

LENDING CLUB CASE STUDY

Contributors:

Shivani M Rao

Jaiganesh Jayaraman

ABSTRACT

- The finance company specializes in offering diverse loans, including personal and business loans to customers.
- Employing Exploratory Data Analysis (EDA) on historical records for informed decision-making to predict whether the applicant will default or not.
- Uncover patterns and indicators linked to loan defaults, enabling proactive risk mitigation.
- EDA-derived insights will directly enhance portfolio management and refine risk assessment strategies for optimal decision.

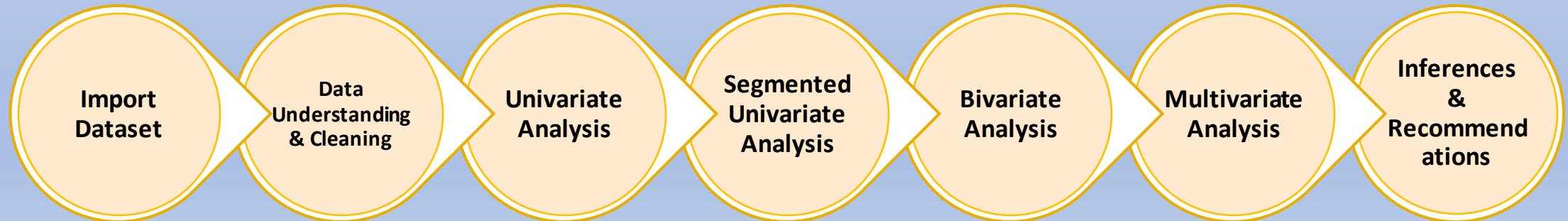
Business Understanding:

The business objective is to take a decision whenever they receive a loan application whether to reject or approve based on certain variables.

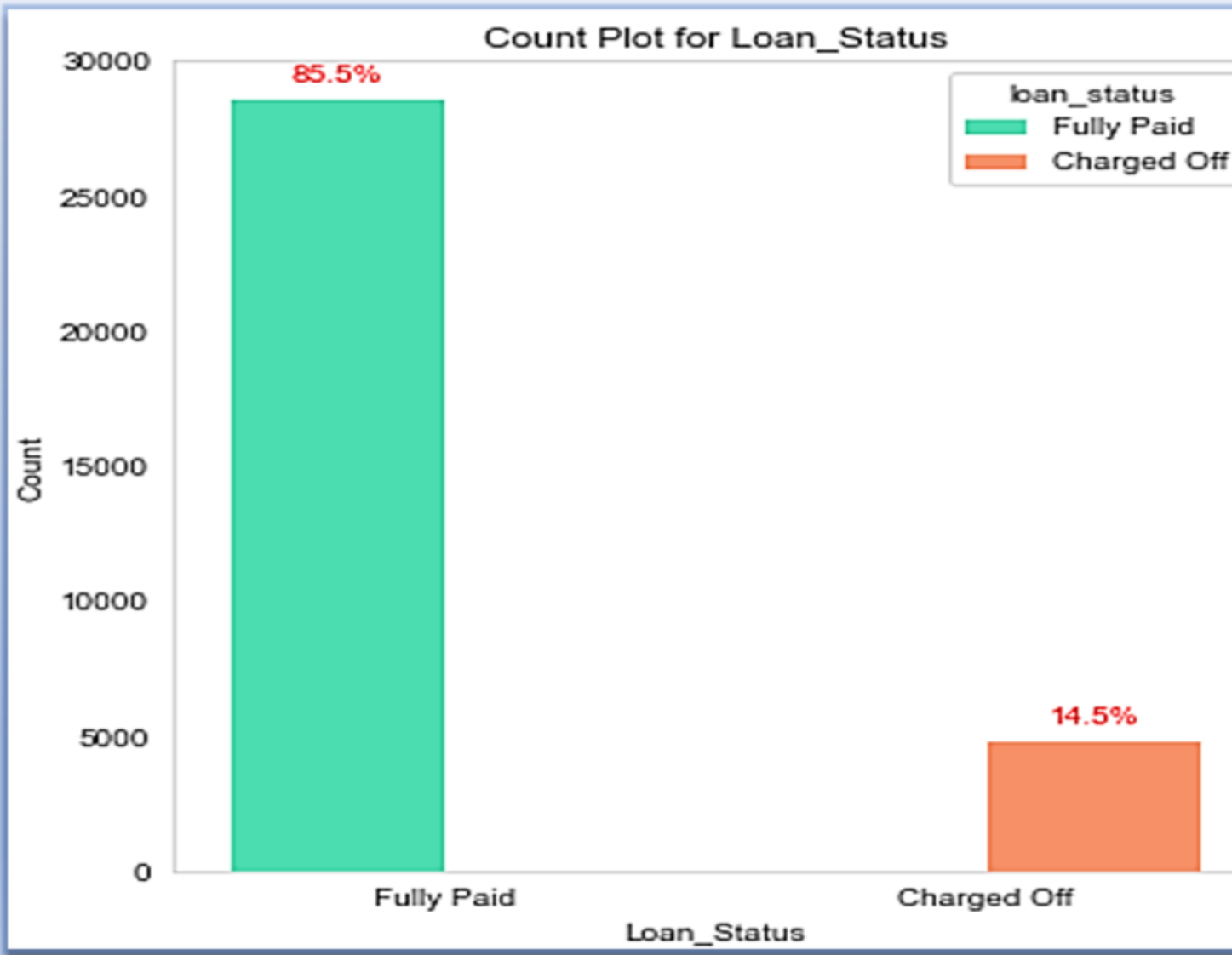
Dataset Dictionary:

The dataset contains information about loans that were approved between 2007 and 2011. It includes details about the loan status, which can be categorized as 'Fully Paid,' 'Current,' or 'Charged Off.' It's important to note that the dataset focuses solely on approved loans and does not provide information about loans that were rejected. Additionally, the dataset indicates whether each loan has experienced a default or not.

Workflow:



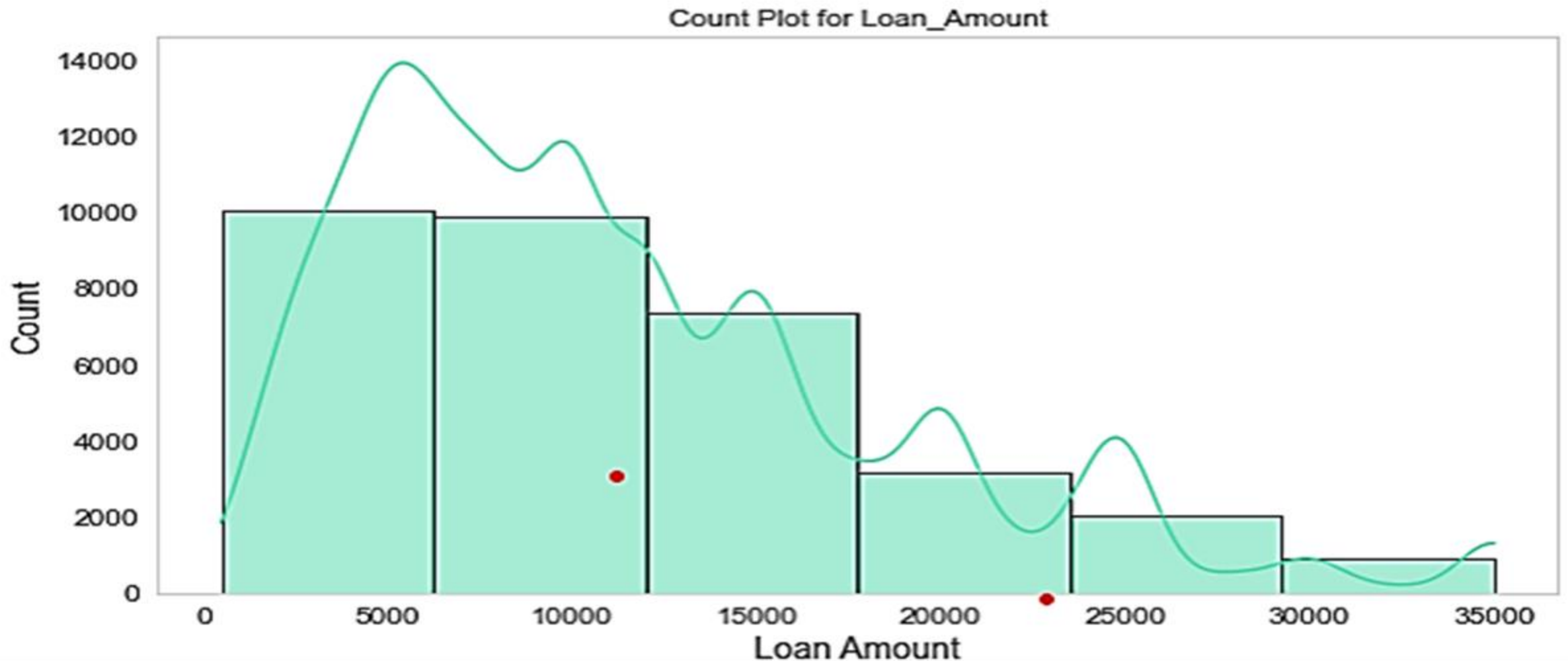
ANALYSIS OF LOAN_STATUS



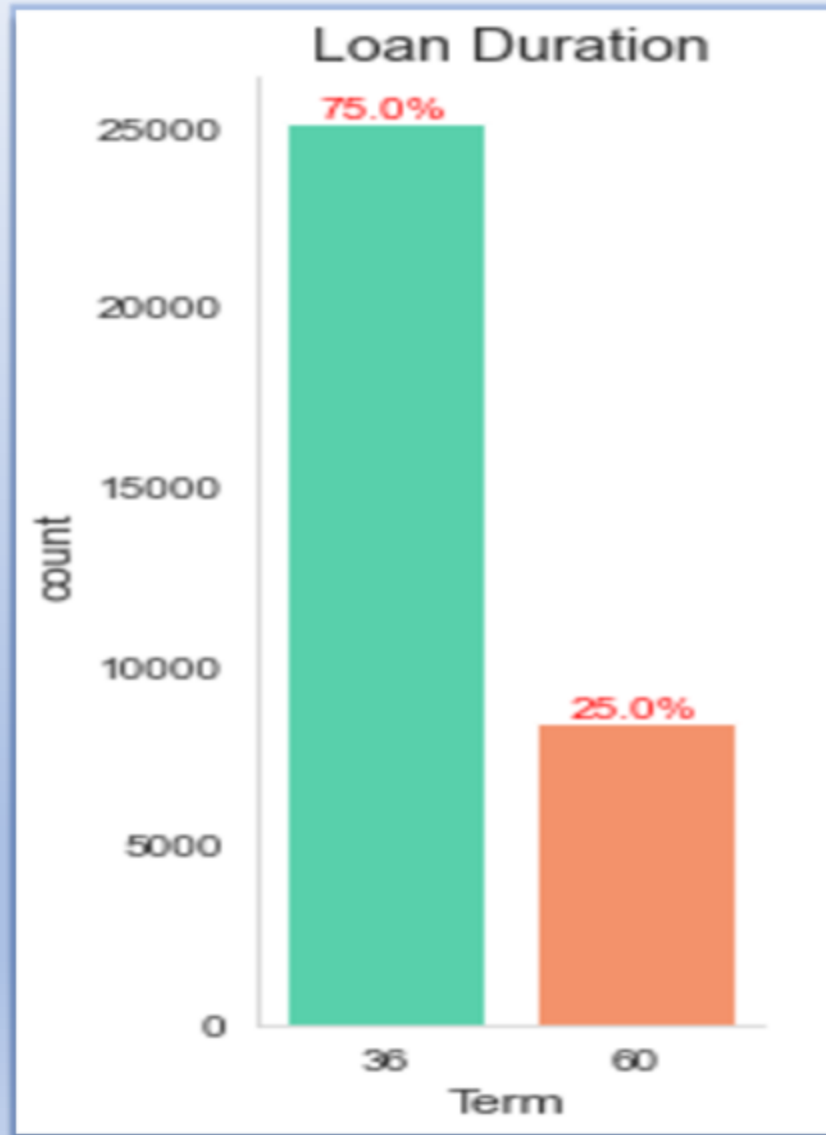
- Loan Status is the target variable.
- 14.5% of loans are Charged off or Defaulted.
- 85.5% of loans are Fully paid or Non Defaulted.

ANALYSIS OF LOAN AMOUNT

- Loan Amount is majorly spread across 6000 to 18000 approximately.



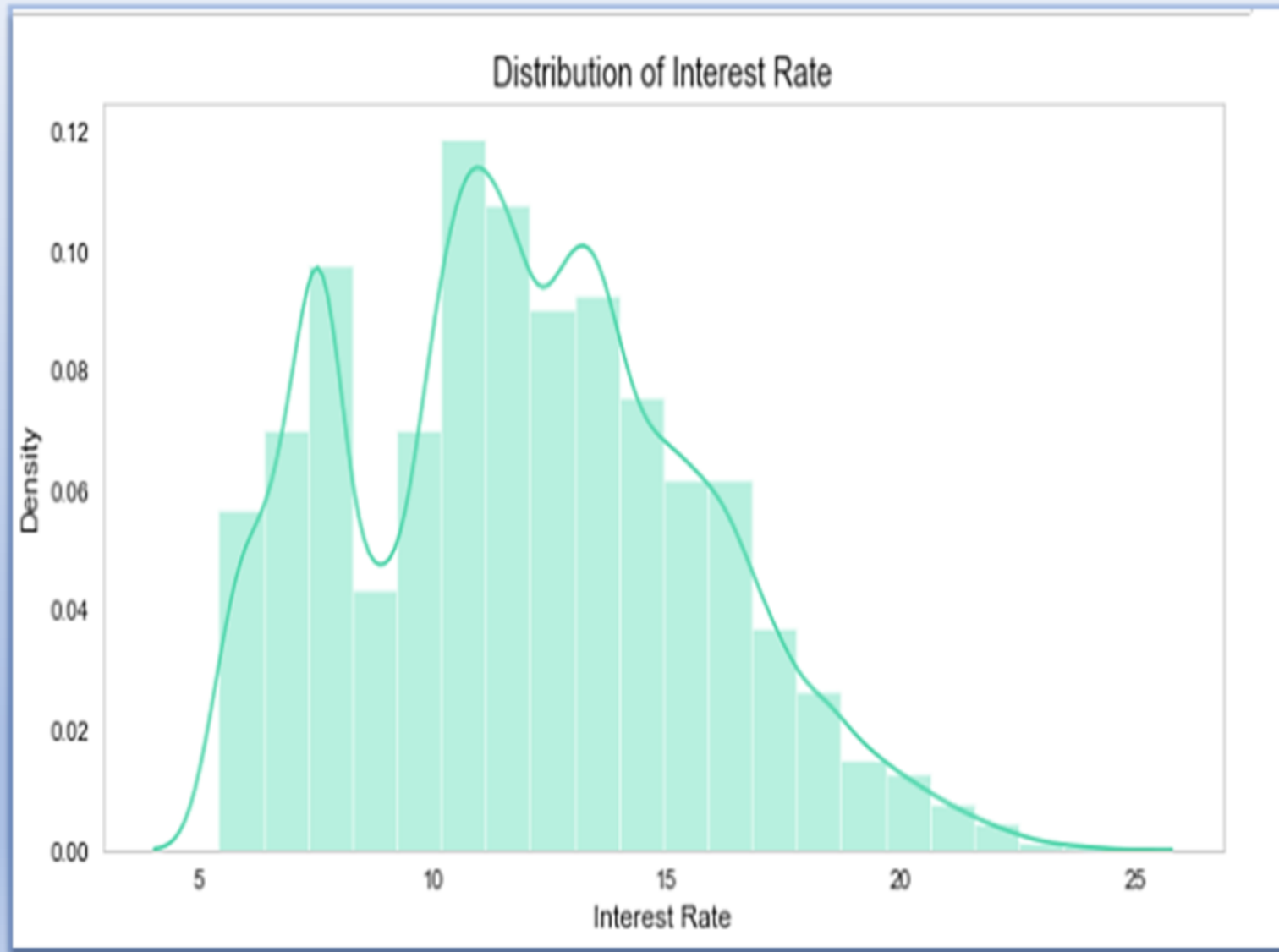
ANALYSIS OF LOAN AMOUNT



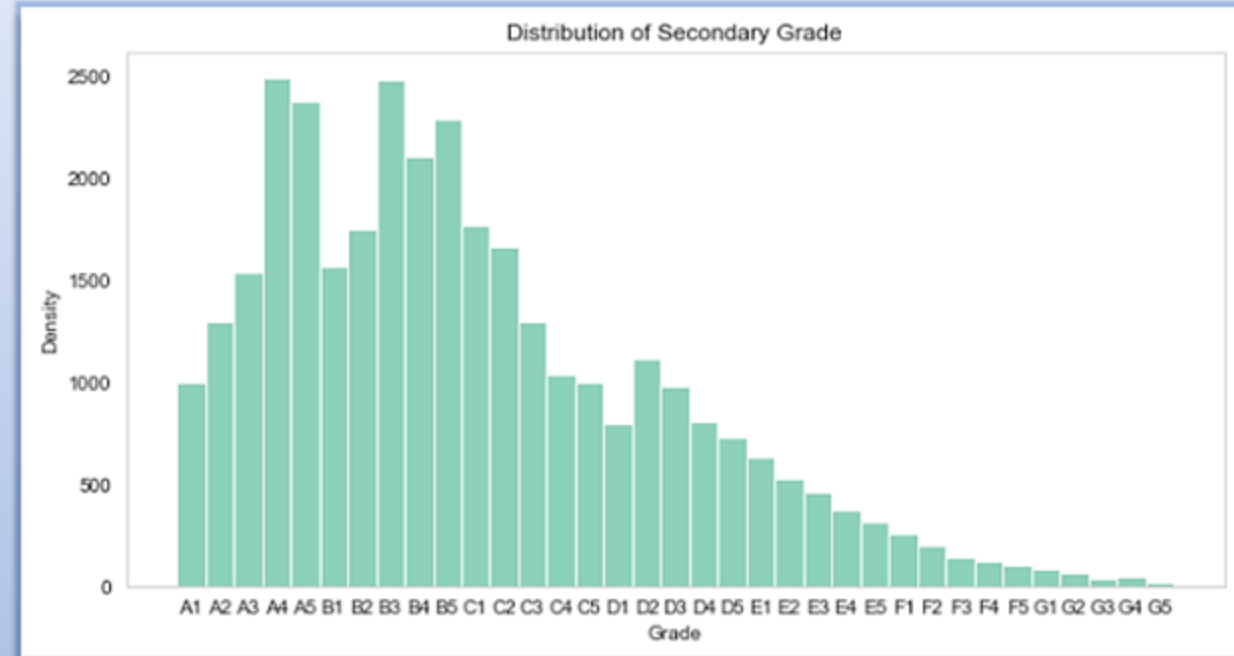
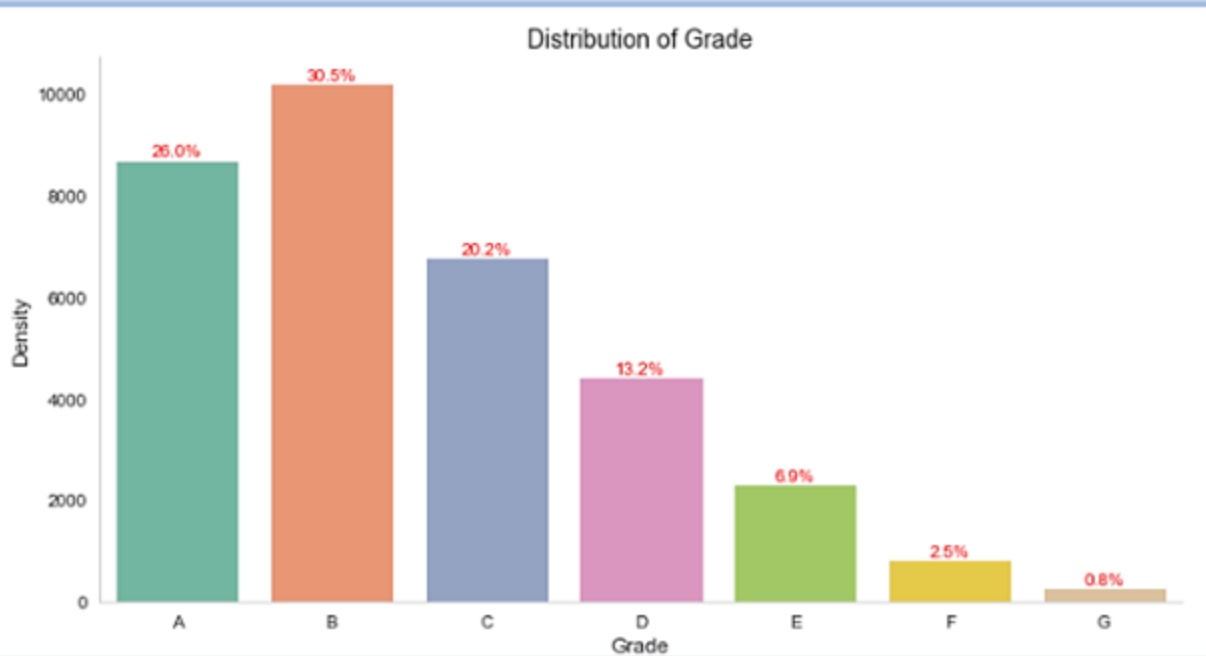
- Majority of people prefer loan with duration of 36 months.

ANALYSIS OF INTEREST RATE

- Interest rate is majorly spread between 8-14%.



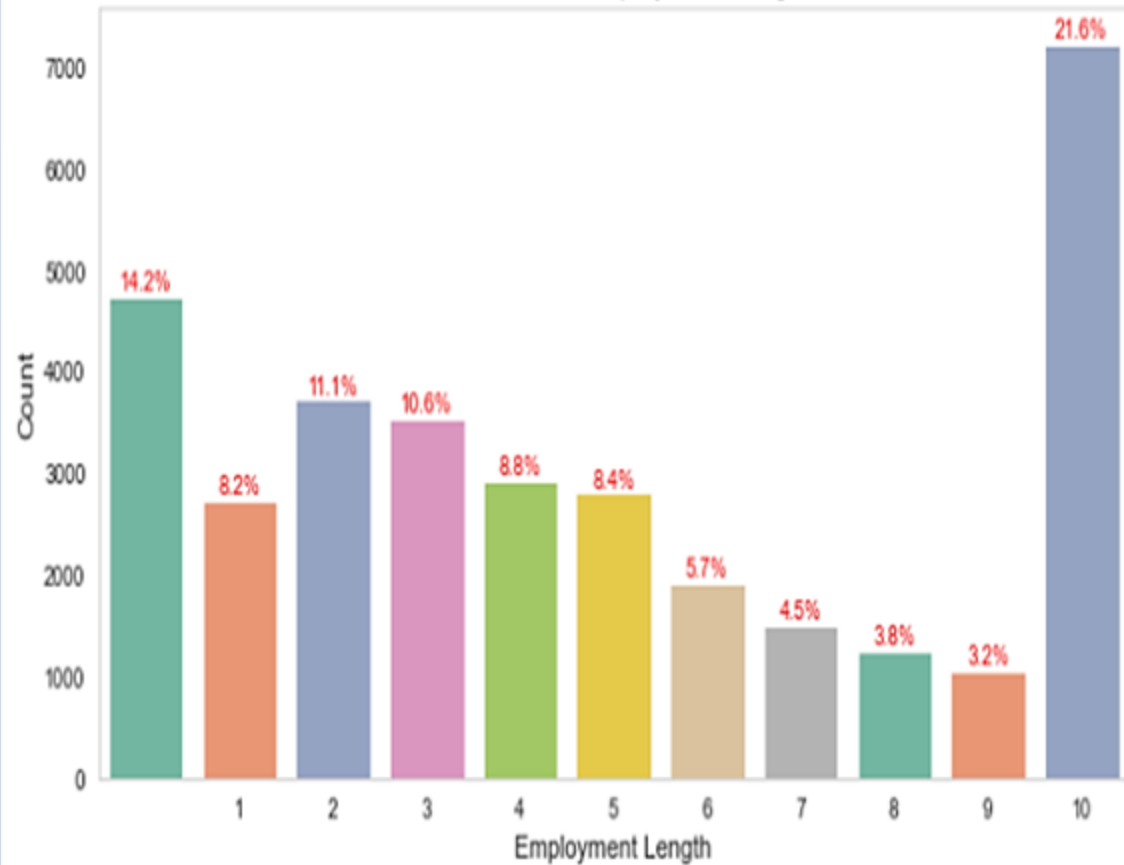
ANALYSIS OF GRADE & SUB GRADE



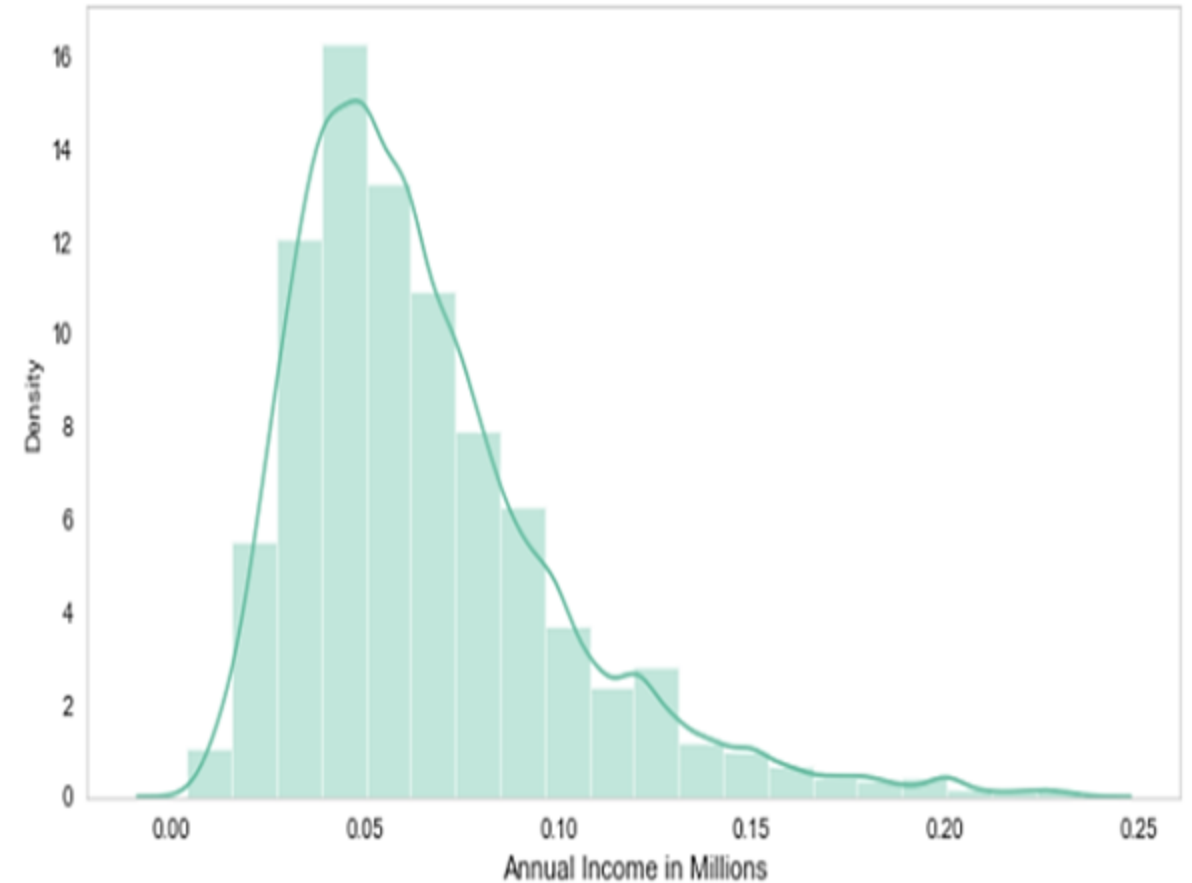
- Majority of applicants fall under grade B - 30.5% followed by grade A – 26%. Majority lies in subgrade A4,A5,B3 and B5.

ANALYSIS OF EMP_LENGTH, INCOME

Distribution of Employment Length



Distribution of Annual Income



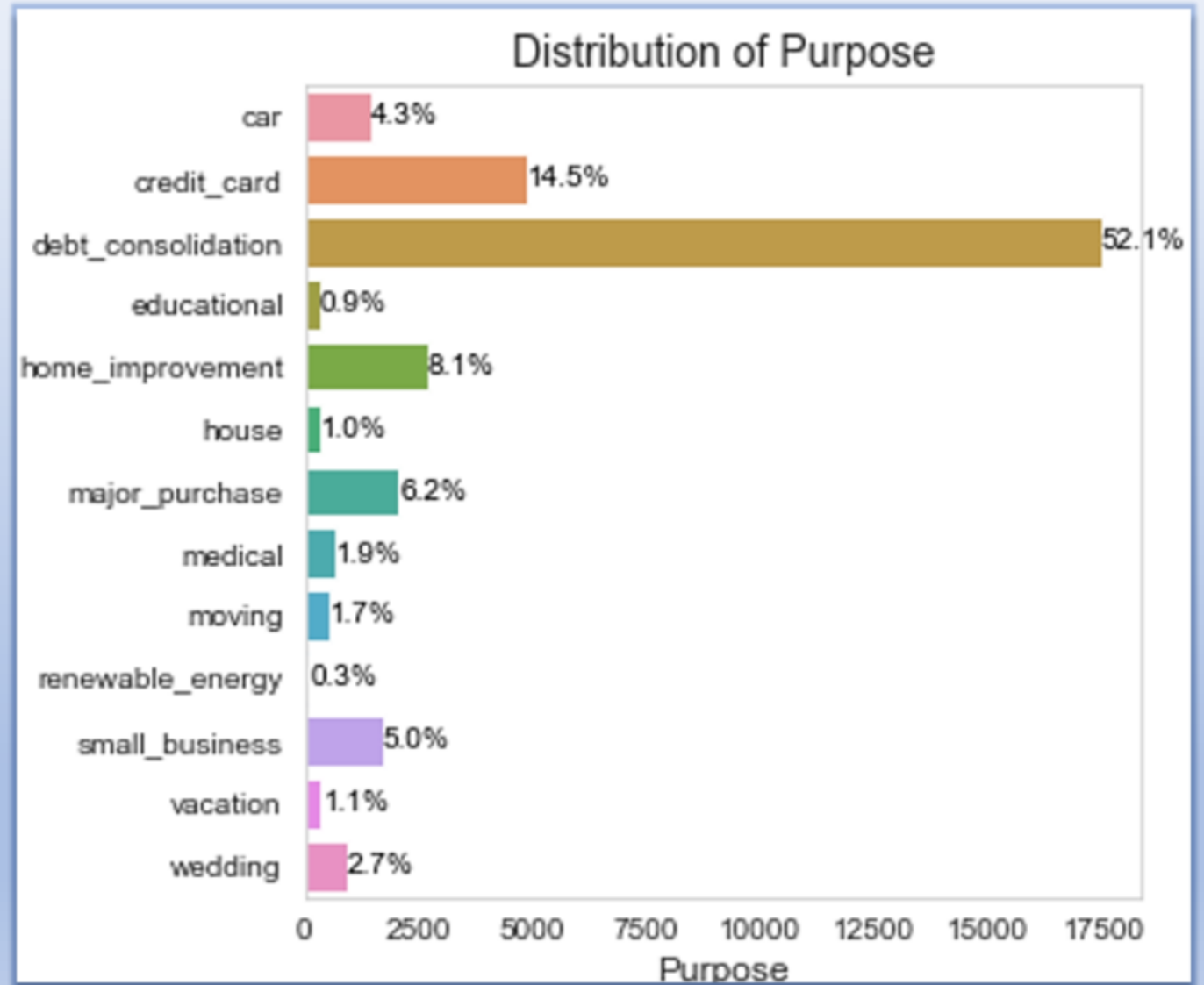
- Employee with 10 or more years have 21% distribution. Annual Income of majority applicant is 40k-75k

PURPOSE DISTRIBUTION ANALYSIS

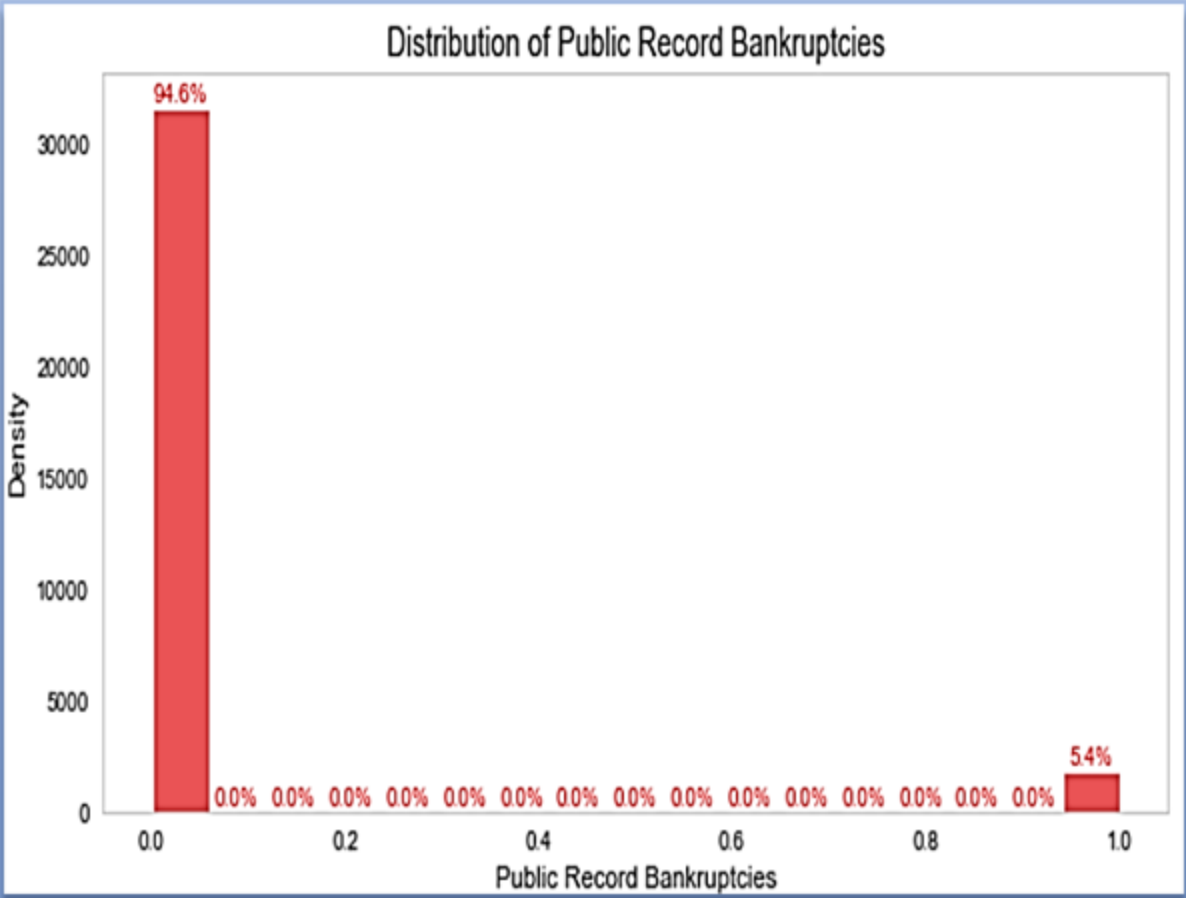
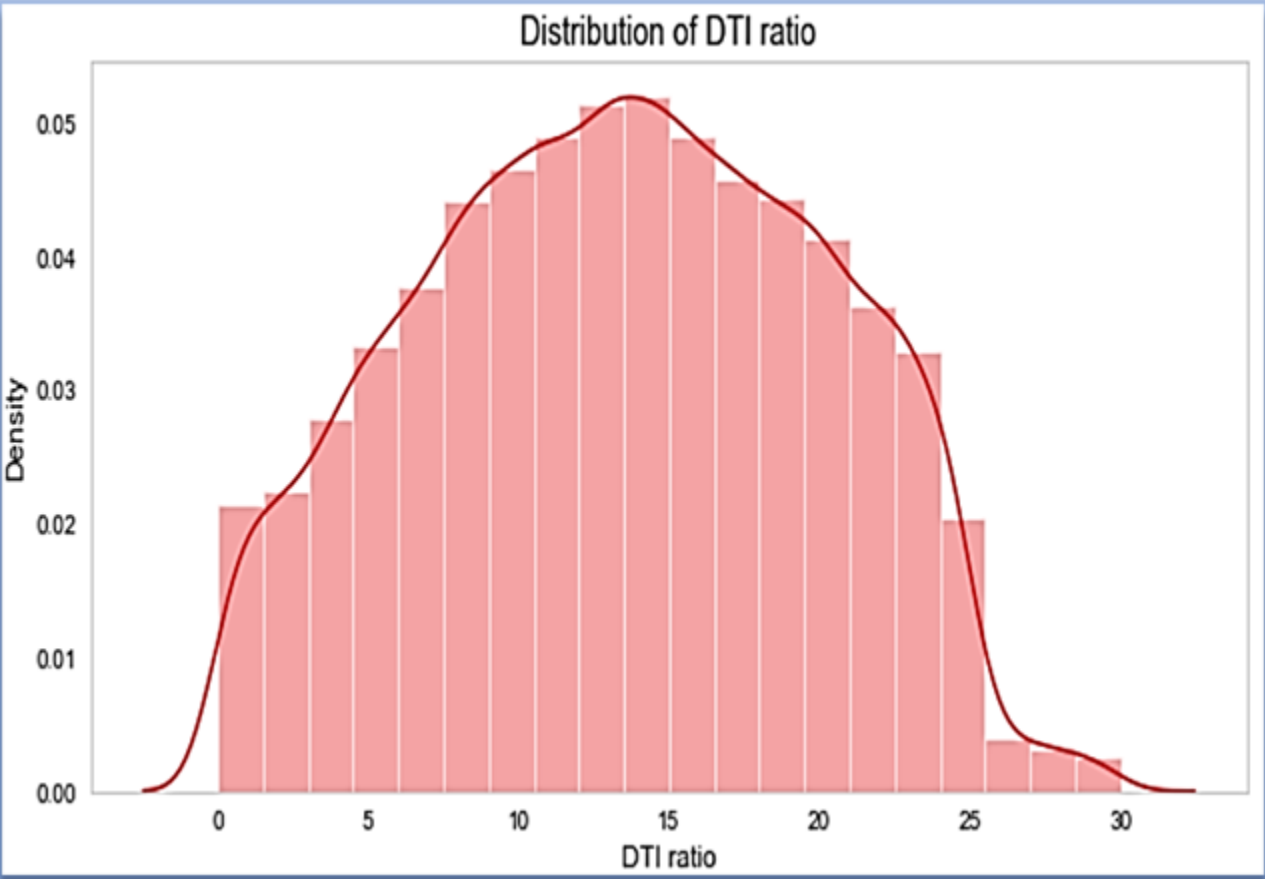
- Debt_Consolidation is the main purpose for obtaining loans.

Top 5 purposes for loan:

- debt_consolidation – 52.1%
- credit_card – 14.5%
- home_improvement – 8.1%
- major_purchase – 6.2%
- small_business-5%

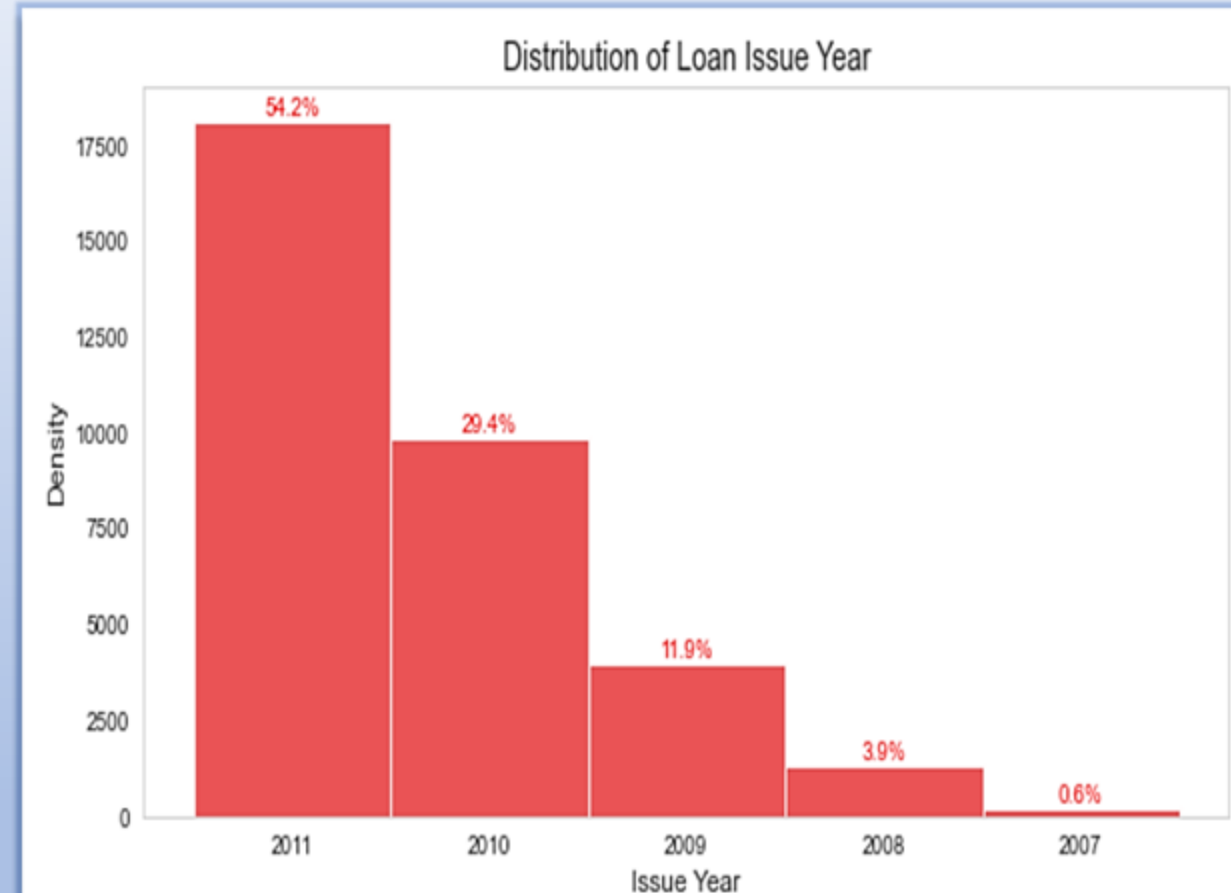
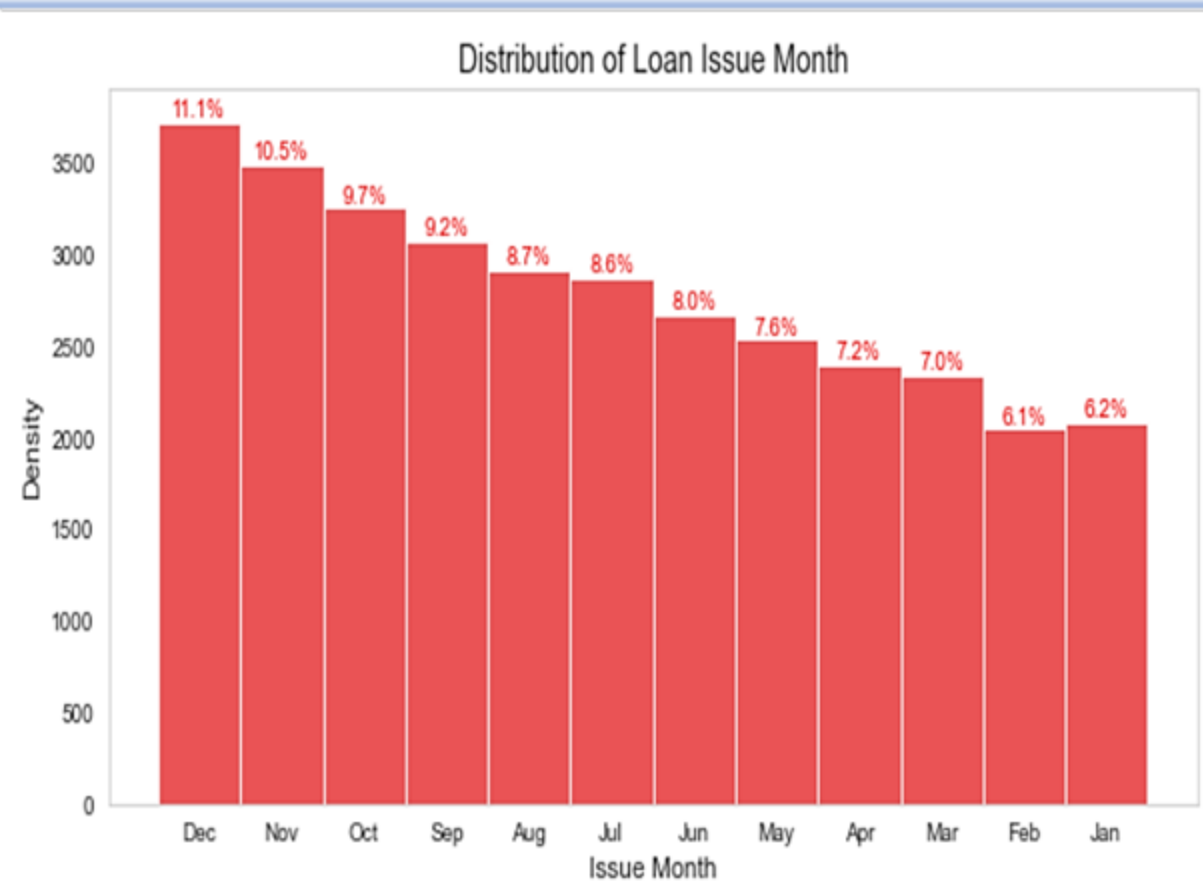


DTI RATIO PUBLIC RECORD BANKRUPTCIES ANALYSIS



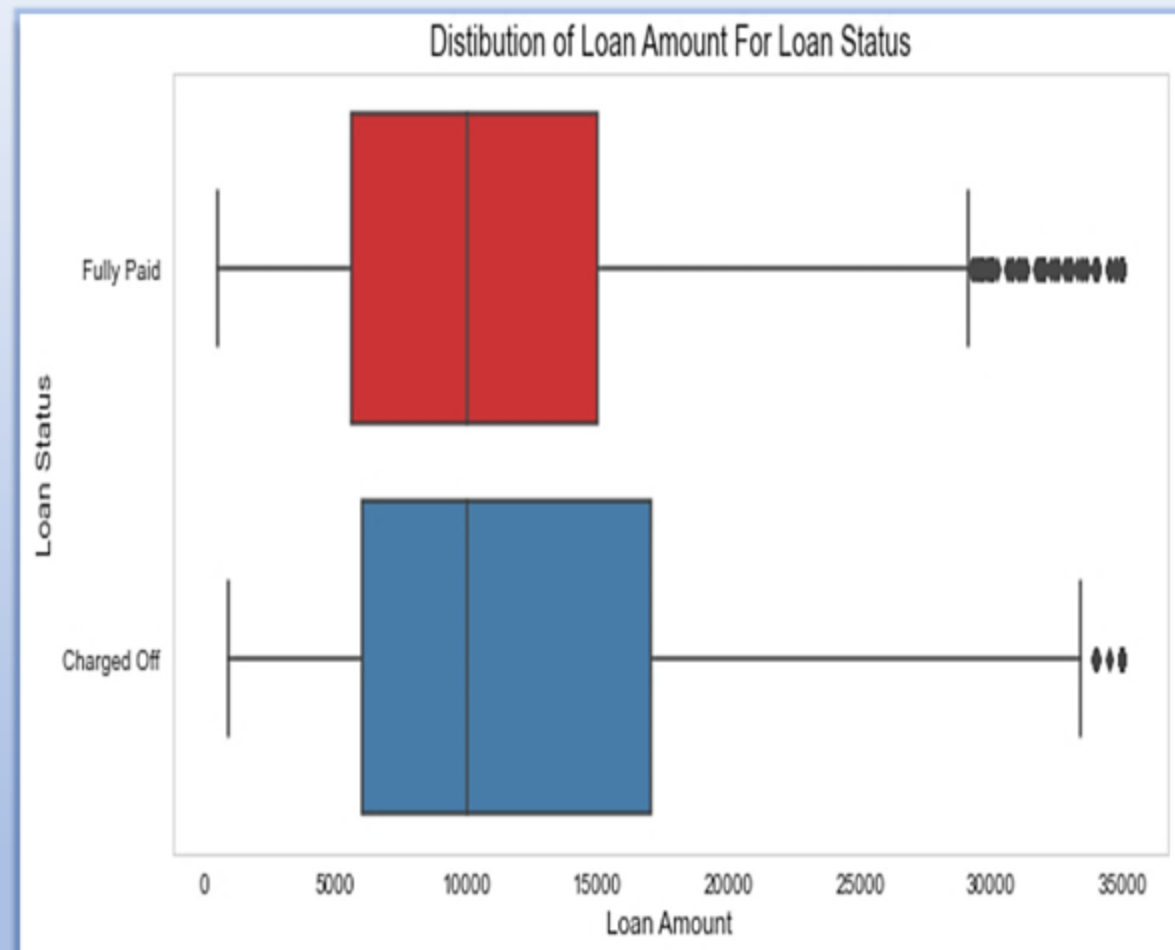
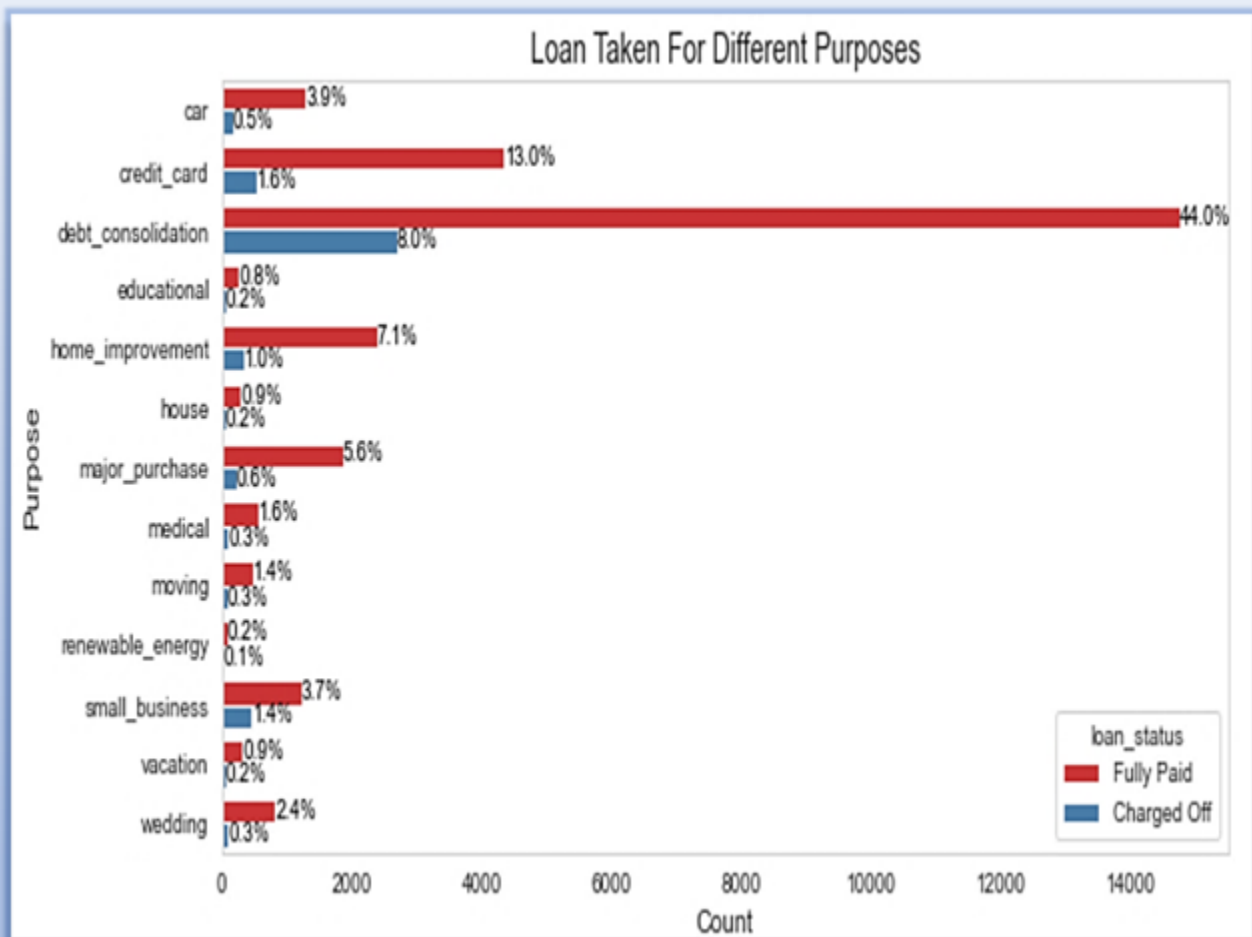
- Majority of DTI lies between 10-20, with average of 13.39

ISSUE MONTH AND YEAR ANALYSIS



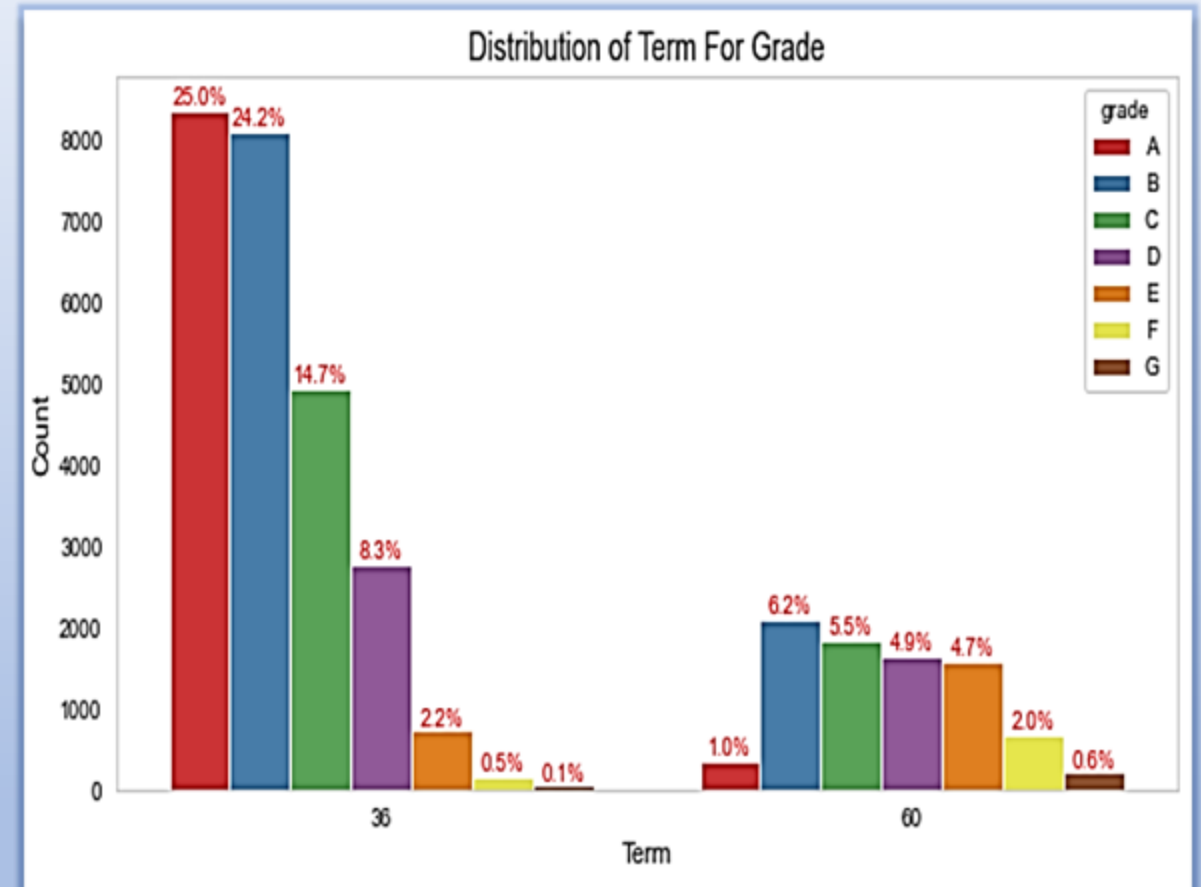
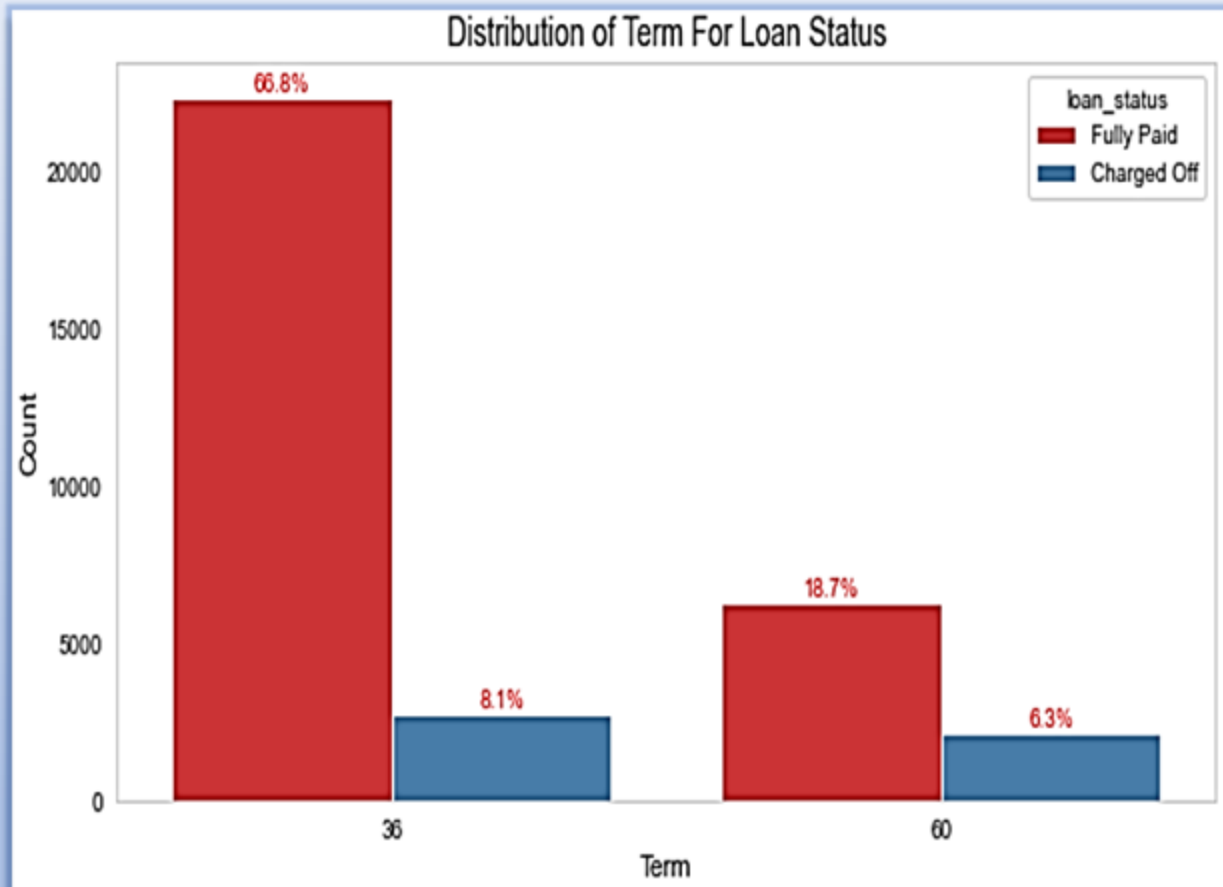
- Most of loans are issued in second half of year majority in December. We see increase in loans offered with years with 2011 having 54.2%

LOAN AMOUNT, TERM, LOAN STATUS ANALYSIS



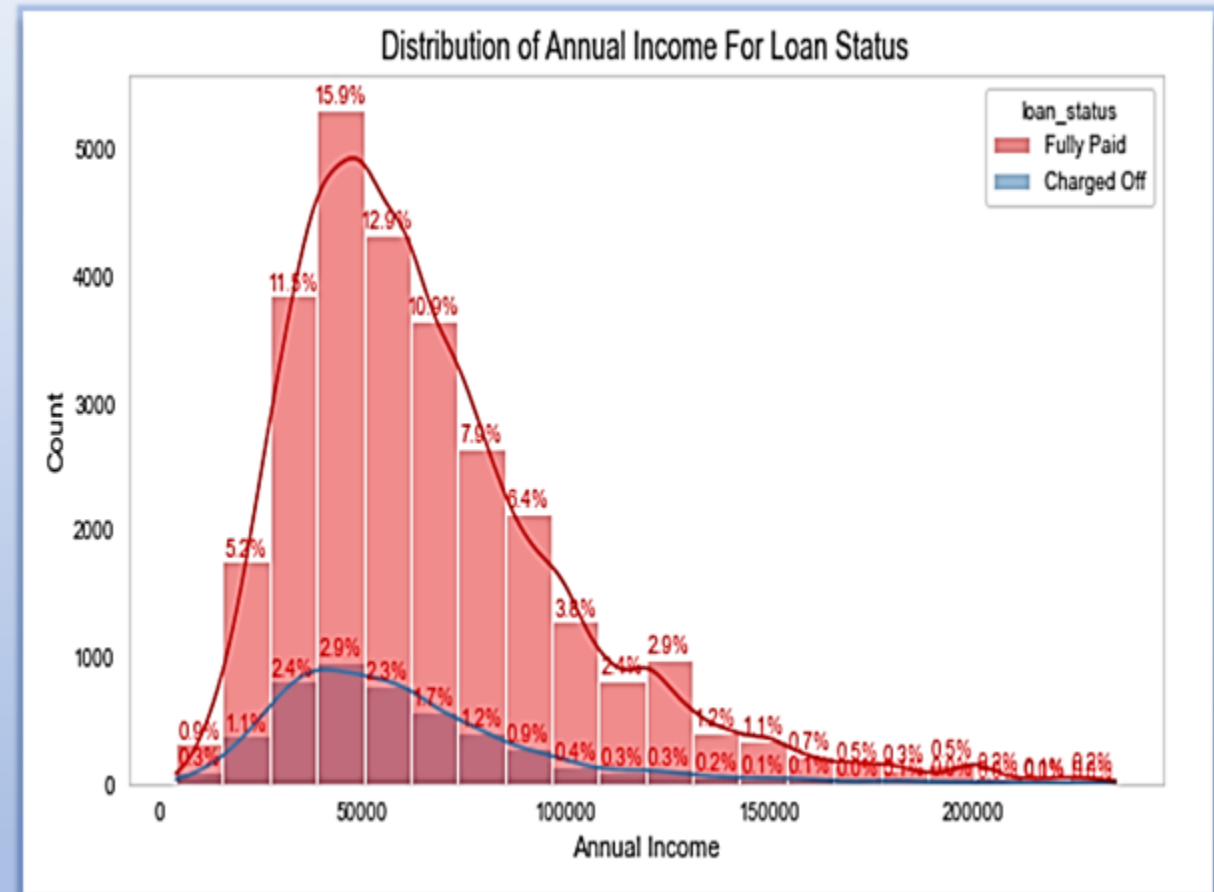
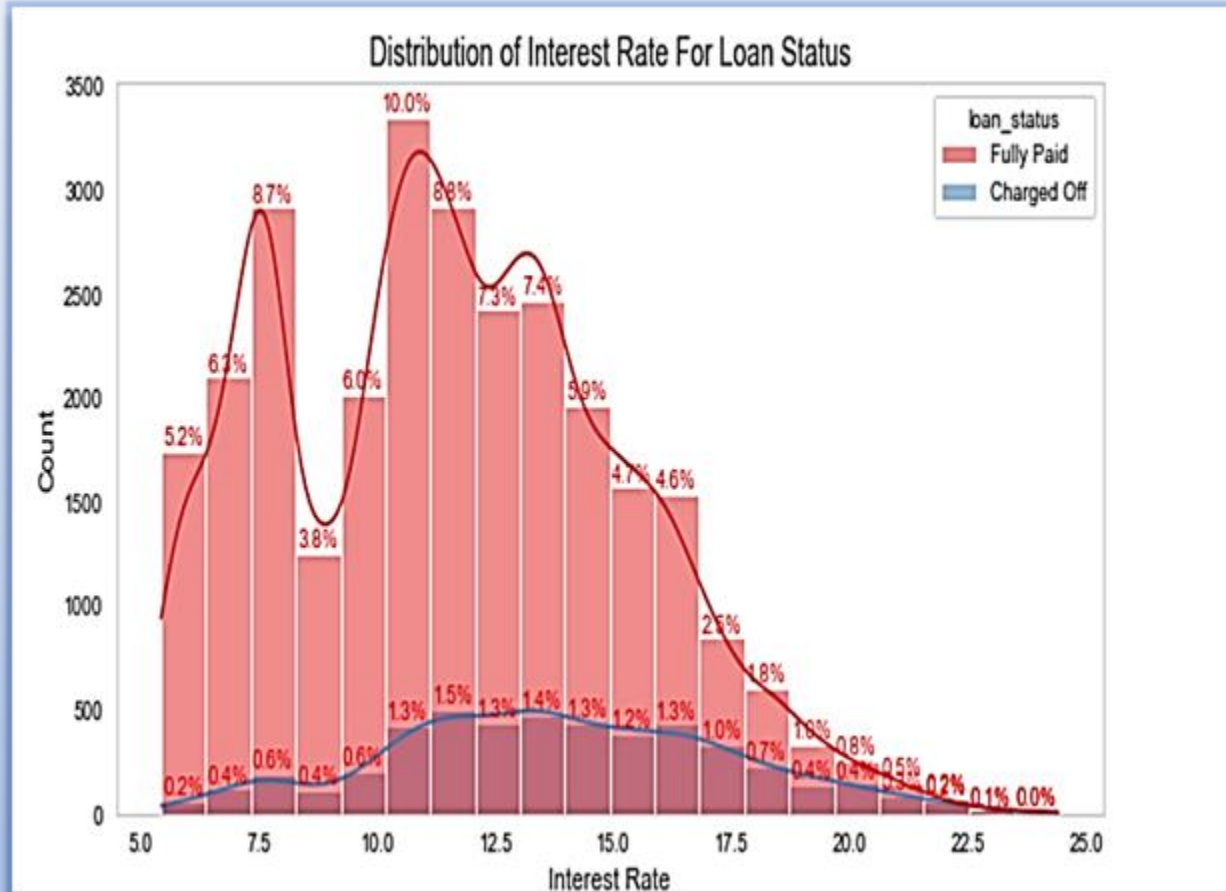
- Applicants default more when loan amount is increasing , majorly for loan amount of 15000 and above.
- Majority of Charges off is for debt consolidation 8%

TERM, GRADE AND LOAN STATUS ANALYSIS



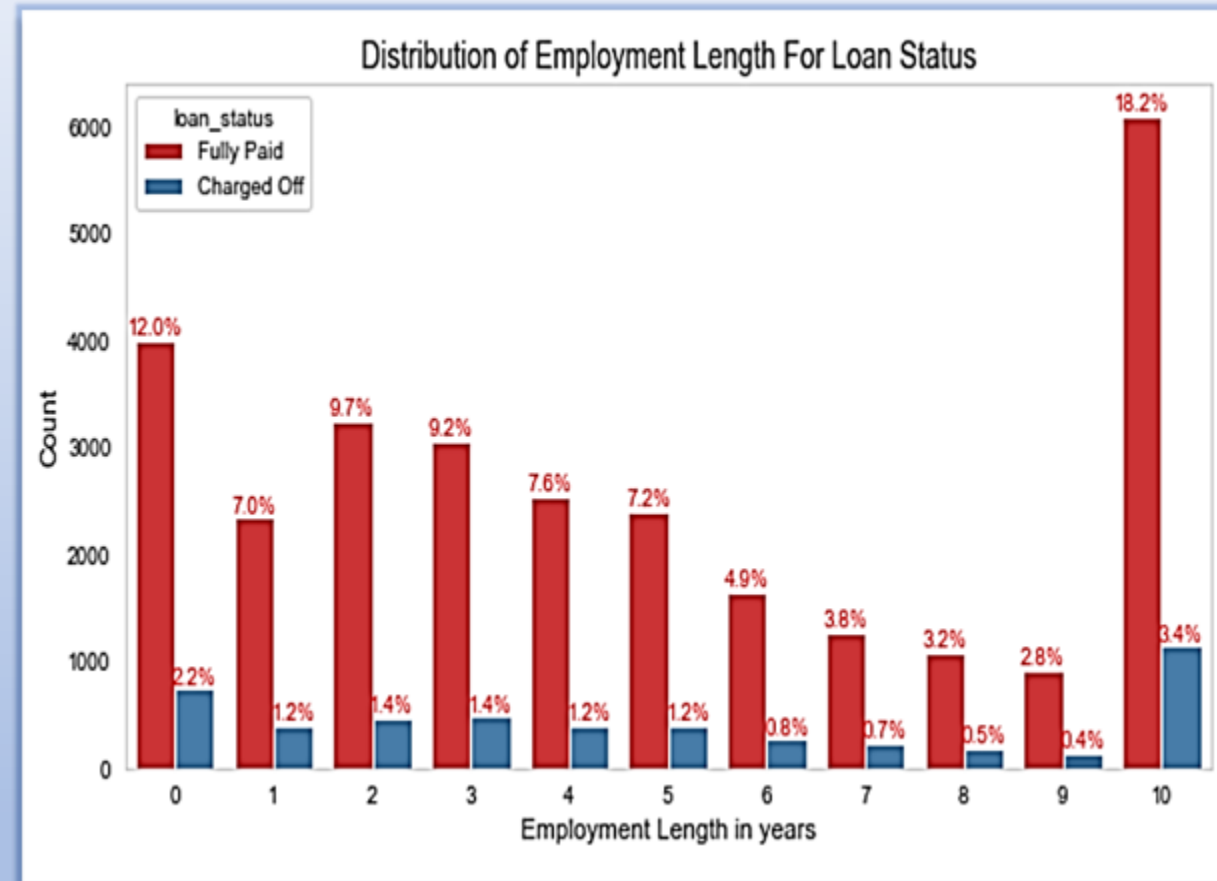
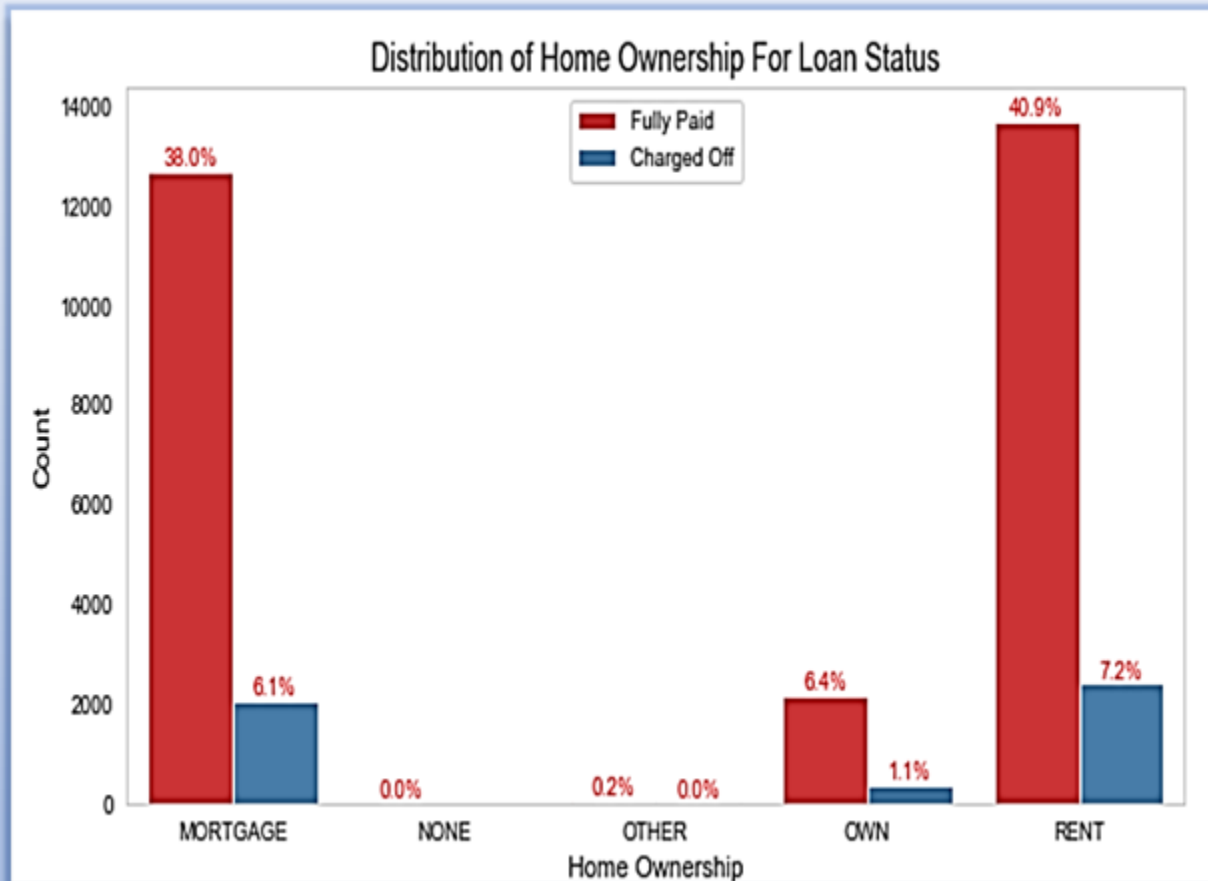
- 8.1 % of loans have been charged for term 36, followed by 6.3% in term 60. Majority of loans are in Grade A or B in term 36 months.

INTEREST RATE, ANNUAL INCOME, LOAN STATUS ANALYSIS



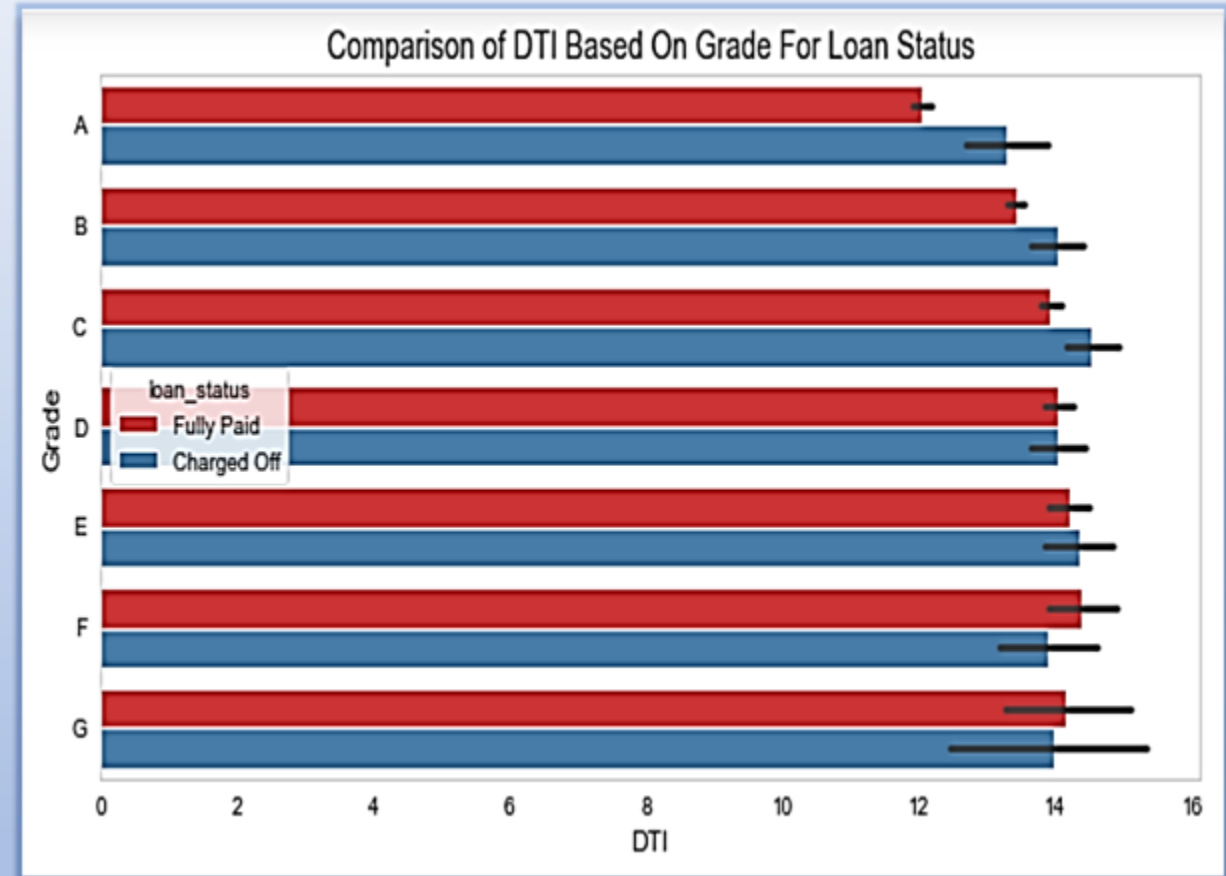
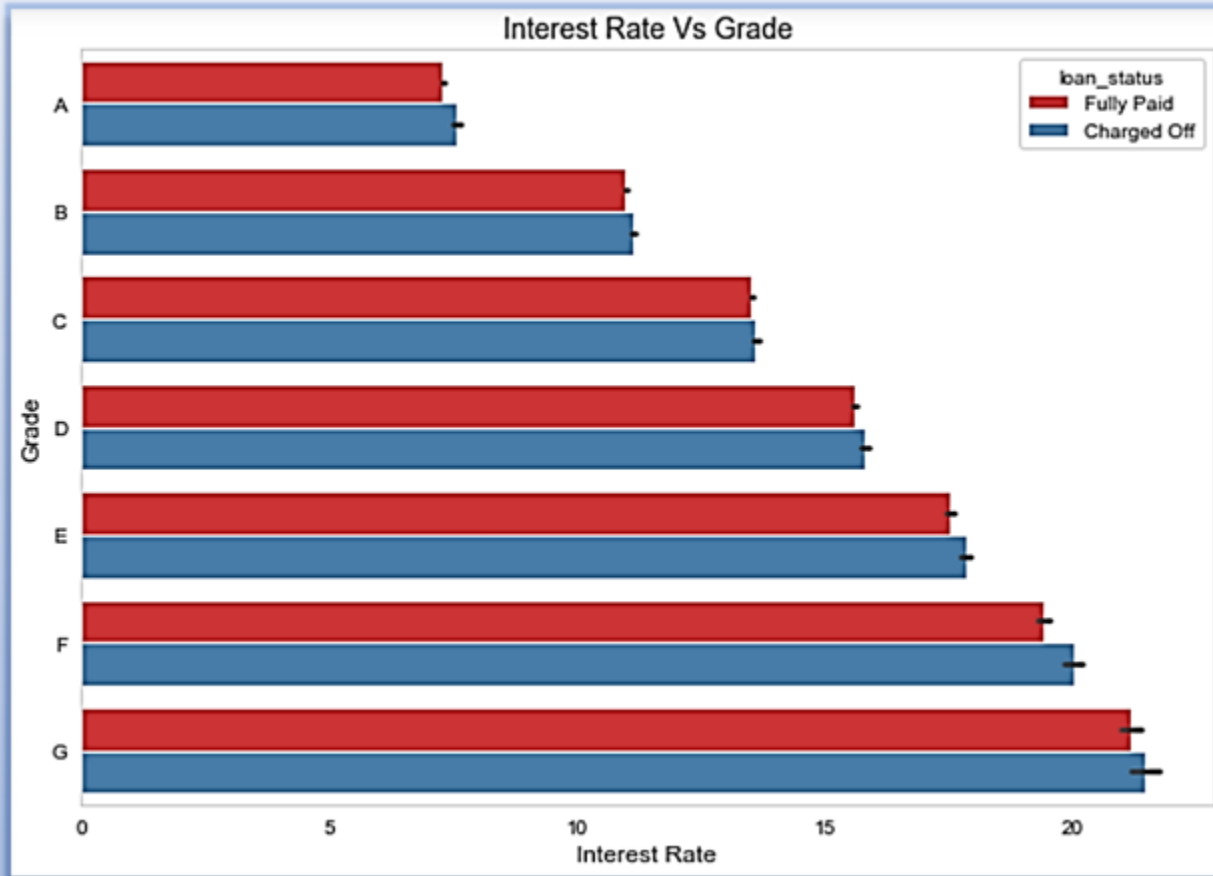
- Majority of the loan applications are in the category of Very Low interest rates.
- Very High interest i.e 15% above are in risk of Charge Off.
- Annual income range of 0-40K has the highest charge offs. Charge off ratio within the bucket of 0-40K have highest Charge Offs

HOME OWNERSHIP, EMPLOYMENT LENGTH, LOAN STATUS ANALYSIS



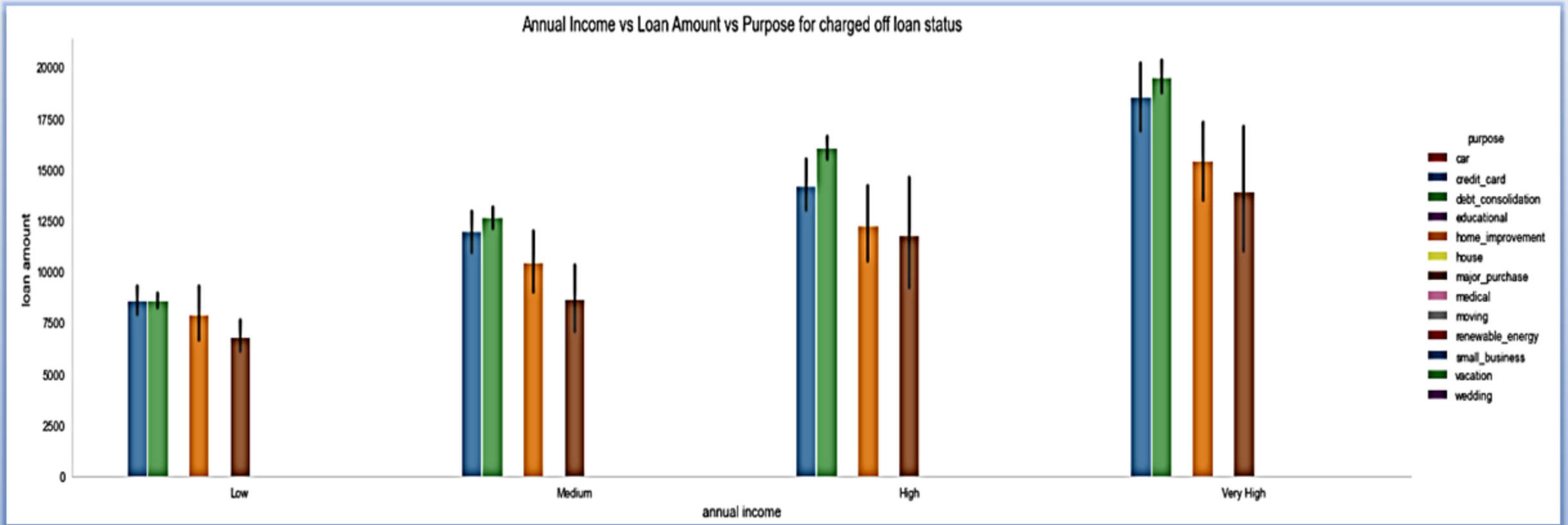
- 7.2% charged off loan applicants live in a rented home, closely followed by mortgage.
- Highest Charge Offs are in the employee length category of 10 Years and above

INTEREST RATE, GRADE, DTI LOAN STATUS ANALYSIS



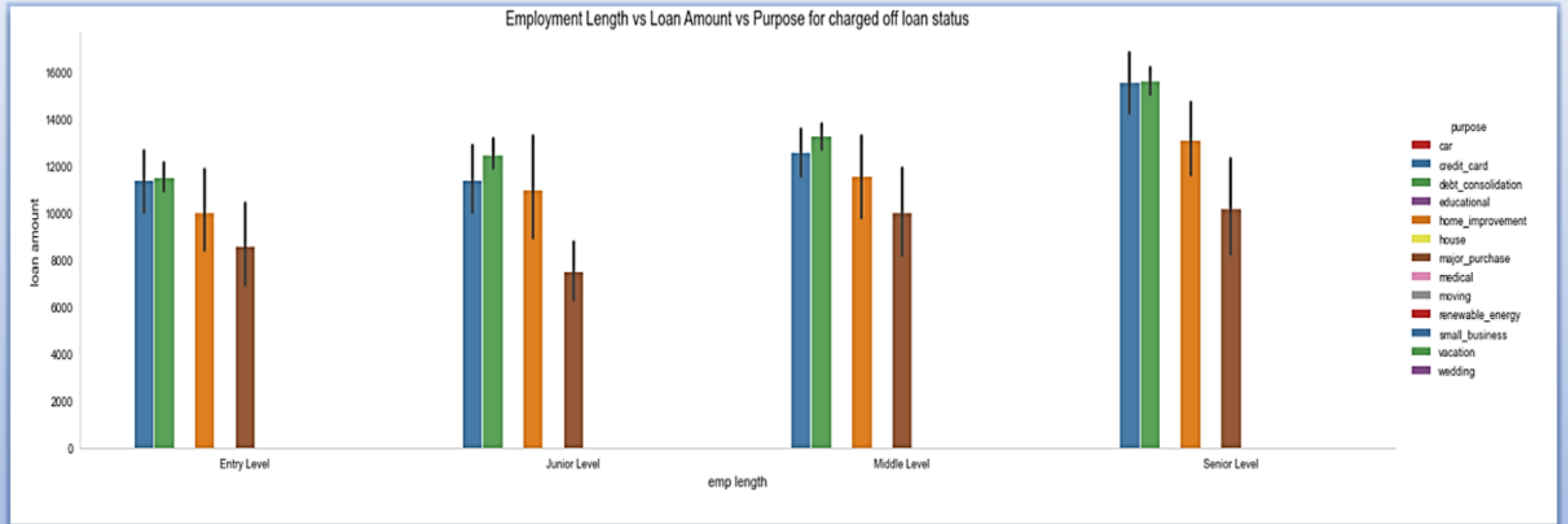
- Grades F and G have a high chance of charging off when compared with the interest rate, while other grades have an equivalent chance of fully repaying the loan.
- Contradictorily, Grades B and C have a high chance of charging off when compared with the DTI based on loan status.

INCOME VS AMOUNT VS PURPOSE FOR CHARGED OFF LOAN



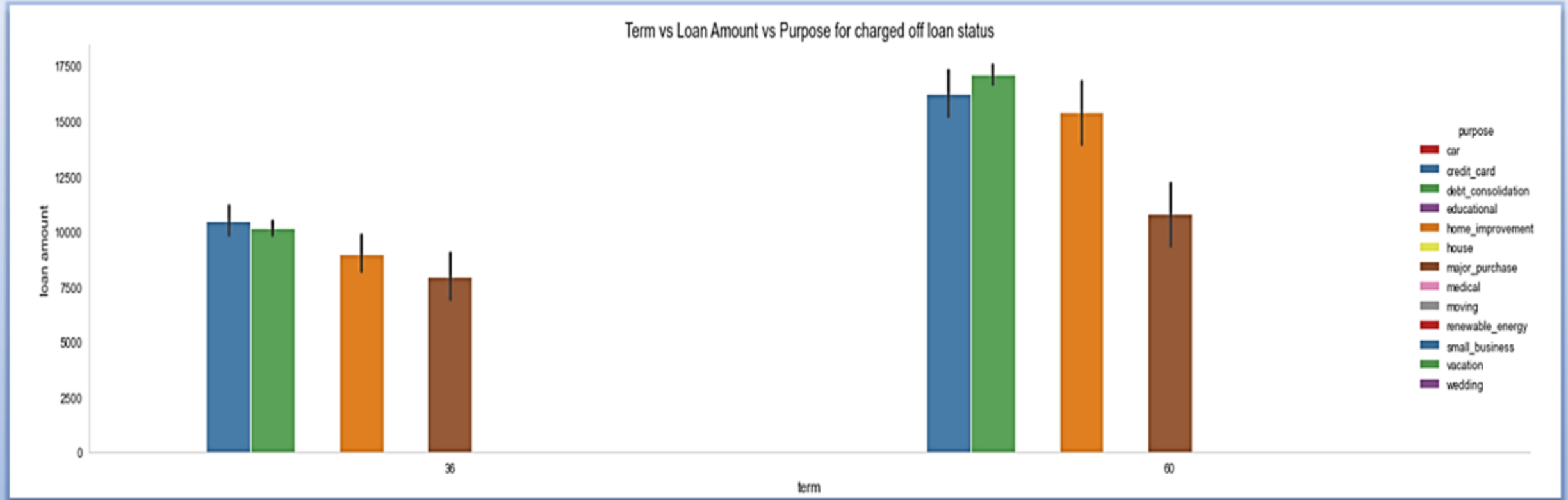
- Applicants with salary in column Medium, High, Very High have defaulted more in debt consolidation.

EMPLOYEE LENGTH VS AMOUNT VS PURPOSE FOR CHARGED OFF LOAN STATUS



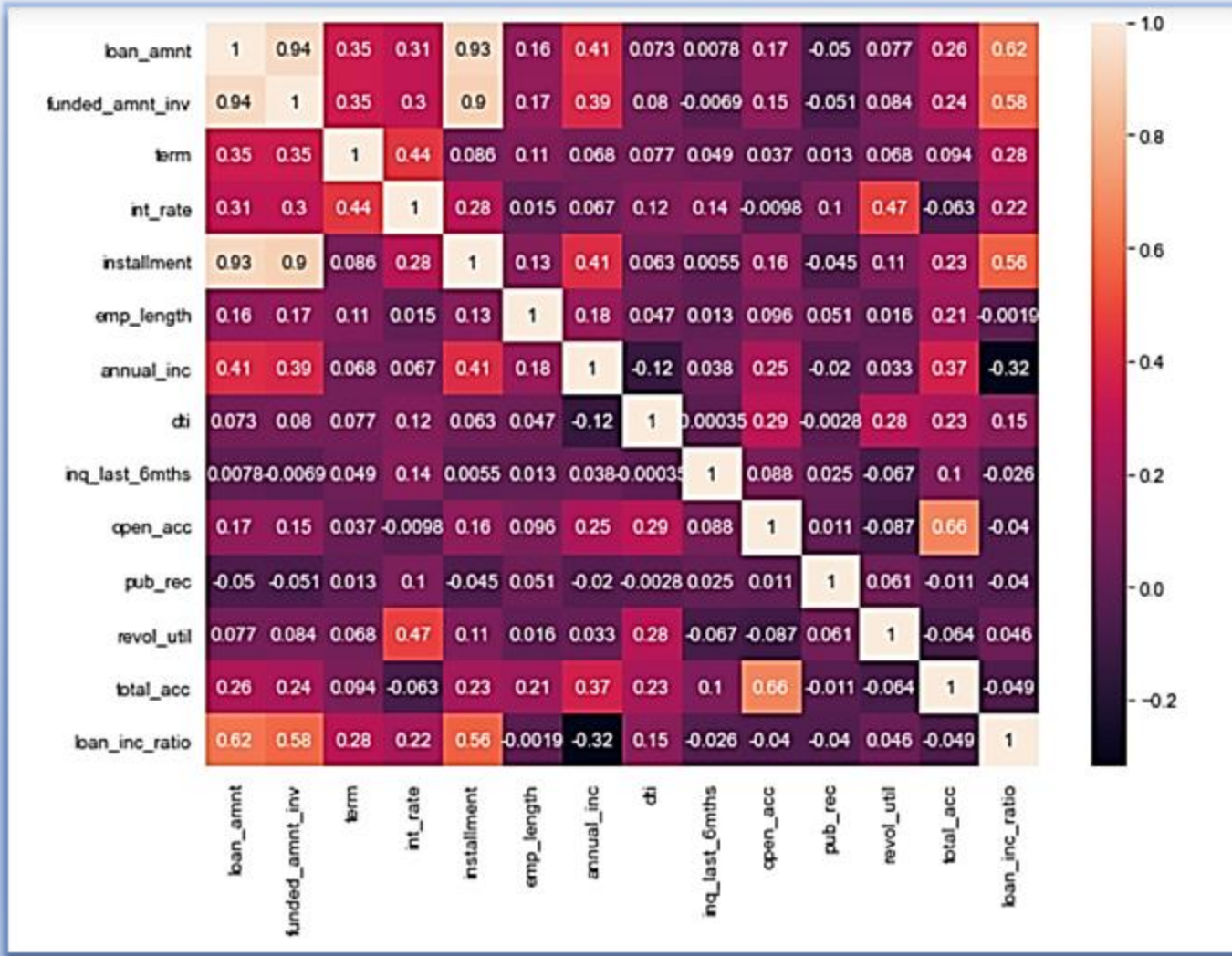
- Employee of all the range of employee length have majority charged off in debt_consolidation

TERM VS LOAN AMOUNT VS PURPOSE FOR CHARGED OFF LOAN STATUS



- Applicants default most in small_business in 36 months term, in debt consolidation for term of 60 months.

CORRELATION BETWEEN VARIABLES



- loan_amnt has negative correlation with pub_rec_bankruptcies
- annual income has a negative correlation with dti
- term has a strong correlation with loan amount
- term has a strong correlation with interest rate
- annual income has a strong correlation with loan_amount
- pub_rec_bankruptcies has weak correlation with most of the fields

SUMMARY

- Loan amounts range from 500 to 35,000, with an average of \$9,800.
- More than half of the loans have a term of 36 months, while fewer have a 60-month term.
- The interest rates are concentrated around 5-10% and 10-15%, with a dip near 10%.
- The majority of loans belong to high grades 'A' and 'B'.
- Within grades 'A' and 'B', there are more lower subgrades, aligning with the overall grade distribution.
- Most borrowers have work experience exceeding 10 years.
- The majority of borrowers do not own property and are either on a mortgage or renting.
- Annual income follows a left-skewed normal distribution, indicating that most borrowers have relatively low annual incomes.
- About half of the borrowers are either company-verified or have their sources verified.
- Debt consolidation is the most common reason for taking out a loan, followed by credit card debt.¹
- Many borrowers have a significant debt-to-income ratio, especially concentrated in the 10-15 range.
- Most borrowers do not have a record of public bankruptcy.
- The highest number of loans are approved in the last quarter of the year.
- The number of approved loans shows an exponential increase over time, suggesting an increasing loan approval rate.

RECOMMENDATION

- The major Driving factor/Driving Variables behind loan defaults are:
 - ✓ Annual income
 - ✓ Grades
 - ✓ Verification Status
 - ✓ DTI
 - ✓ pub_rec_bankruptcies
- It can be inferred that people with 10+ year of employee length and have taken loan for debt_consolidation with high interest rate for term of 60 months tend to default more.

THANK YOU