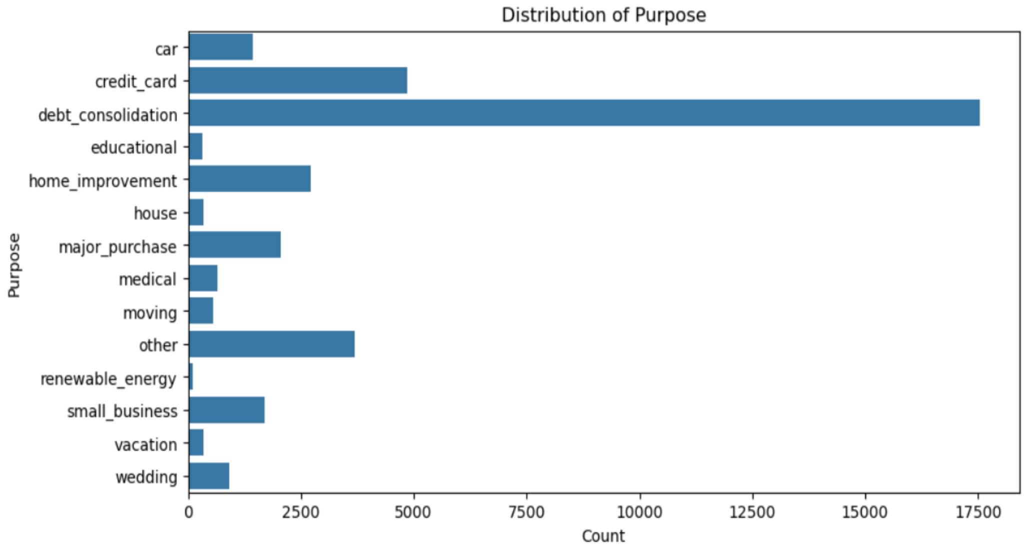
- Loans are taken mostly for Rent and Mortgage
- Around 50% of people are verified or source verified
- Annual income is left skewed so it is observed that majority of people have lower annual income

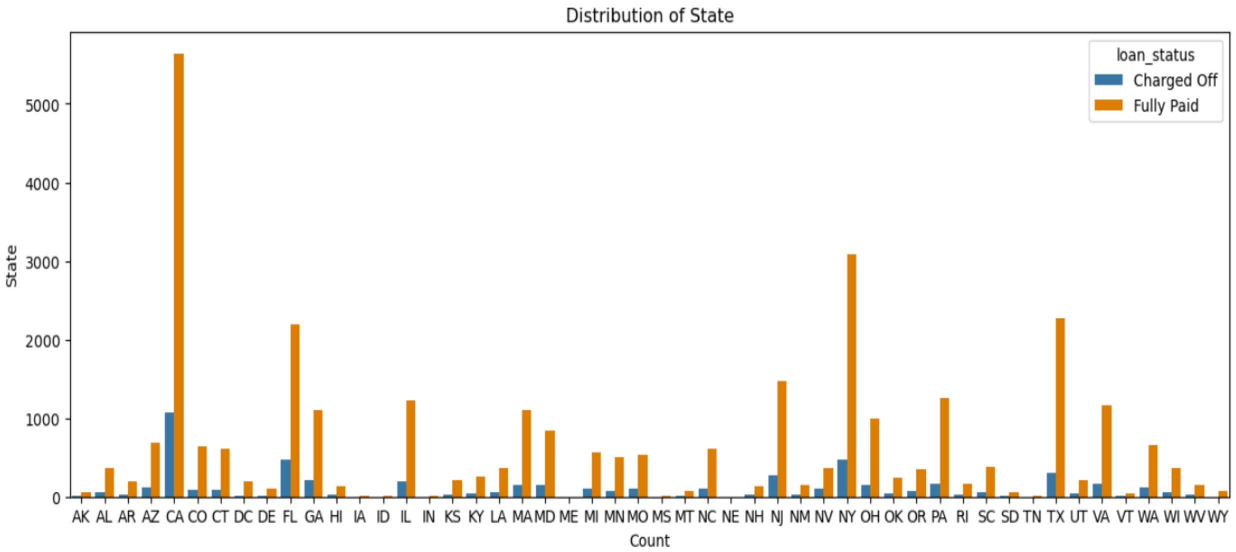


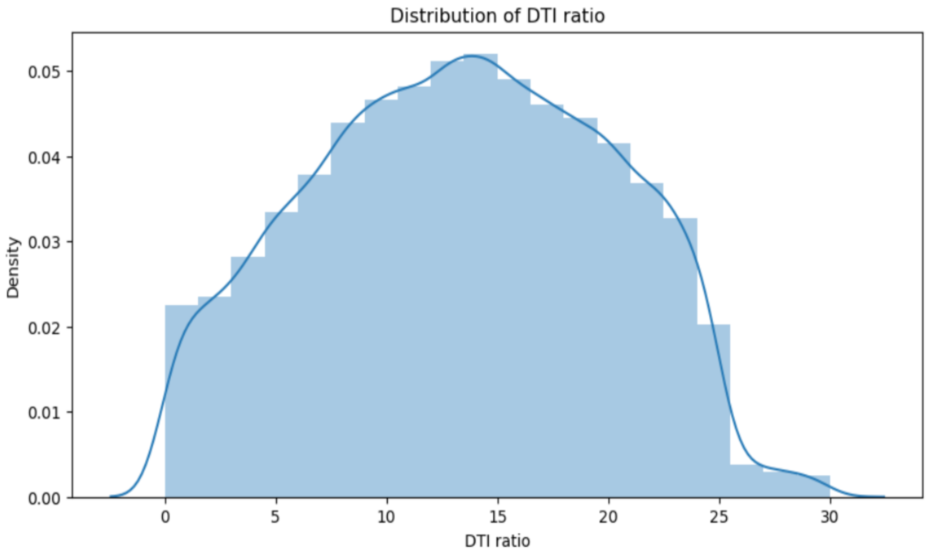




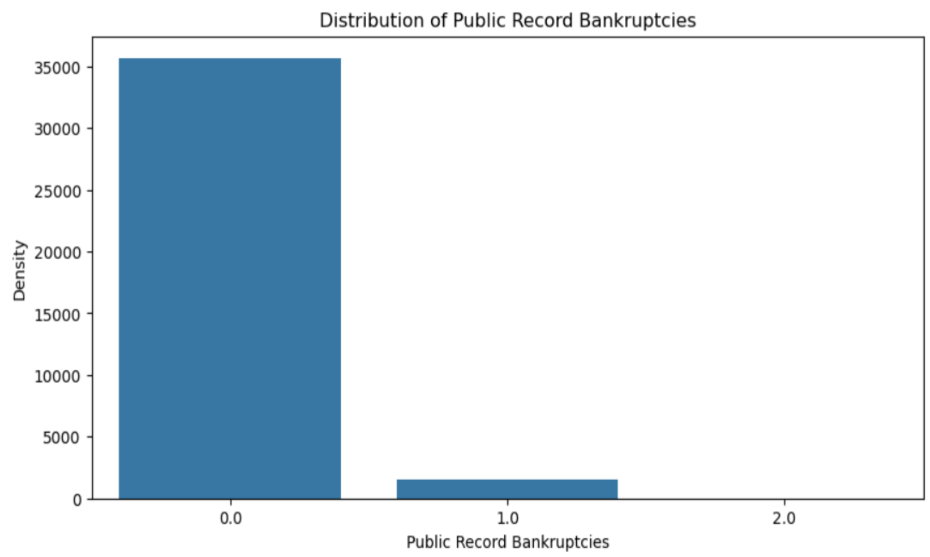
- More loans are taken for debt consolidation followed by credit card
- Majority of loan borrowers are from California, Florida, New York, Texas
- More borrowers have high level of debt to income ratio clustered within the 10-20 ratio range

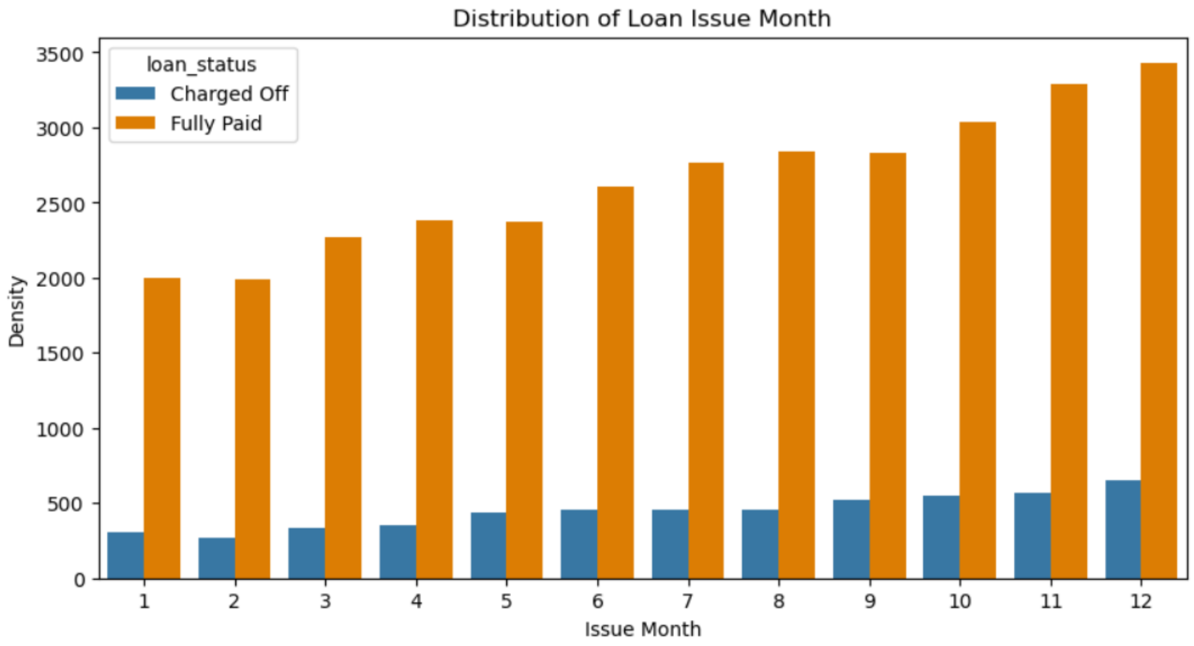


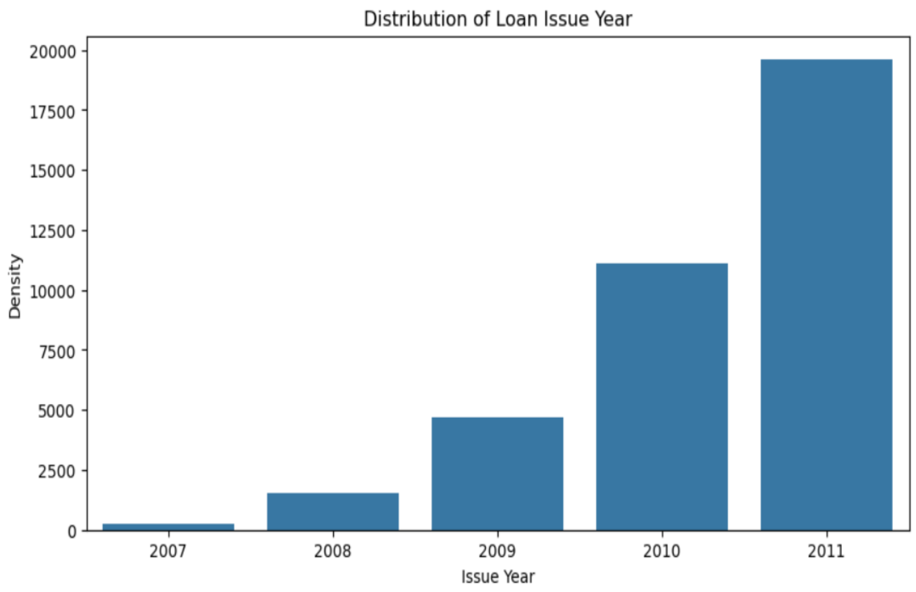




- Most of the borrowers don’t have any record of Public Record Bankruptcies
- More loans were given in the last quarter of year
- Number of loan approvals increases with time

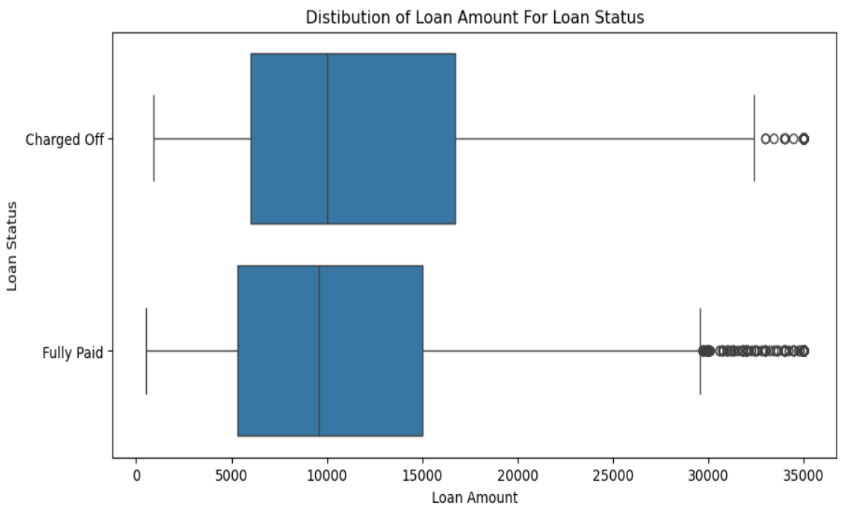


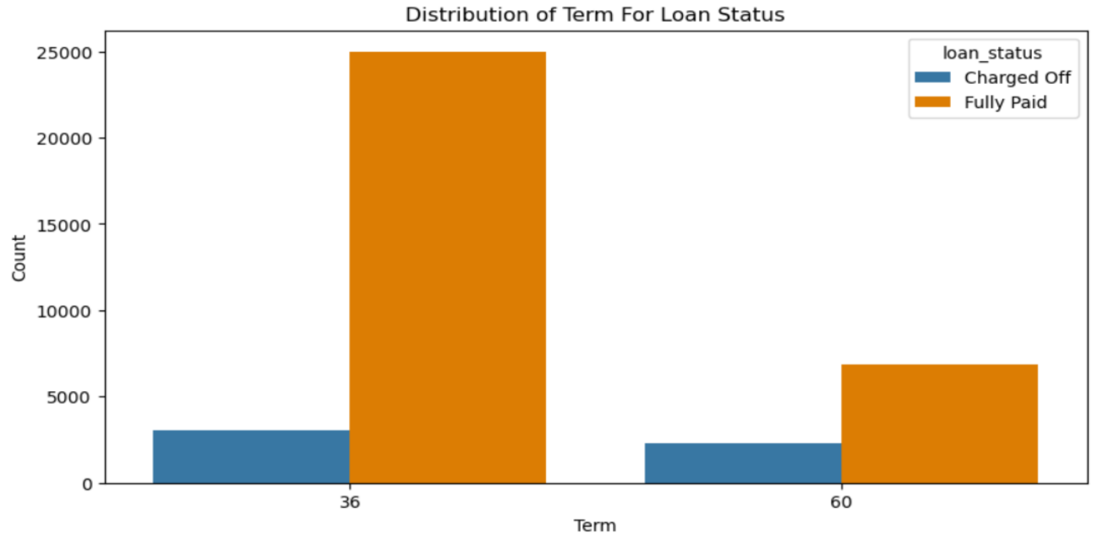


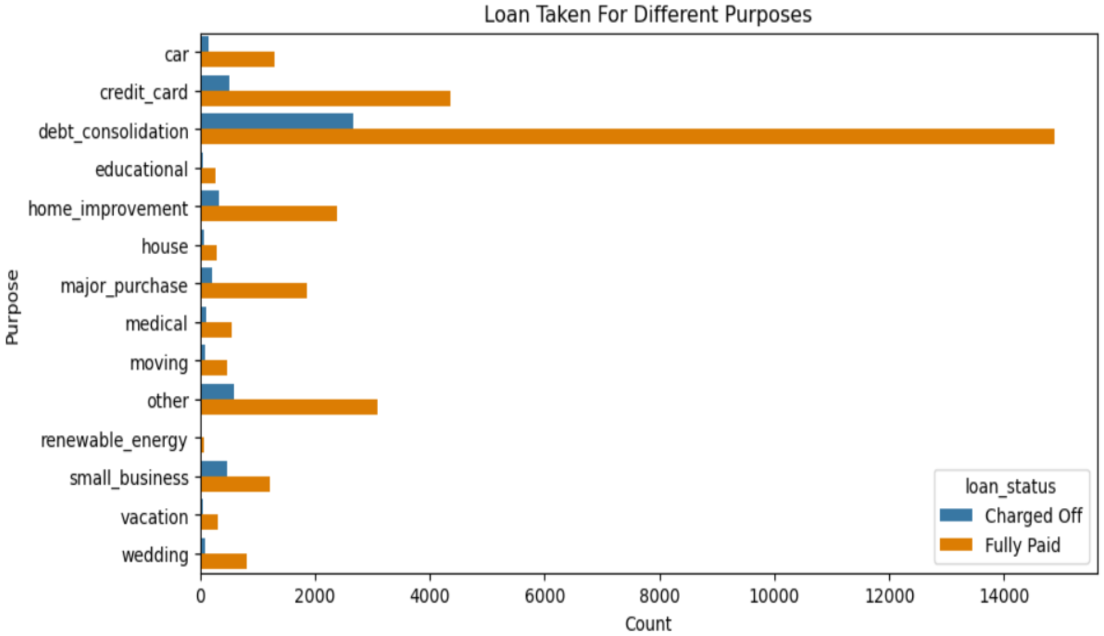


Segmented Univariate Analysis

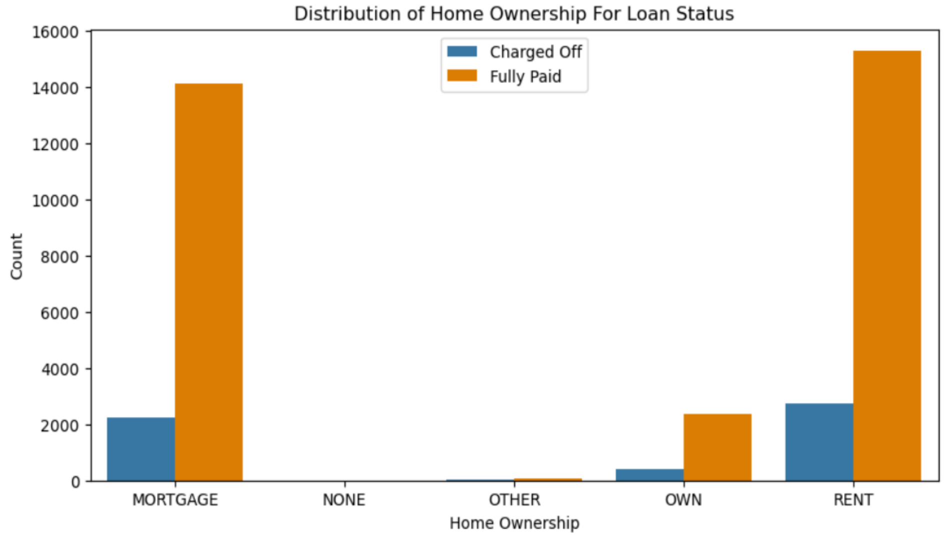
- It is observed that 75% percentile is more in defaulted loans and so we can say that large amount of loans has higher chances of defaulting
- Debt Consolidation is the most popular purpose for loan taken and it also has high number of people paying loans as well as defaulted
- People who have taken loans for less duration i.e 36 months have paid the loan amount in time.

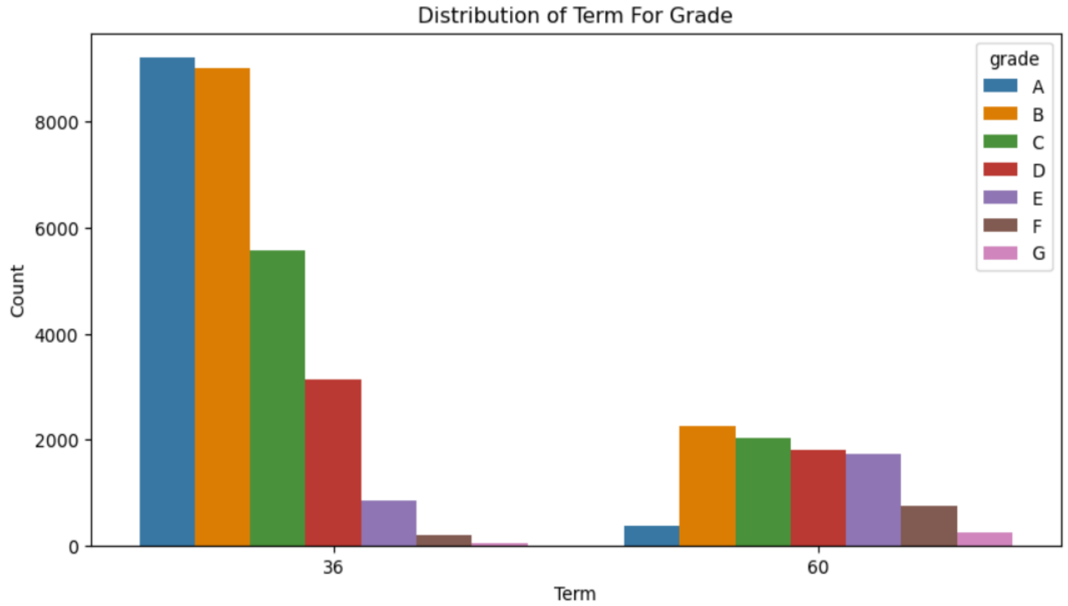


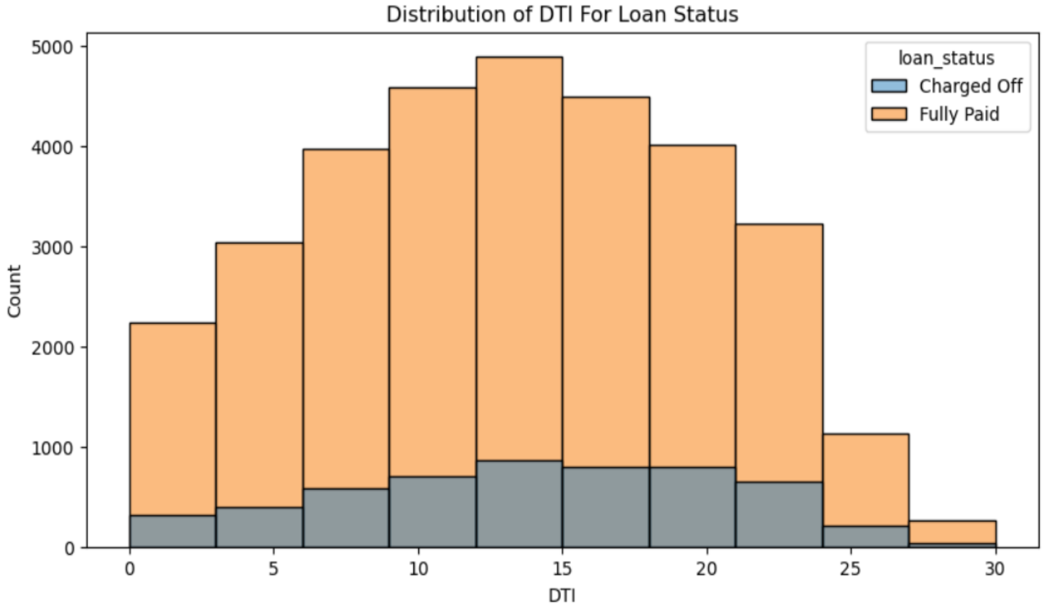




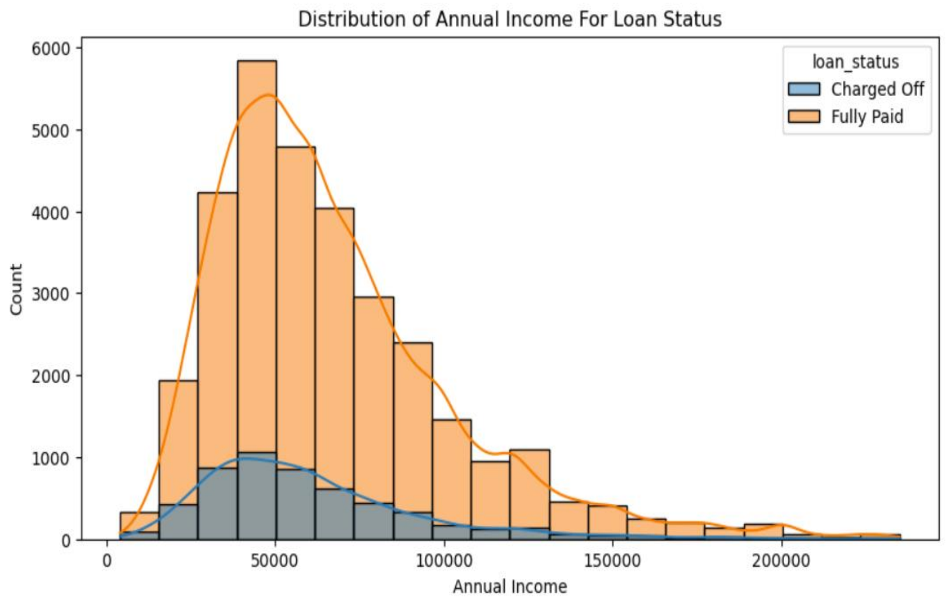
- People who have taken loans for less duration i.e 36 months are the people with higher grades like A and B
- Most borrowers fall within the 10-20 DTI range, and while higher DTIs are present, they don't show a significant increase in loan defaults.
- Most borrowers who either mortgage a home or rent have fully paid their loans and the defaulted numbers remains same for mortgage as well as rented people

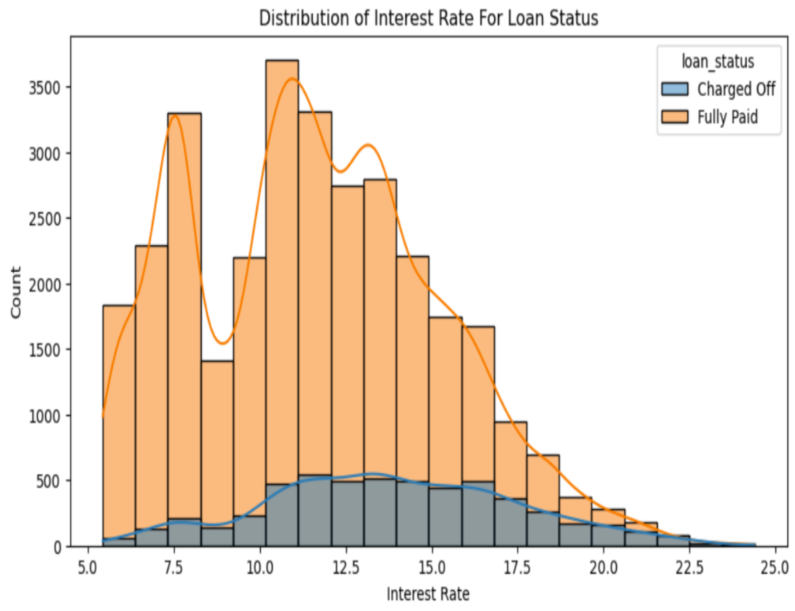


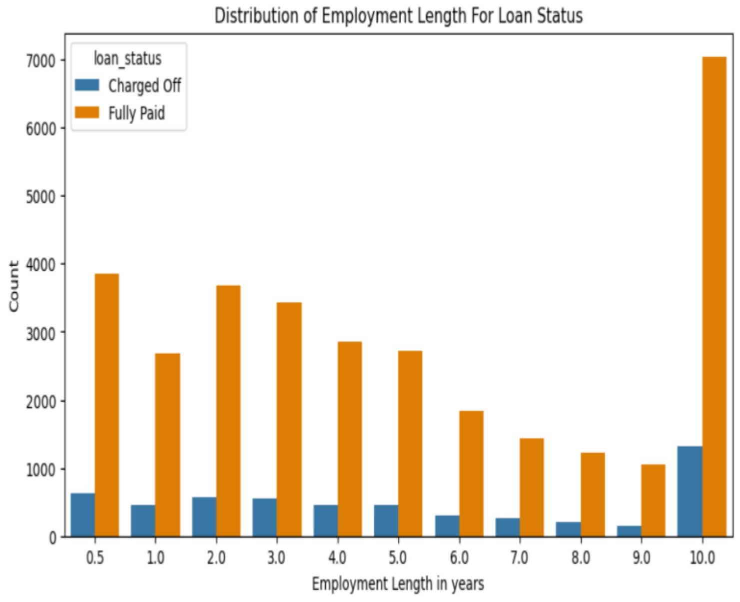


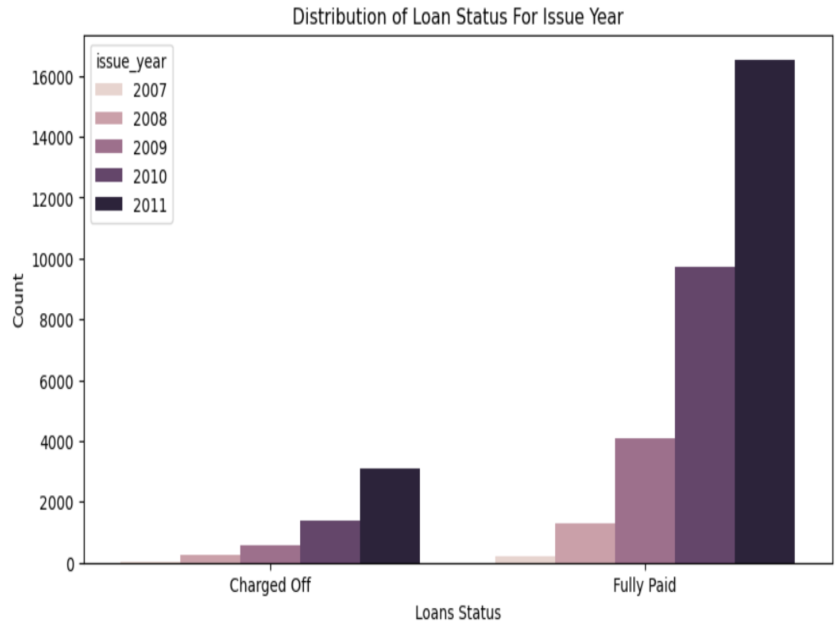


- Borrowers with annual income around 50k are more likely to default the loans compared to higher income people
- Fully paid loans are increasing with time compared to defaulted loans
- Defaulted loans are most common within the 5%-15% interest rate range, peaking around 8%, and then gradually decreasing as the interest rate rises beyond 17.5%.
- The Employees with 10+ years of experience are likely to default and have higher chance of fully paying the loan.



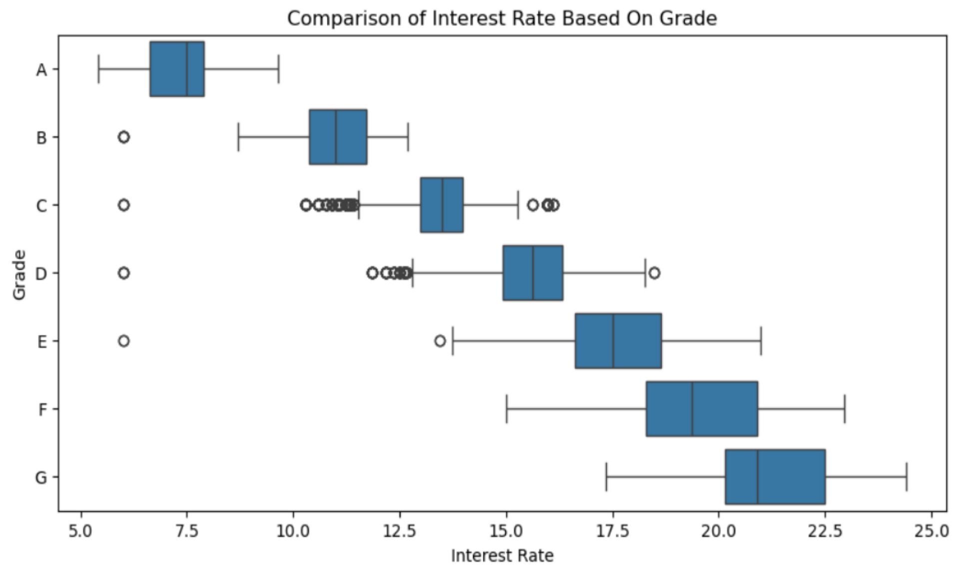


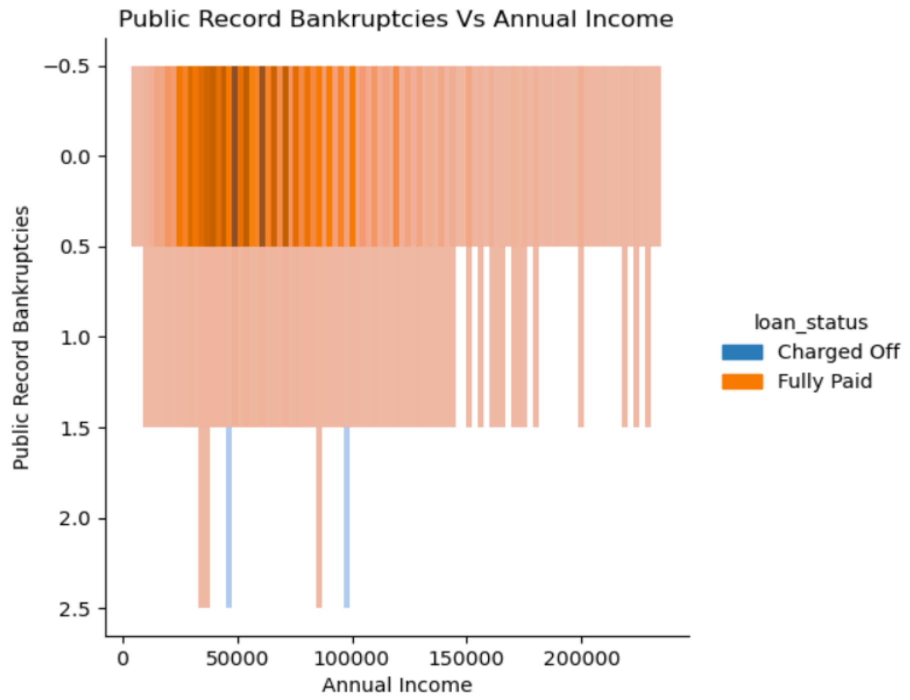




Bivariate Analysis

- Higher grades (A, B, C) are associated with lower interest rates, while lower grades (D, E, F, G) correspond to higher interest rates.
- Most of the borrowers have no public record of bankruptcies and so we can give loan safely.





Multivariate Analysis

- Interest rate and term are highly correlated which means that loans with longer terms tend to have higher interest rates.
- Annual income and DTI are least correlated which means that a person's income doesn't strongly affect their debt-to-income ratio.

Conclusions

- Defaulted loans are significantly fewer than fully paid loans, with 36-month loans being more common and loans predominantly taken by higher-grade borrowers.
- Loans average $9,800 and are mainly for rent, mortgage, and debt consolidation, with interest rates clustering around 7.5% and 10-15%, and longer-term loans having higher rates.
- Debt consolidation loans show high rates of both full repayment and default, with higher loan amounts and annual incomes around $50,000 being more likely to default.
- Higher grades (A, B, C) are linked to lower interest rates, while lower grades (D, E, F, G) face higher rates, and most borrowers have no public bankruptcy records, indicating a generally safer profile.

Recommendations

- Tighten criteria for 36-month loans due to higher default rates and focus on higher-grade borrowers (A and B) with over 10 years of experience.
- Monitor and manage interest rates, particularly in the 5-15% range, and offer competitive rates for longer-term loans.
- Prioritize approving 36-month loans, especially for borrowers seeking debt consolidation or credit card debt relief.
- Provide financial education to lower-income borrowers, offer better terms for those without public bankruptcy records, and consider work experience and property ownership in loan assessments.