Lender’s Club

LOAN RISK ANALYSIS THROUGH EDA

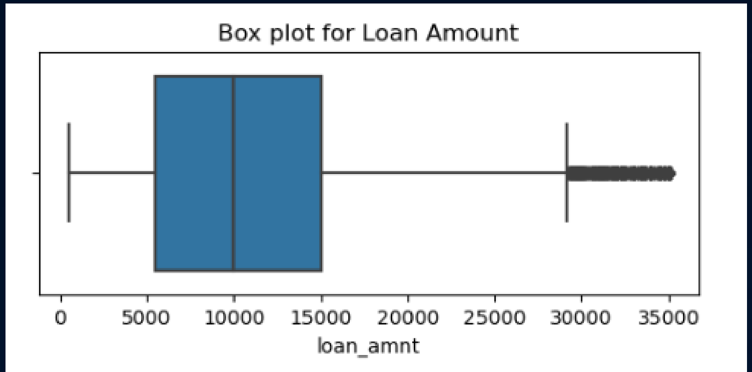
Business Objective

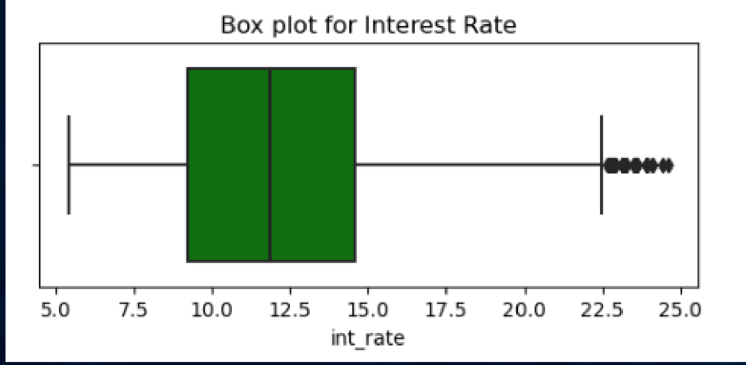
- Lender’s club specializes in lending various types of loans to urban customers
- It is very important to assess the risks associated with approval of loan applications so as to maximize on the company profitability
  - Not approving loans for genuine customers may result in loss of business
  - Approving loans for risky customers may lead to financial loss due to defaulted loans
- With an objective enable the Business team of Lender’s Club make right decisions, an analysis has been performed on past loan data to identify key factors that lead to “Charged Off” loans. Insights from this analysis are presented in further slides

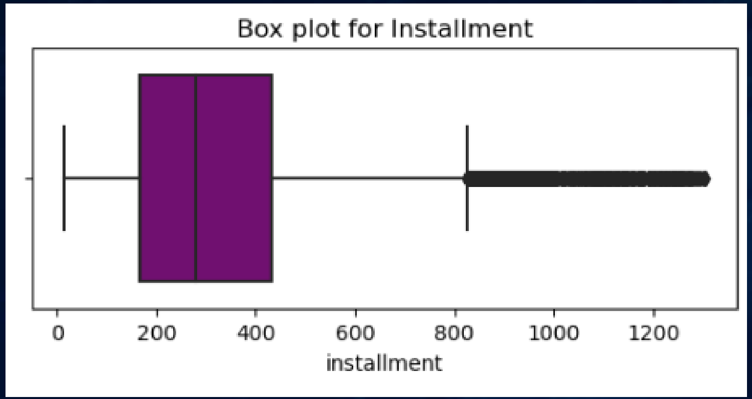
About the Data Set

- Loan Data Set with details about loan and applicant profile for 39717 loan accounts for loans issued from Jun-2007 till Dec-2011
- Data set has overall 111 columns representing different information
- For the purpose of the analysis a clean up has been performed on the data set by investigating missing values, imputing data as necessary and an optimized data set with 39717 rows and 48 columns as been considered for the analysis
- Target data field for our analysis is "Loan Status" that has values of "Fully Paid", "Current" and "Charged Off"

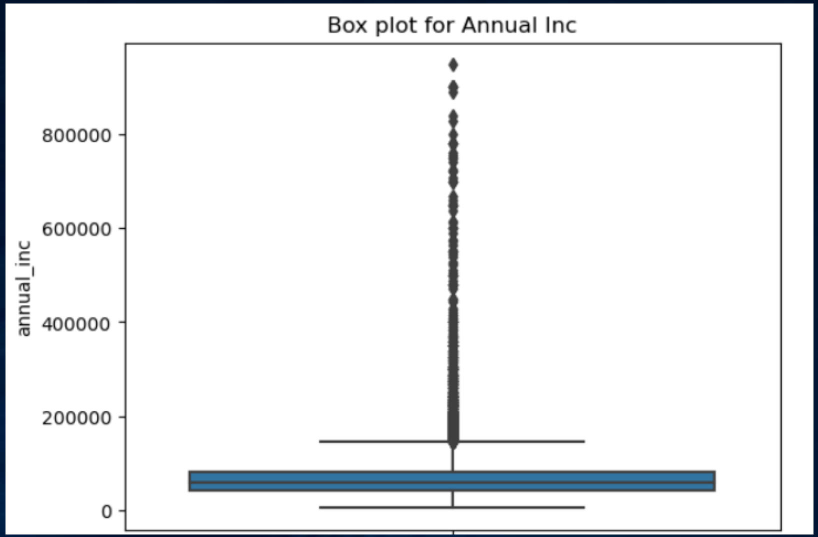
Insights from Univariate Analysis



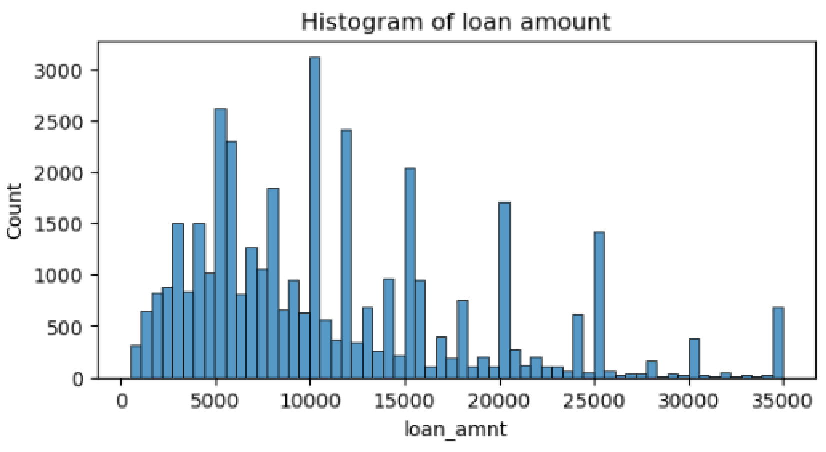




- More than 50% of the loan amounts are in the range of 5000 to 15000 dollars
- More than 50% of the loans have an interest rates ranging between 9% to 14%
- More than 50% of the installments are lying in the range of around 170 to 425

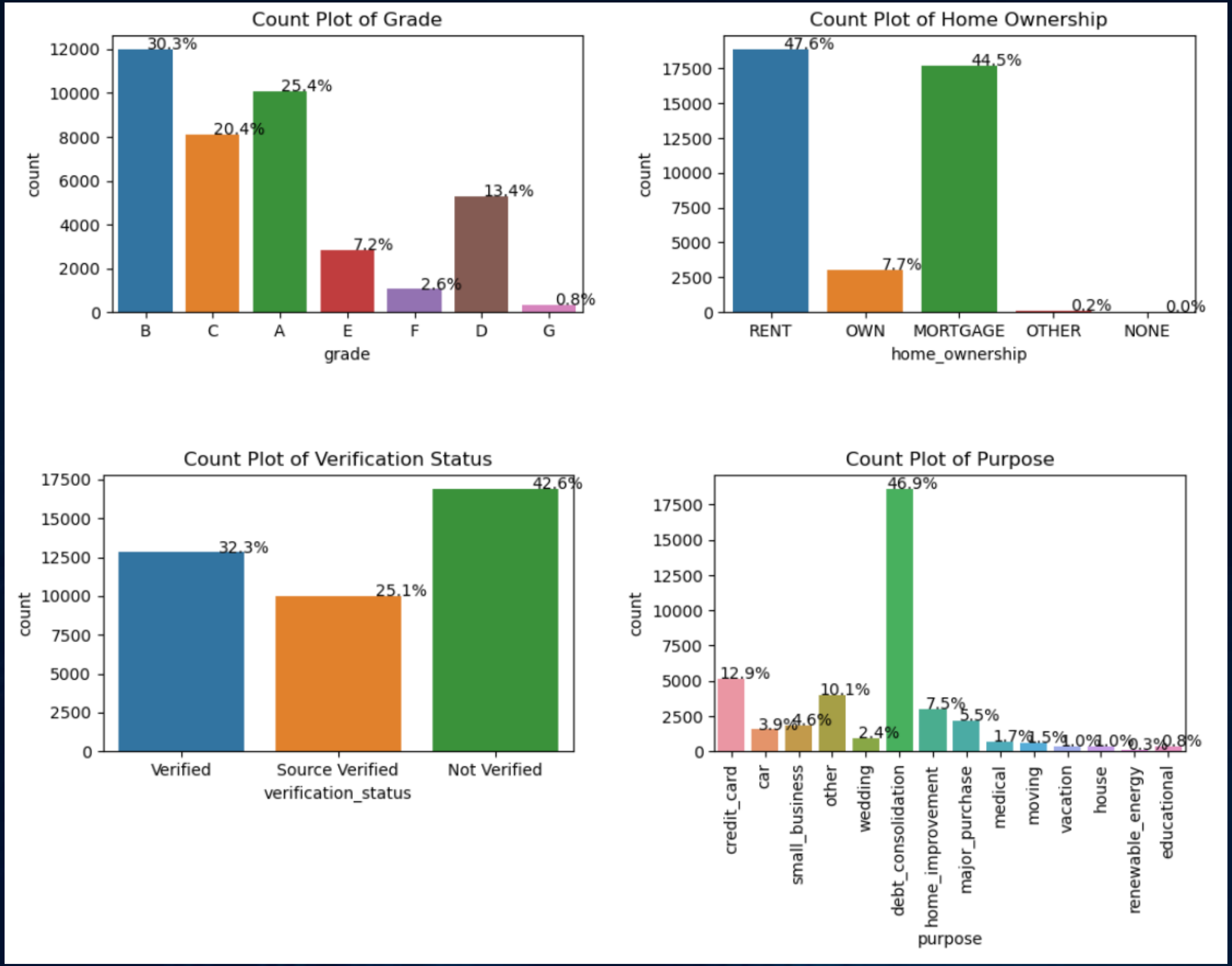


95% of the values of Annual income are between 20000 and 185000



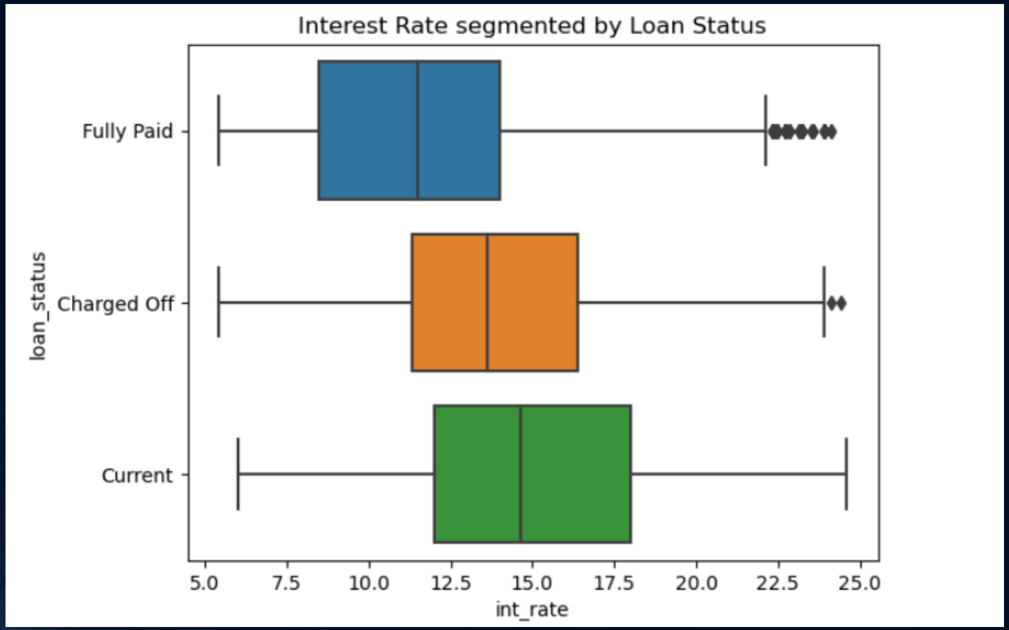
For the loan amount we see that there are spikes at exact amounts such as 10k, 15k, 20k, 25k and so on

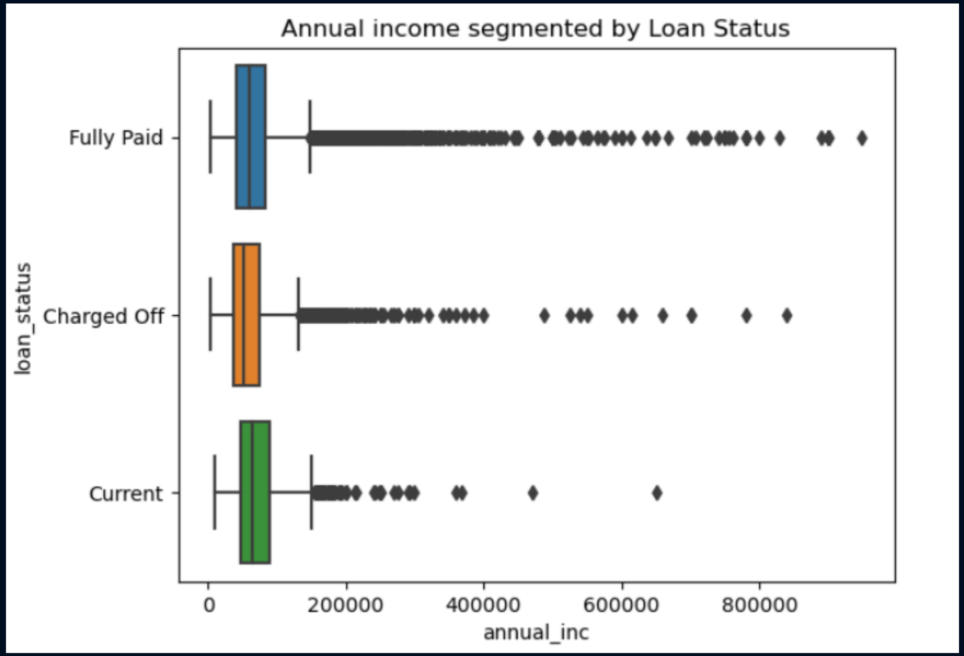
Insights from Univariate Analysis



- 75% of the loans are in grade A, B, C
- more than 92% of the loans are taken by persons with house ownership as rented or mortgaged
- Around 42% of accounts are not verified
- Around 67% of the loans are for three purposes - debt_consolidation, credit_card and home_improvement - with debt_consolidation covering more than 46% of total loans

Insights from Segmented Univariate Analysis

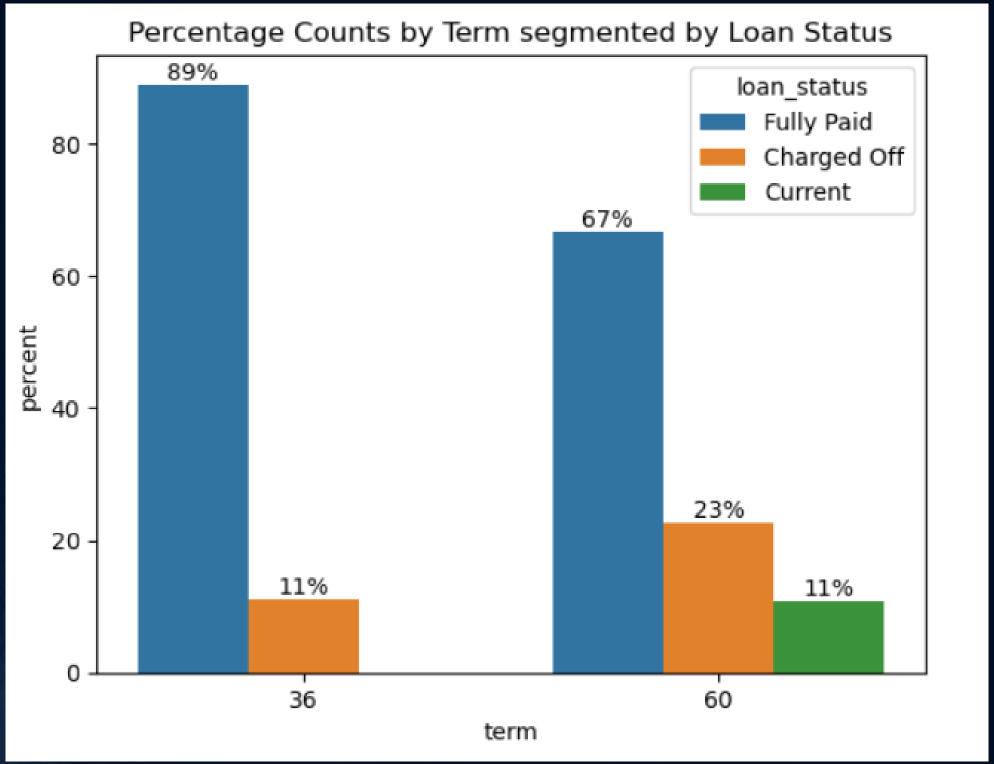


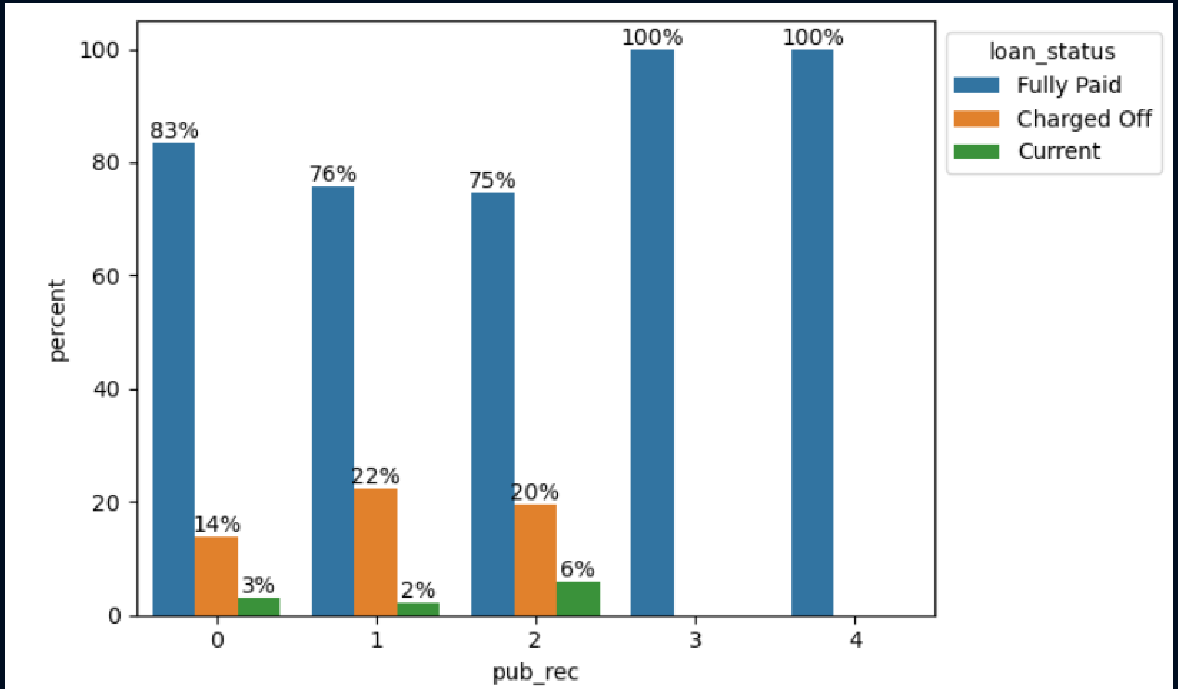


- Charged Off loans have higher interest rates as compared to fully paid loans

- Average annual income for charged off accounts is lower than that of fully paid accounts

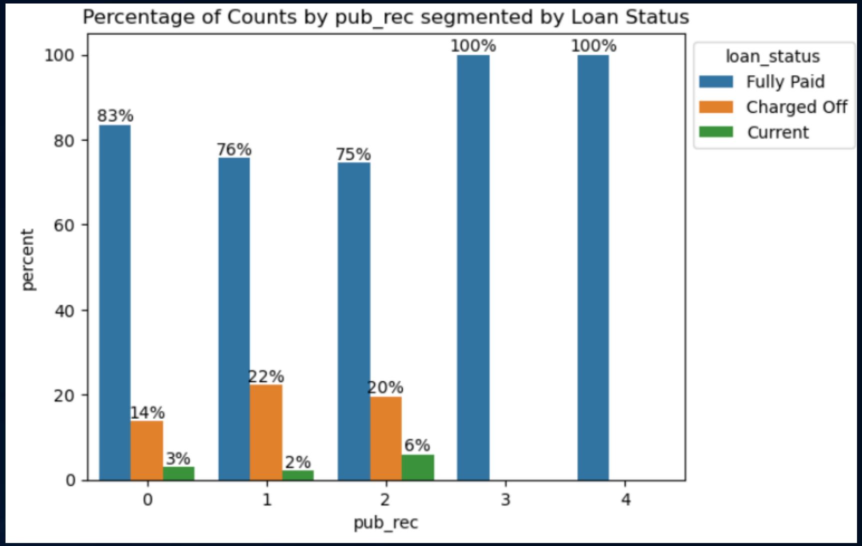
Insights from Segmented Univariate Analysis

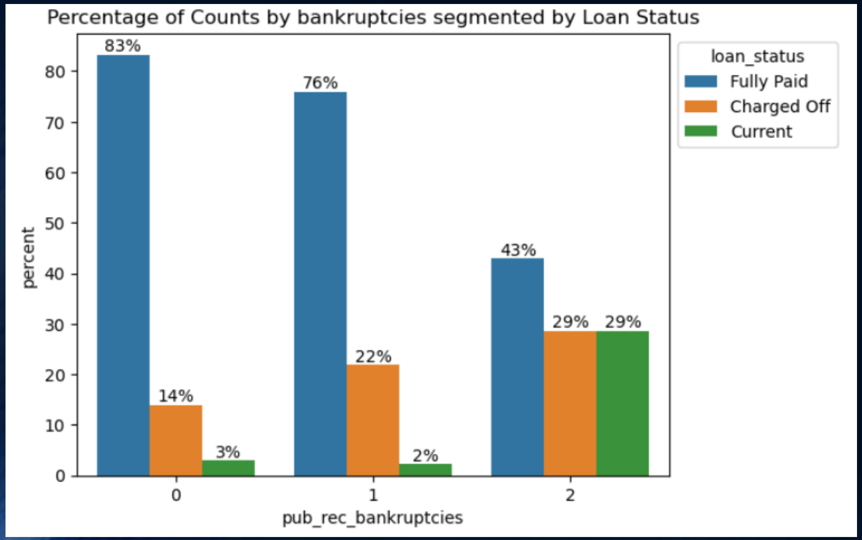




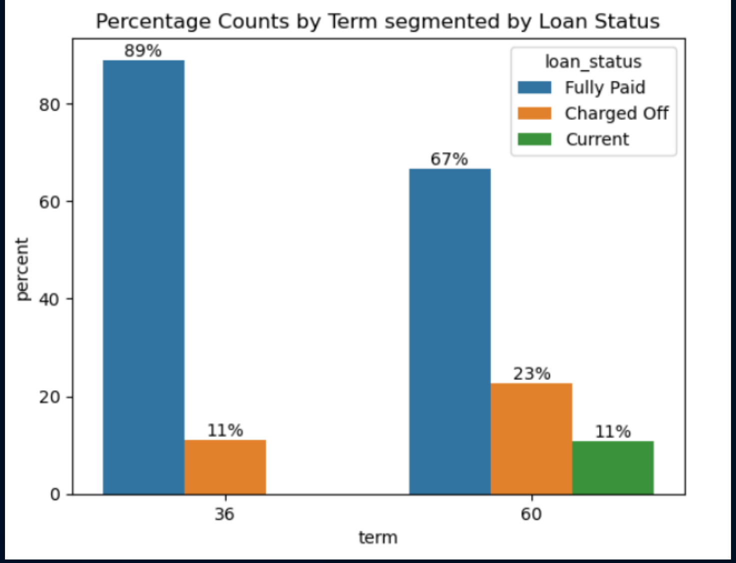
- Loan accounts with 60 months terms have higher percentage of Charged Off loans
- Loan accounts with derogatory public records have higher percentage of Charged Off loans

Insights from Segmented Univariate Analysis



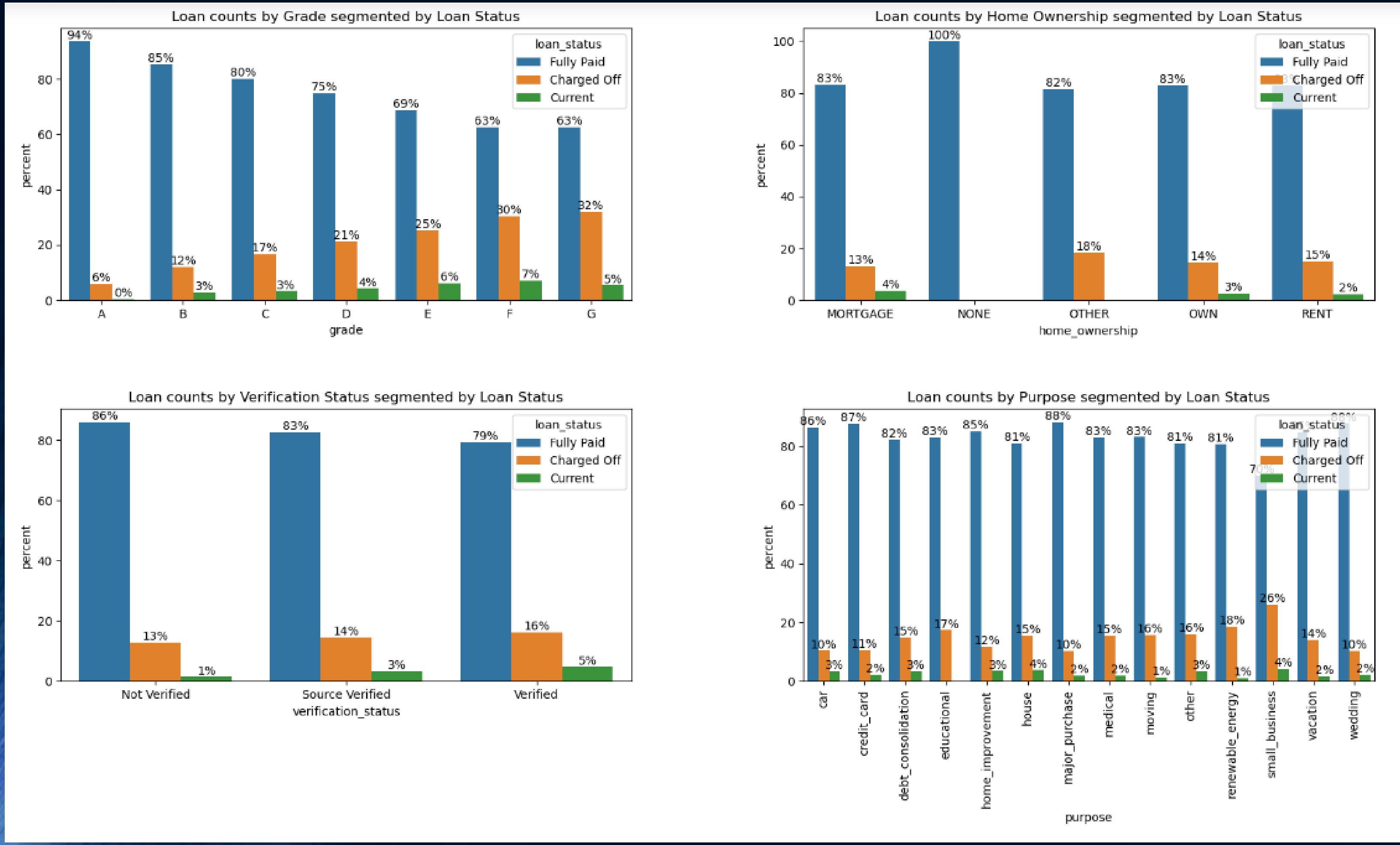


- Loan accounts with derogatory public records or bankruptcies have higher percentage of Charged Off loans
- Individuals with 2 bankruptcies recorded have a 29% chance of loan being Charged Off



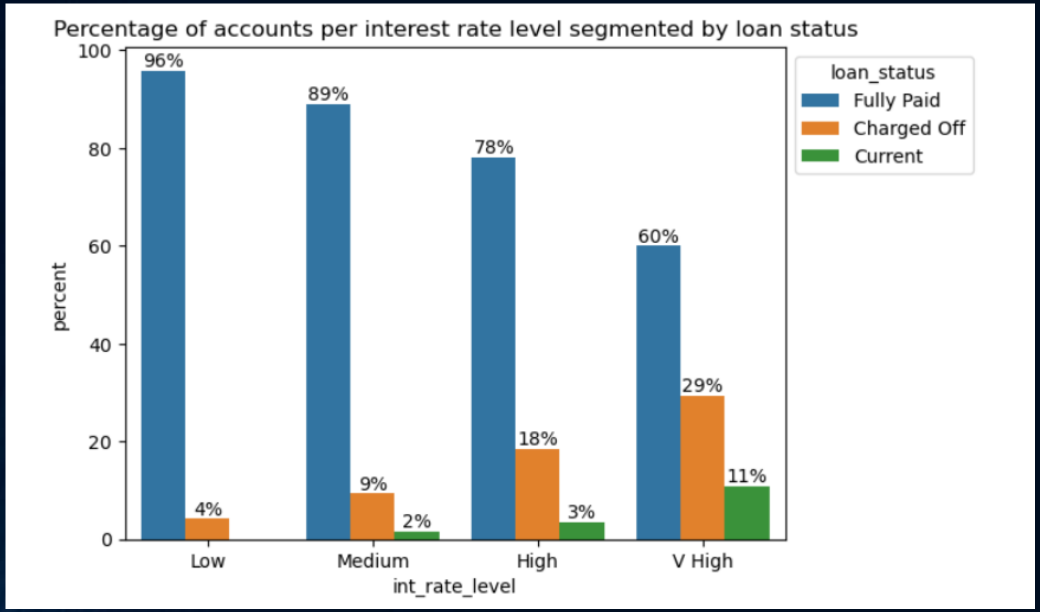
- Loan accounts with 60 months terms have higher percentage of Charged Off loans at 23%

Insights from Segmented Univariate Analysis

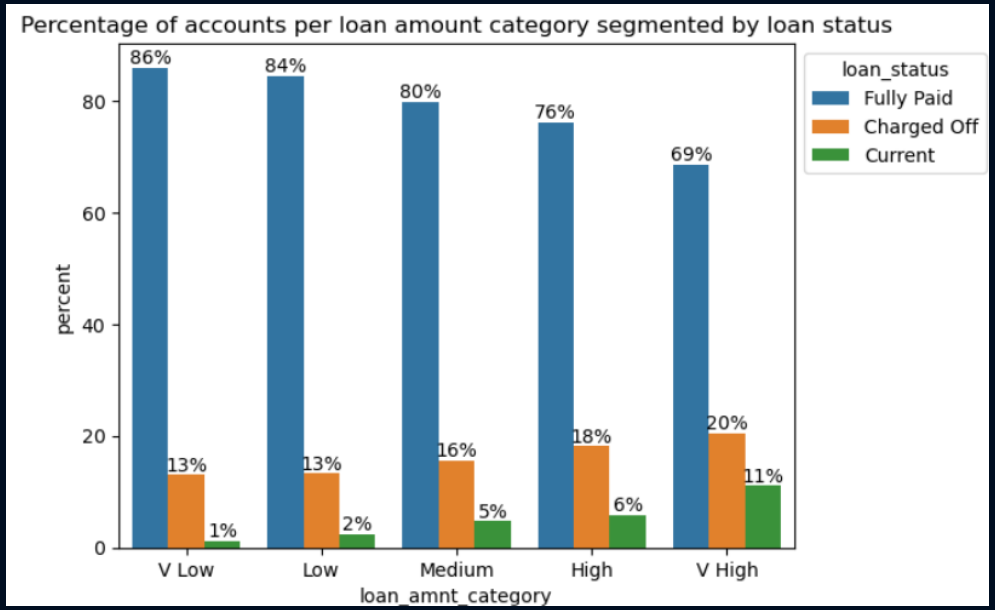


- The percentage of charged off loans increases with loan grade from A to G and at the same time % of fully paid loans decreases
- More than 25% of loans taken for small business get charged off, next highest percentage is that of renewable energy at more than 18%
- Home ownership and verification status do not seem to impact the loans charge off

Insights from Derived Metrics Analysis

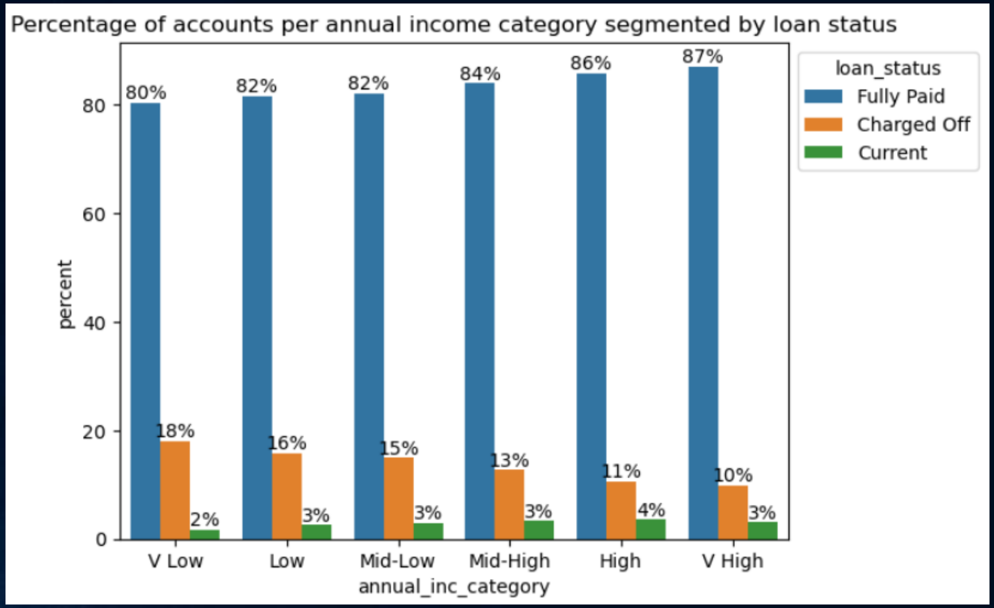


- Percentage of charged off accounts increases with the interest rate levels
- Interest rate levels:
  - Low < 6%
  - Medium – 6 to 12%
  - High – 12 to 18%
  - V High – more than 18%



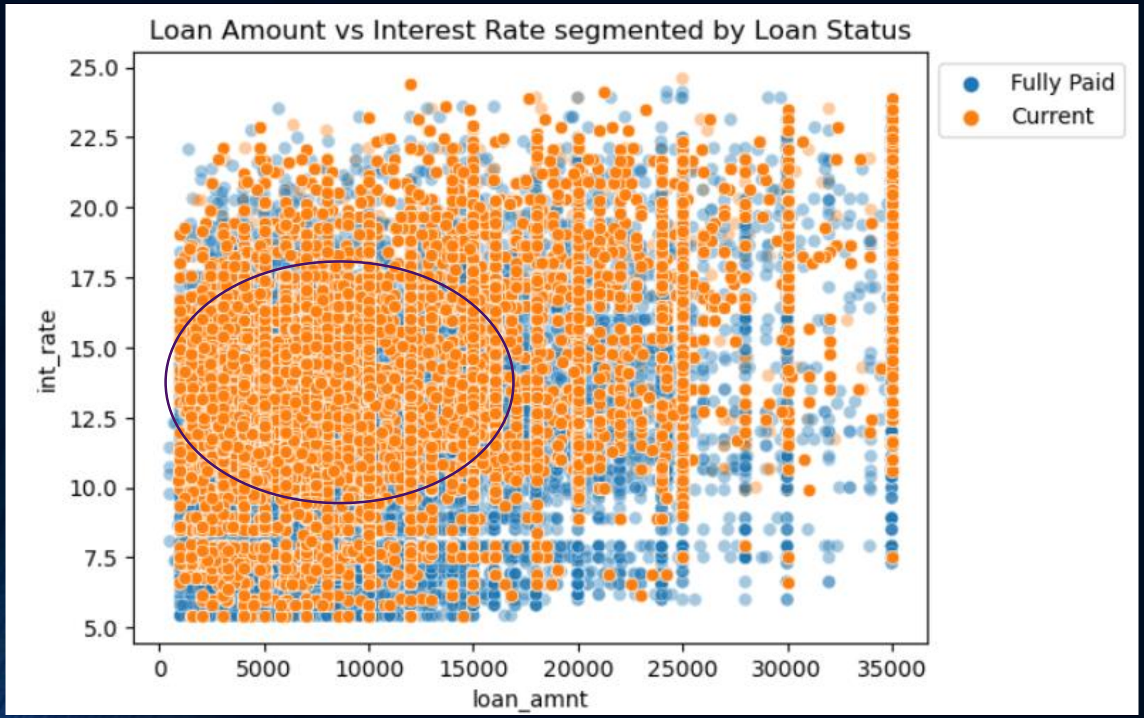
- Percentage of charged off accounts increases with the Loan amount category
- Loan amount category:
  - V Low – Amount < 7400
  - Low – Amount between 7400 to 14300
  - Medium – Amount between 14300 to 21200
  - High – Amount between 21200 to 28100
  - V-High – Amount more than 28100

Insights from Derived Metrics Analysis



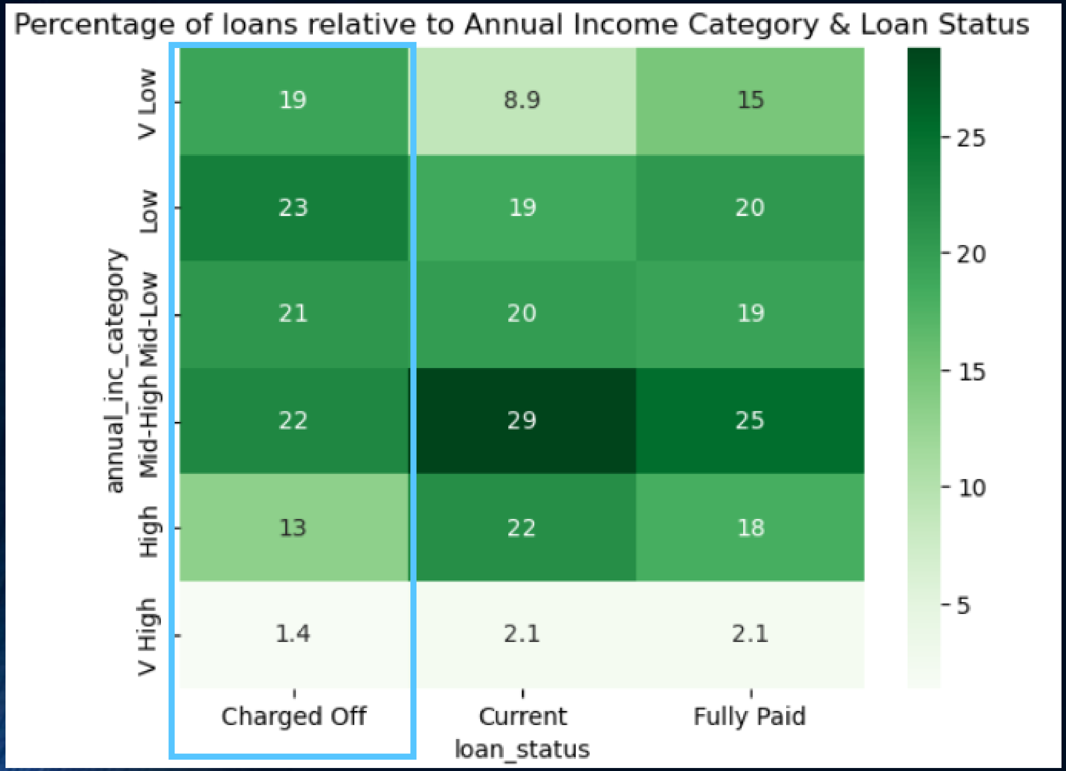
- Percentage of charged off accounts decreases with the annual income category levels
- Annual income categories:
  - V Low – Annual income < 34000
  - Low – Annual income between 34k to 48k
  - Mid-Low – Annual income between 48k to 62K
  - Mid-High – Annual income between 62k to 90k
  - High – Annual income between 90k to 187 k
  - V High – Annual income more than 187k

Insights from Bivariate & Multivariate Analysis

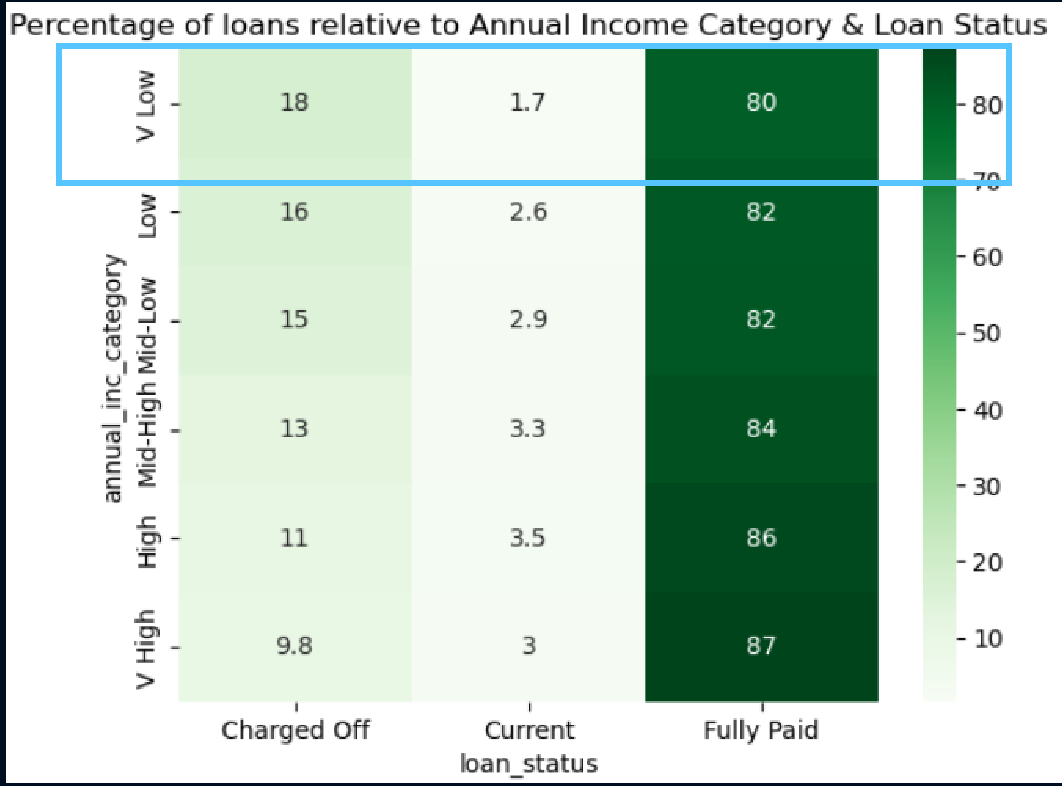


- There is a dense clustering of charged off loans for loan amounts up to 15k with interest rates between 10 to 17%

Insights from Bivariate & Multivariate Analysis

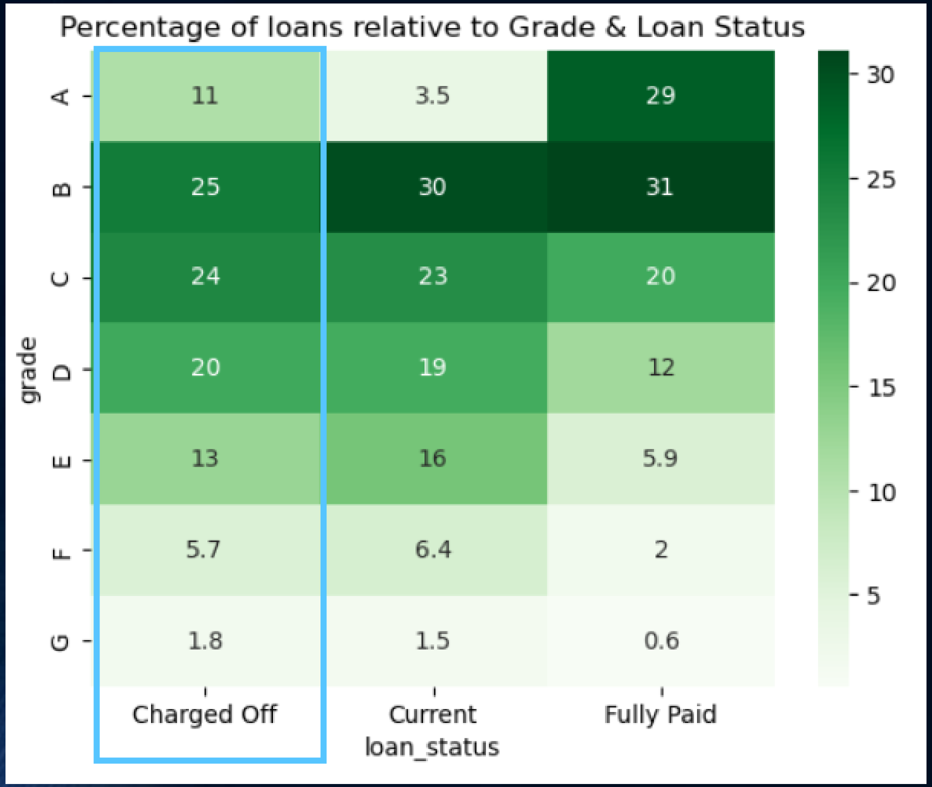


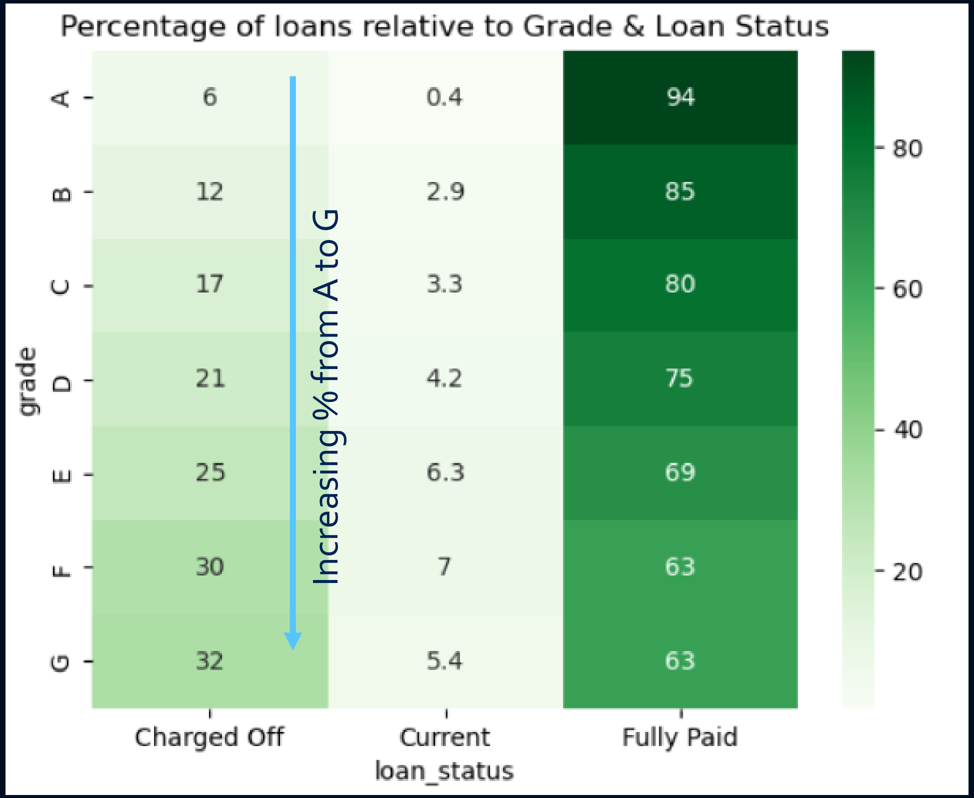
- Within the charged off loans the "V Low" to "Mid High" income categories have a higher percentage of charged off loans



- Across all the income categories "V Low" category seems to have highest percentage of charged off loans (18%) in comparison to other categories

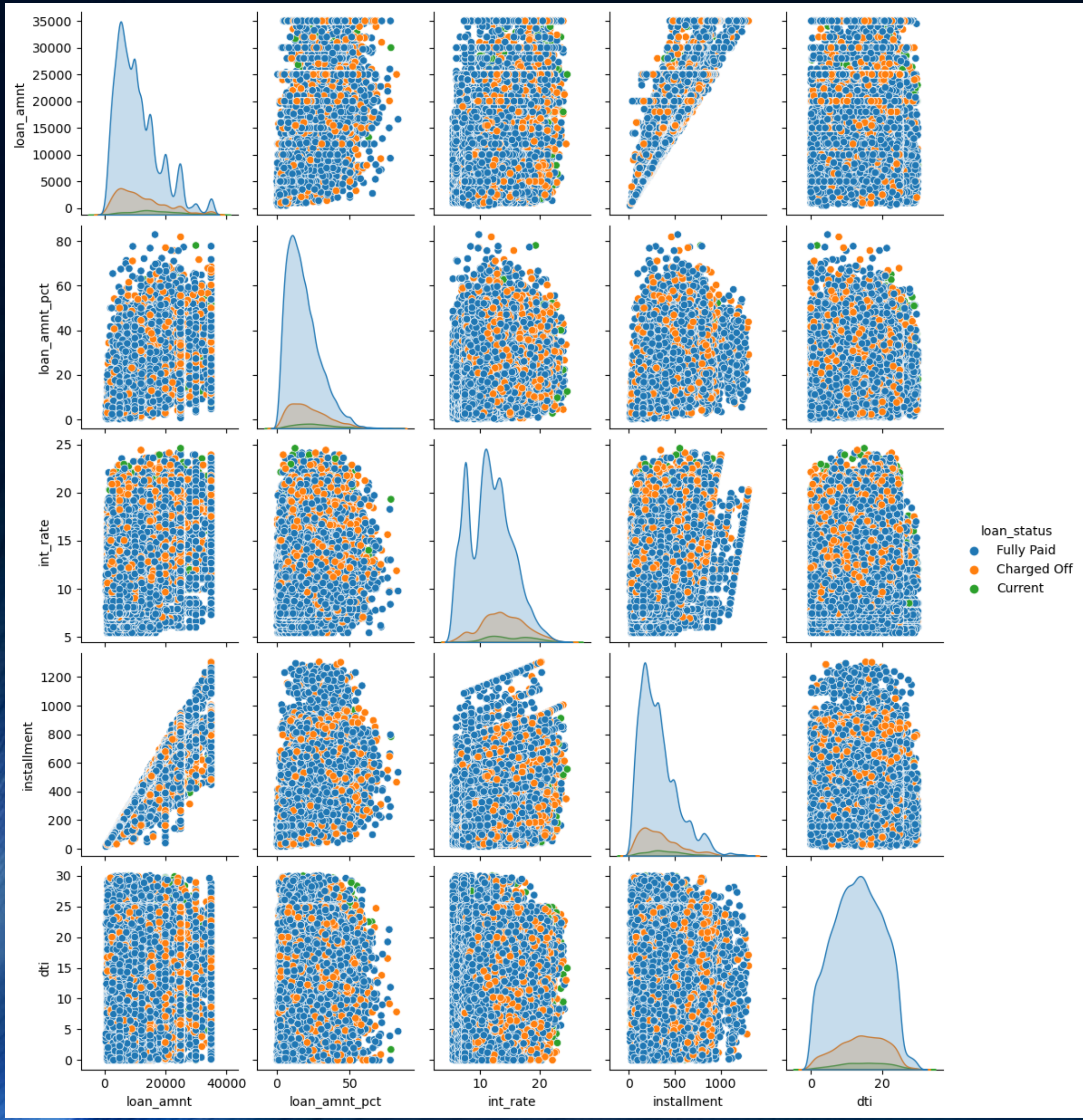
Insights from Bivariate & Multivariate Analysis





- Out of the total charged off loans, a high percentage of the charged off loans are in grades B-D.
- However, within the grades, out of the loans issued per loan grade the percentage of charge off increases from grade A to G

Insights from Bivariate & Multivariate Analysis



- Here we see the relational stats between different variables color coded based on the loan status
- Insights from these plots are as below
  - Loan amount and installments have a correlation as expected
  - There is a cluster of charged off loans in the region of low to mid loan amounts and high interest rates
  - If we observe the charge off peaks in the histograms, the peaks are at – lower range of loan amount, mid range of interest rates and towards higher DTI
  - Low DTI but mid to high interest rate also shows a cluster of charged off loans
  - Higher loan amount percentage (ratio of loan amount to annual income) and mid to high interest rate also shows a cluster of charged off loans

Overall Inferences from the Data Analysis

- Key factors influencing loans to be charged off are:
  - Annual income in the lower range and mid to high interest rates
  - Higher loan amounts leading to higher installments
  - Low amount loans with high interest rates
  - Higher debt to income ratio
  - Derogatory public records and bankruptcies
  - Loan for purposes like small businesses
  - Loan grade from A to G
- Recommendations for avoiding the risks
  - For customers with lower annual income – suggest joint loan and consider appropriate interest rates
  - Validation of derogatory public records before issuing the loan
  - Assess the loan grade appropriately
  - Additional checks for small business loans such as assessing the business model, funding etc.

Thank You !!