LENDING CLUB CASE STUDY

SUBMISSION

Team:

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Lending Club Case Study:

Company

- Lending Club is the largest online loan marketplace, facilitating personal loans, business loans, and financing of medical procedures.

  Borrowers can easily access lower interest rate loans through a fast online interface.

Context

- Lending Club wants to understand the driving factors behind loan default, i.e. the driver variables which are strong indicators of default.

  The company can utilize this knowledge for its portfolio and risk assessment.

Objective

- To identify the risky loan applicants, then such loans can be reduced thereby cutting down the amount of credit loss.

  Identification of such applicants using EDA is the aim of this case study.

Data Understanding

- Identify quality issues and reported.

- Meanings of the variables are correctly interpreted

Data Cleaning

- Drop columns with null values, all random values or single category value

- Convert values to proper data types

- Create derived variables

Univariate Analysis

- Check distributions and frequencies of various variables

- Appropriate realistic assumptions are made when required

Segmented Univariate Analysis

- Analyze variables against segments of other variables

- Identify important driver variables

Bivariate Analysis

- Do correlation analysis

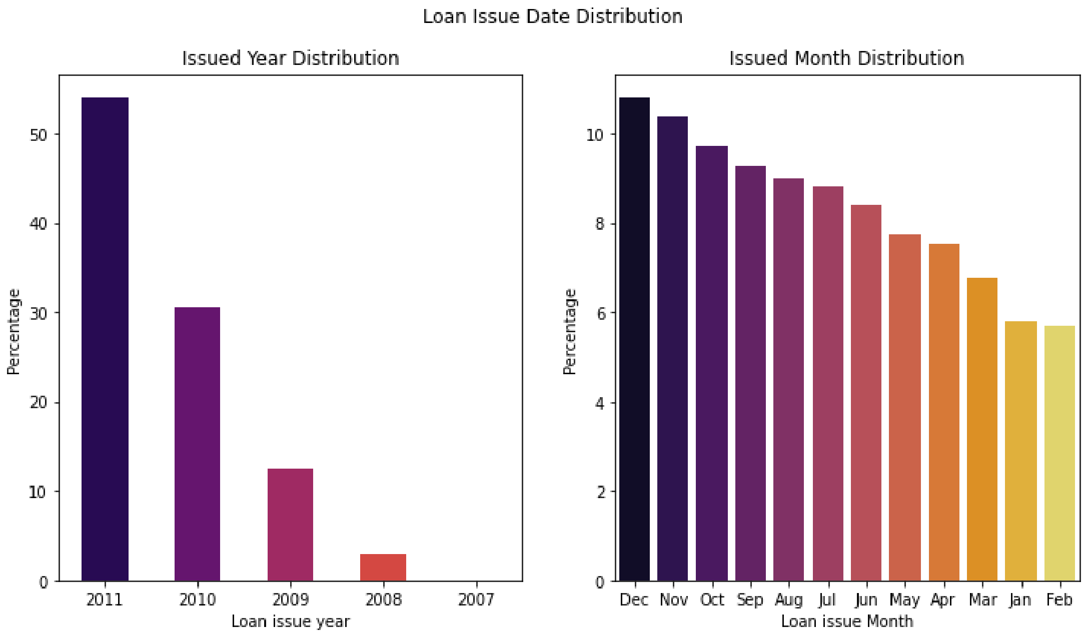
- Check how two variables affect each other or a third variable

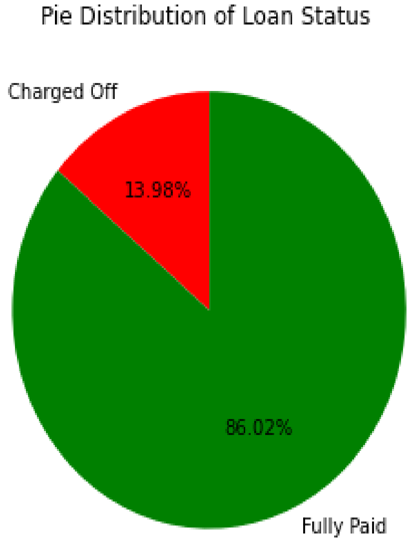
- Analyze joint distributions

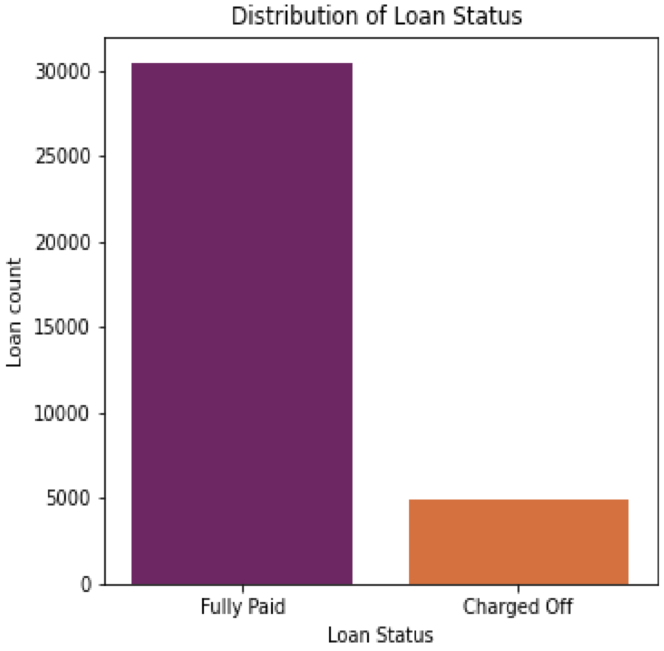
Summarize Results

Publish insights and observations

Lending Club Loan Pattern

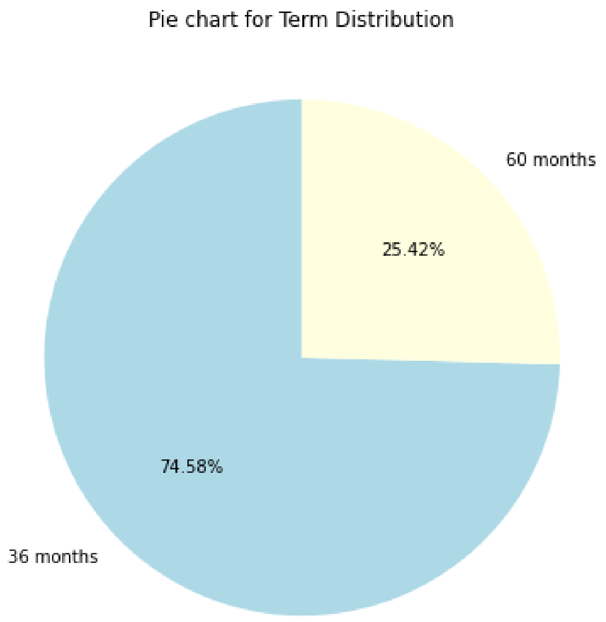


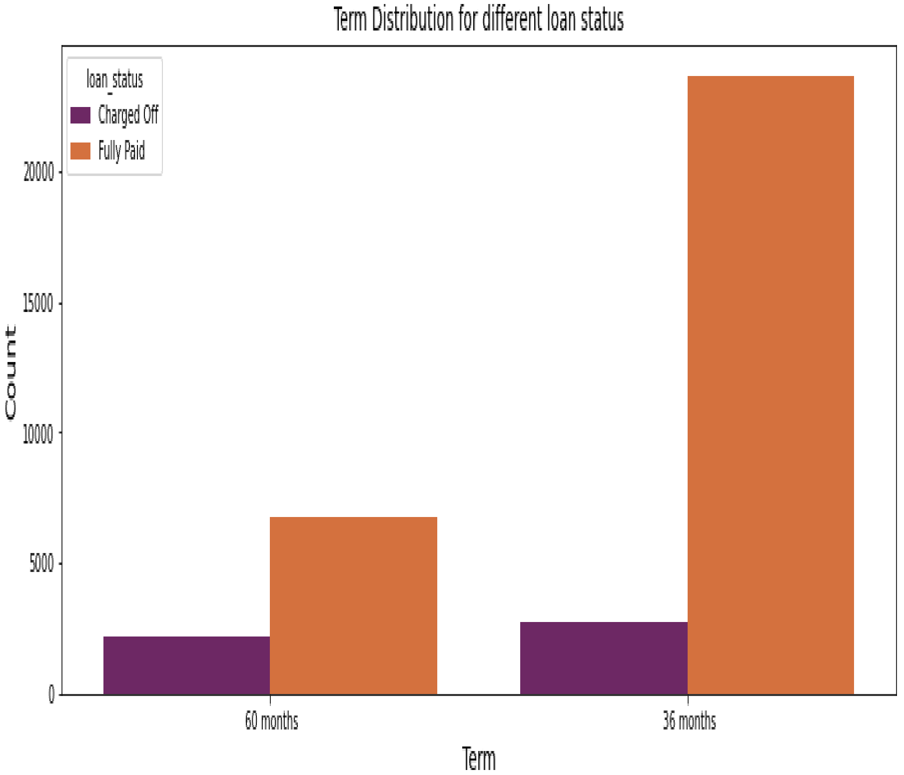


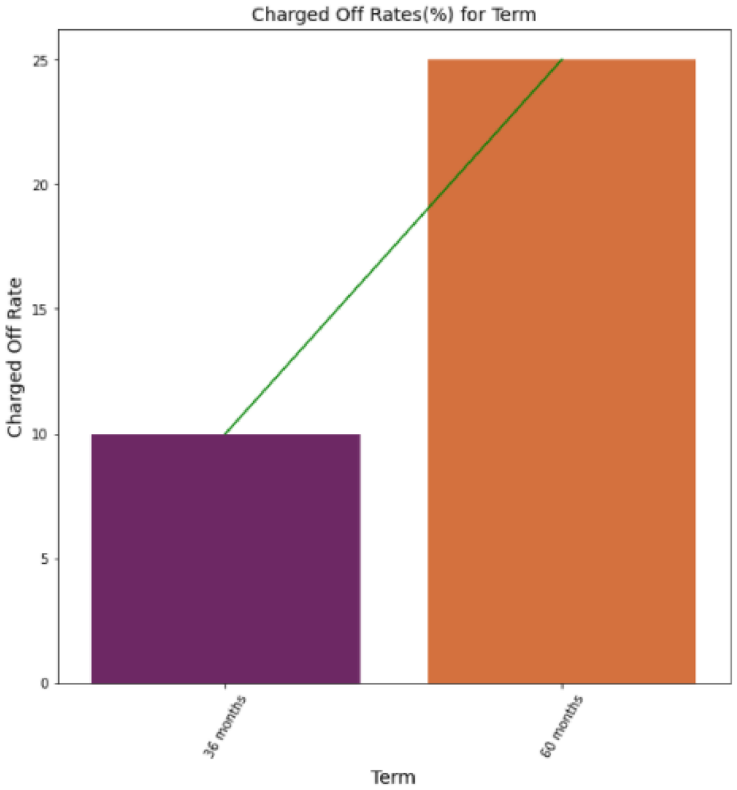


- As we can see from 2007-2011, Lending Club has grown exponentially year on year.
- The number of loan applications are highest during the last 3 months of the year – Dec, Nov and Oct. The holiday season during the year end might be the reason for this behaviour.
- Around 14% of the loans end up to the defaulted/ charged off.
- Out of the 35367 loans, 4943 borrowers have defaulted to fully pay the loan.

Analysis: Term

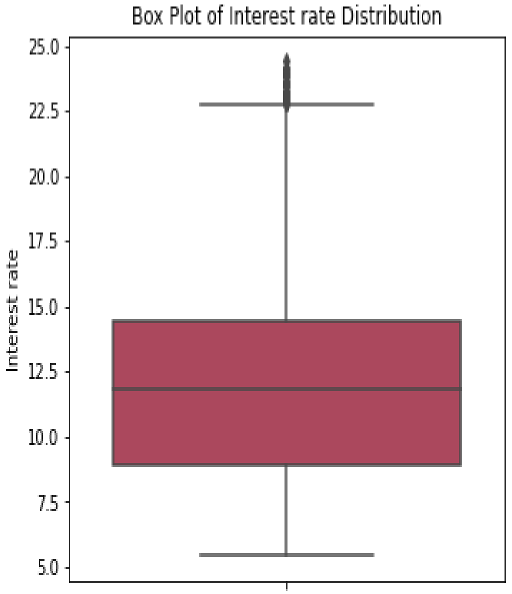


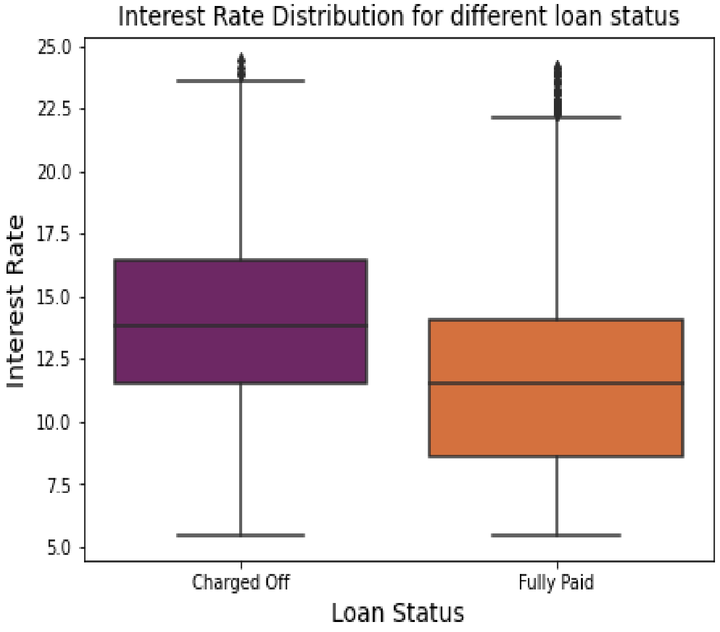


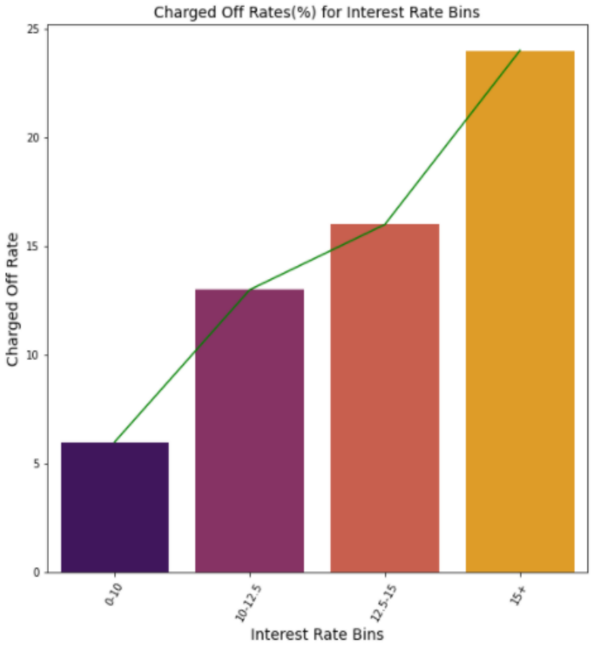


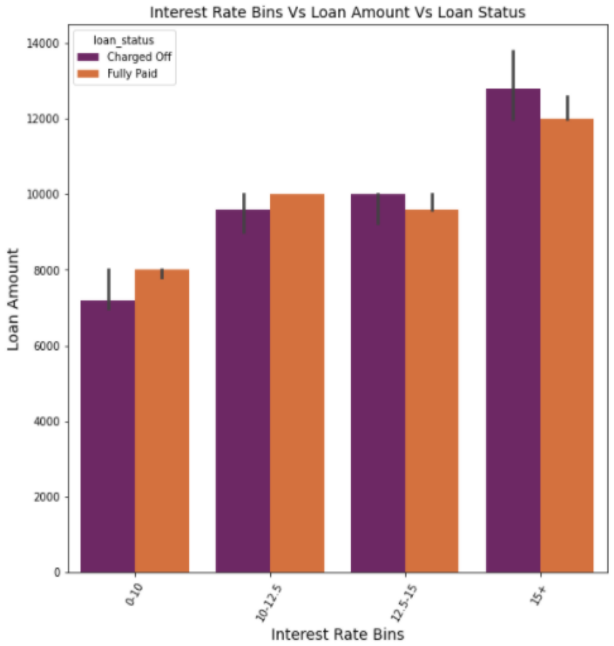
- Around 75% of the borrowers choose 36months tenure for loan repayment.
- Among the borrowers who chose 36 months term, 2730 borrowers have defaulted.
- Among the borrowers who chose 60 months term, 2213 borrowers have defaulted.
- From the third plot, we can see that, around 25% of the borrowers who chose 60month term had defaulted as compared to 10% for 36month term.
- Hence, the borrowers choosing 60month term need to be properly scrutinised as there are high chances to Charge Off.

Analysis: Interest Rate



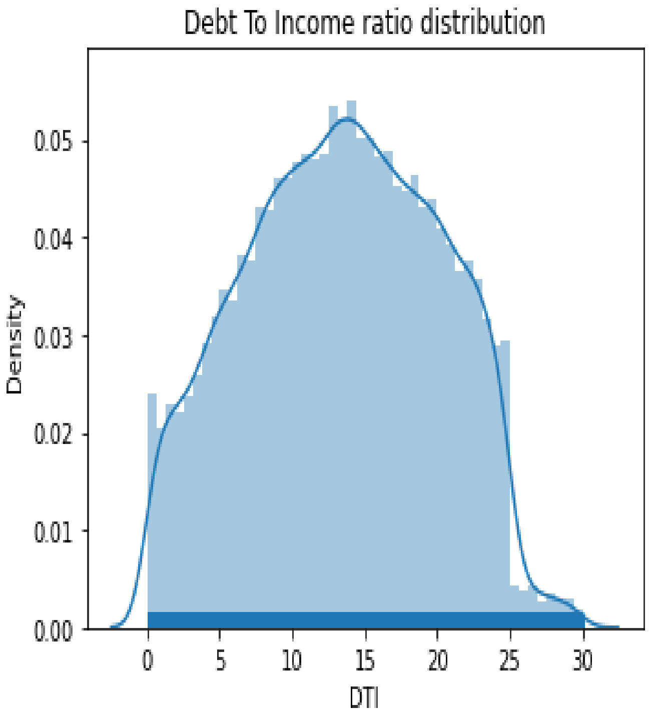


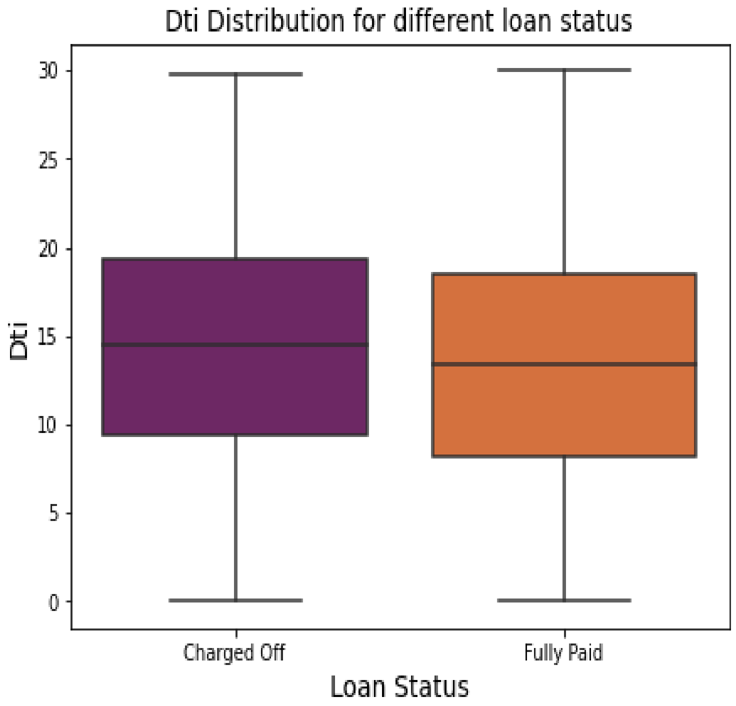


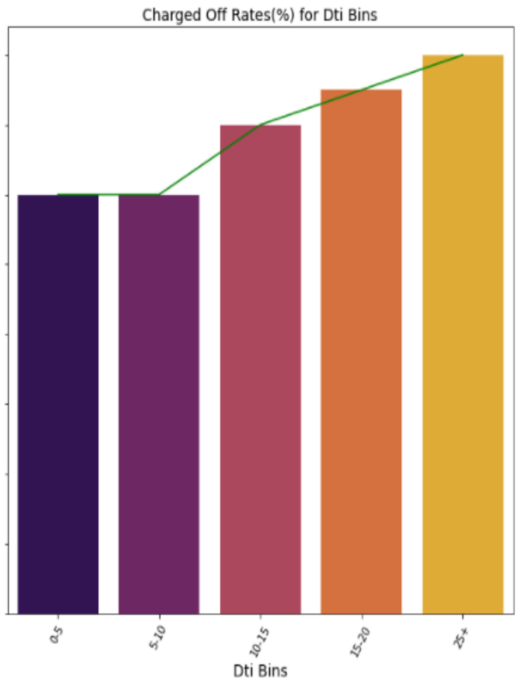


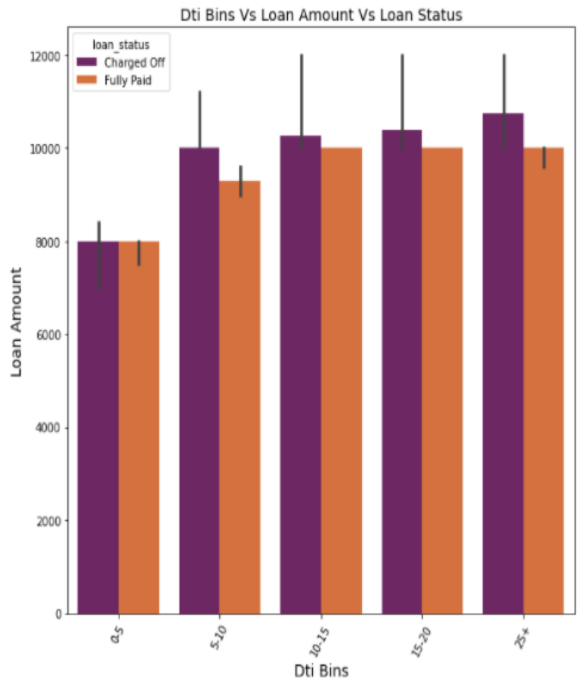
- From the above plots, we can clearly see that, with the increasing interest rates, the Charge Off rate had also increased linearly.
- We can see that the median interest rate for the Charged Off loans are higher than the fully paid loans.
- Also, borrowers going for higher loan amounts at higher interest rates are more likely to Charge Off.

Analysis: DTI (Debt To Income ratio)



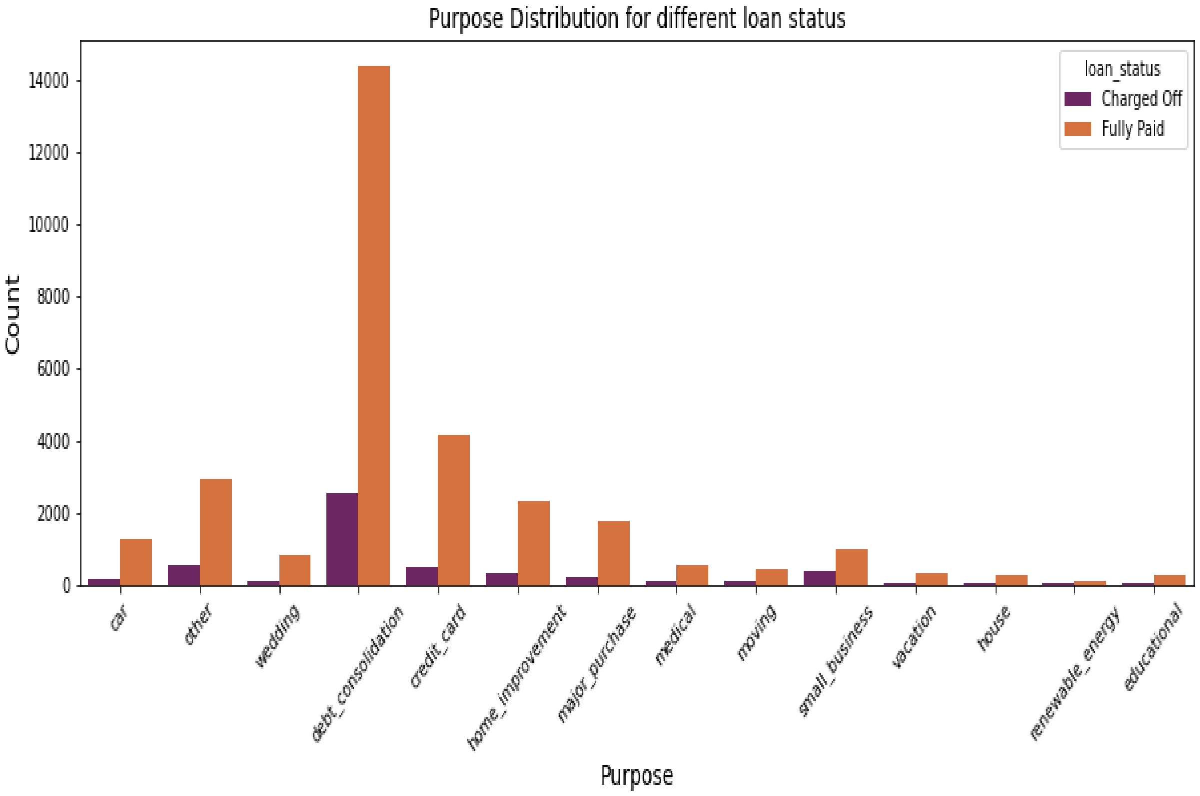


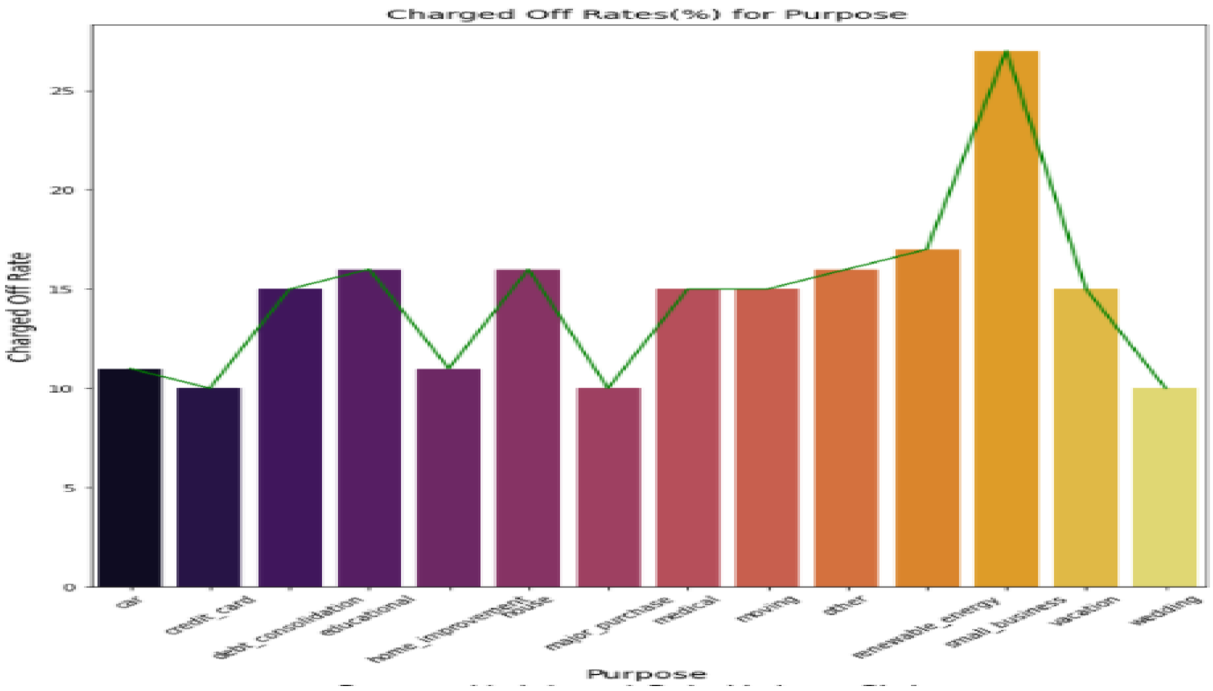




- ➢ From the above plots, we can observe that, with the increasing DTI value of the borrowers, the Charge Off rate had also increased.
- ➢ We can see that the median DTI value for the Charged Off loans are higher than the fully paid loans.
- ➢ Also, borrowers going for higher loan amounts who has higher DTI ratio are more likely to Charge Off.
- ➢ So, borrowers with high DTI value has to be thoroughly scrutinized.

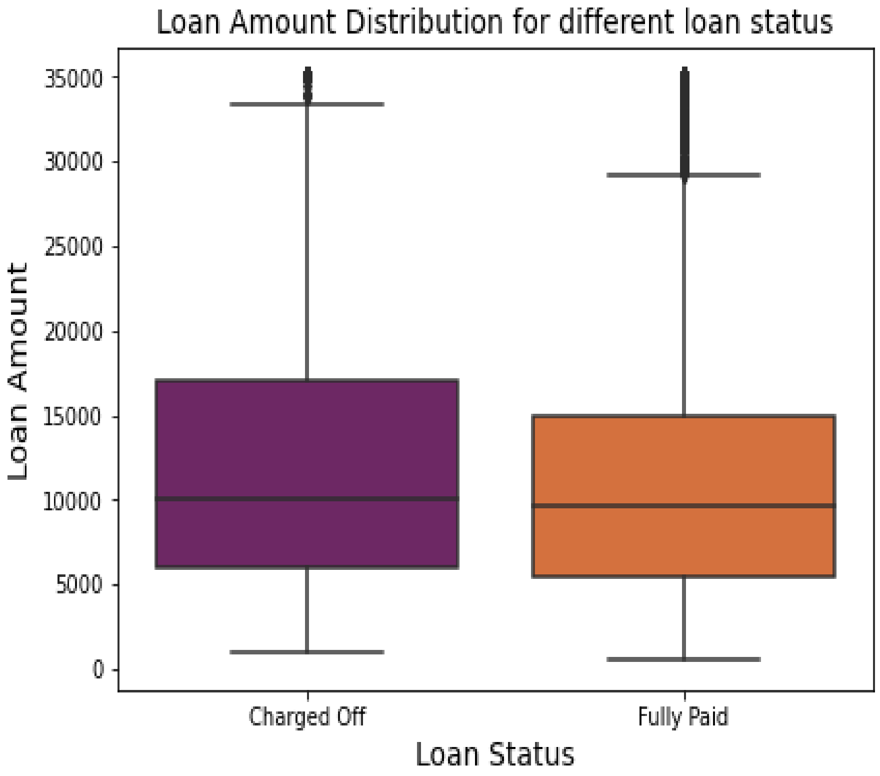
Analysis: Purpose

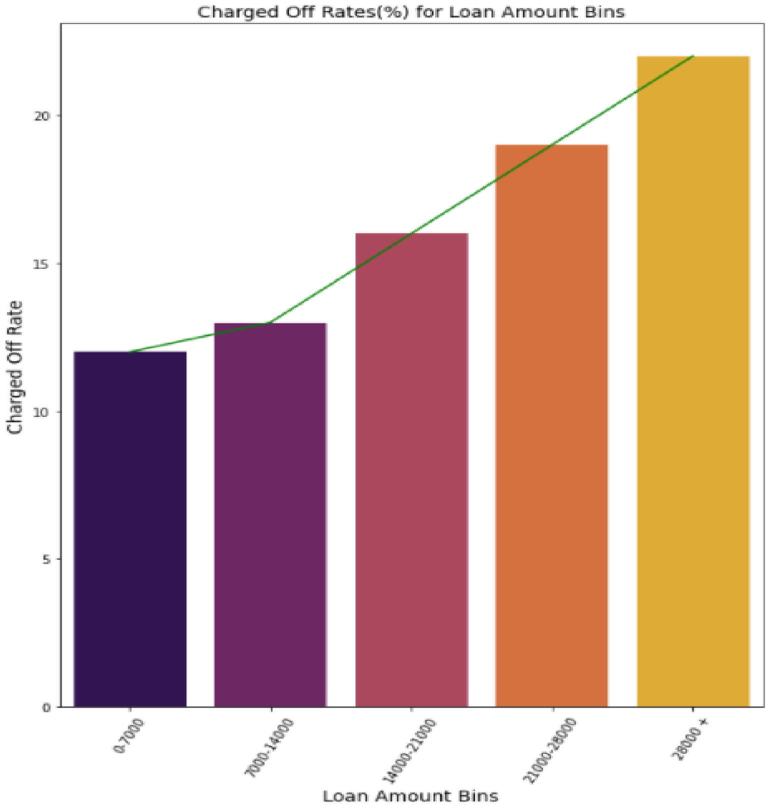


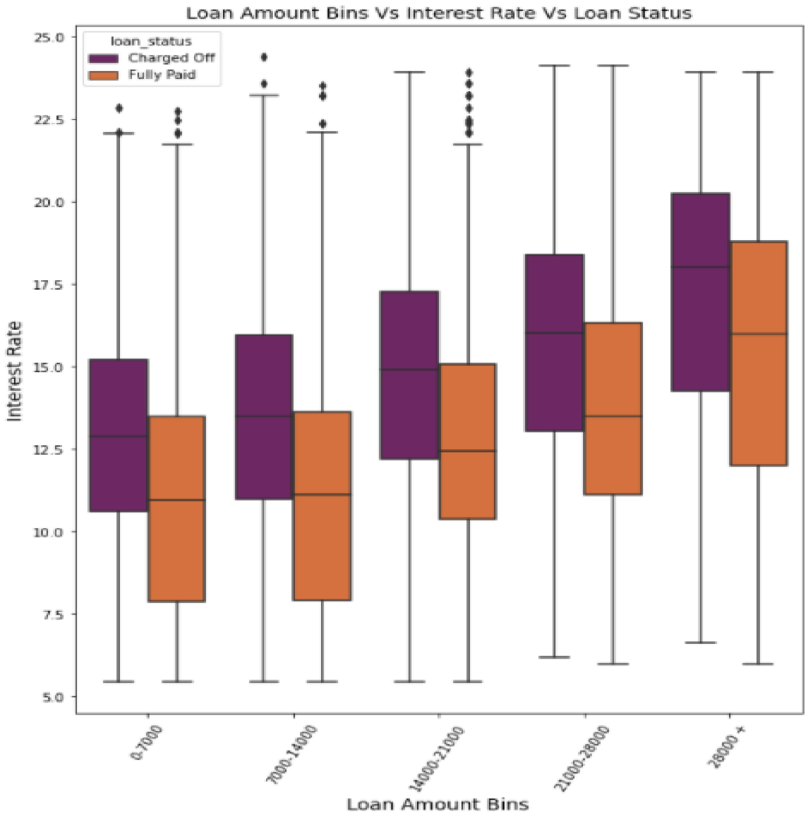


- Majority of the loan applications had the purpose mentioned as debt consolidation or credit card.
- However, when we take a look the distribution of Charged off loans, the borrowers who took the loan for small business had defaulted the most.
- So, Lending Club has to be really careful providing loans to small businesses.

Analysis: Loan Amount

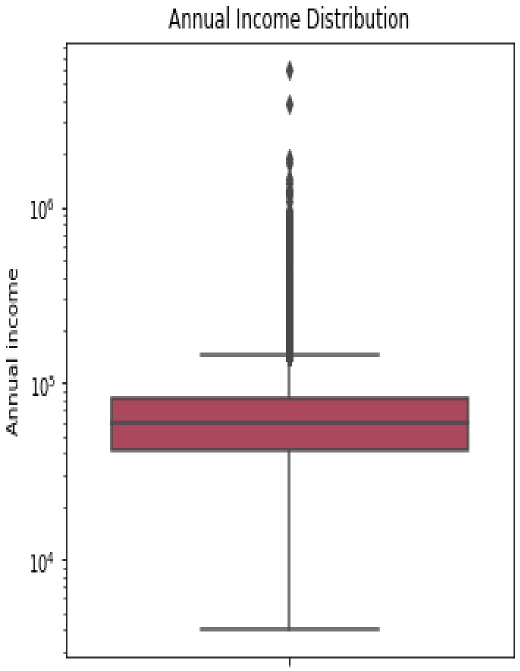


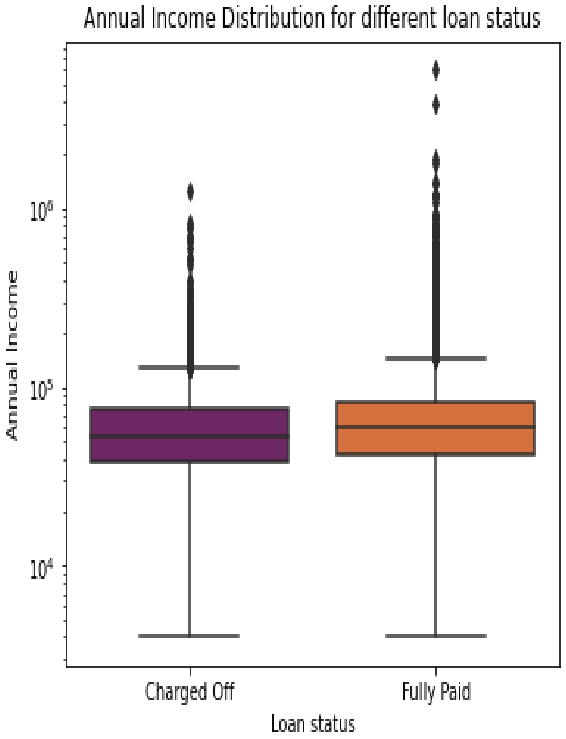


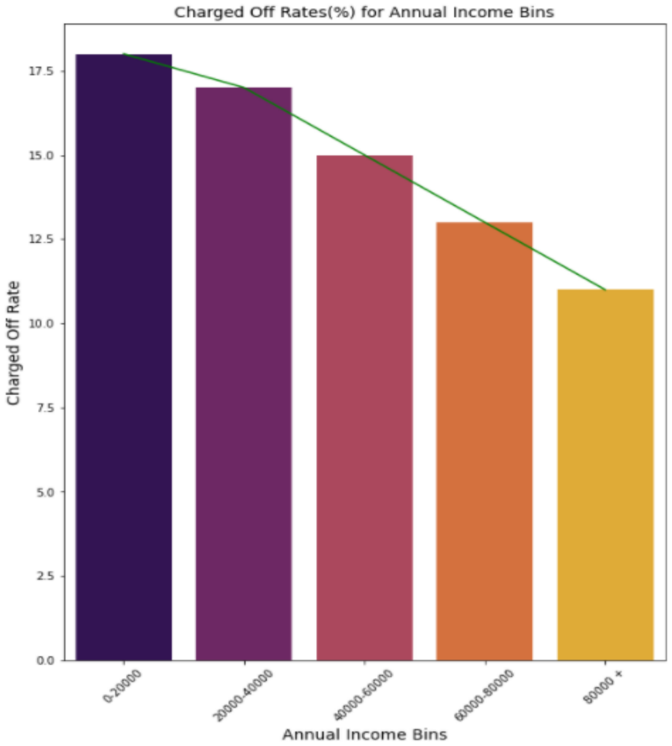


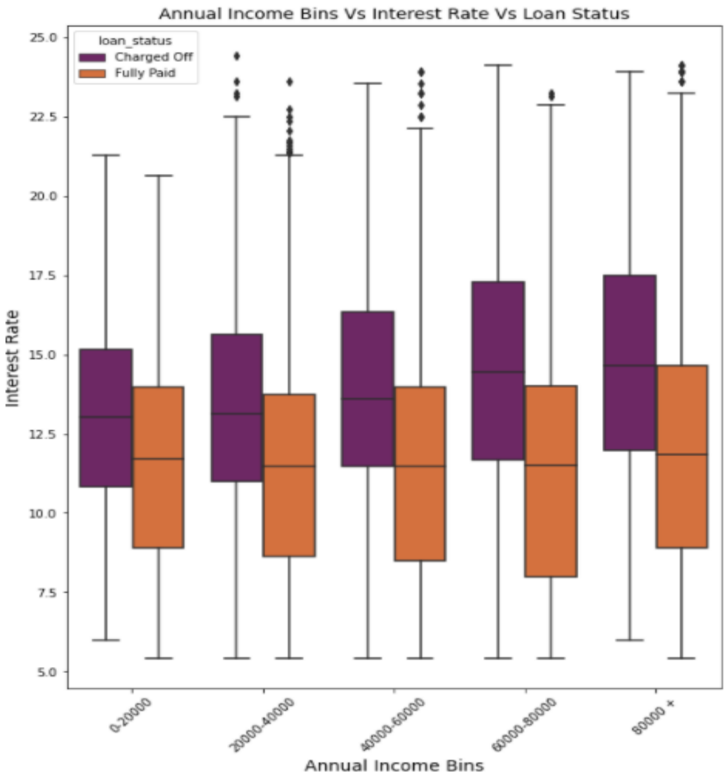
- From the distribution, we can see that, Charged Off loans had went for higher loan amounts.
- Higher is the loan amounts requested, higher had been the Charged Off rate.
- Also, borrowers looking for higher loan amounts, had taken the loans with higher interest rates and they are ones who mostly charged off.
- So, Lending Club has to be cautious approving higher loan amounts.

Analysis: Annual Income





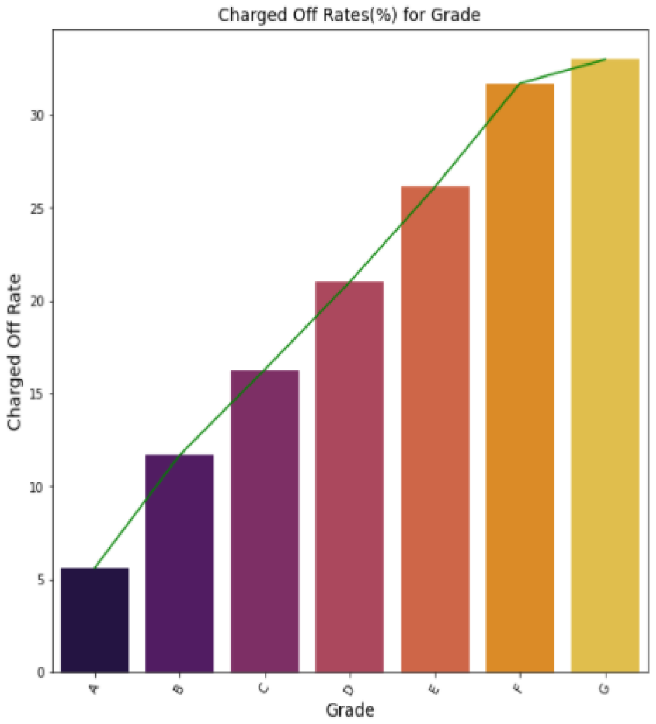


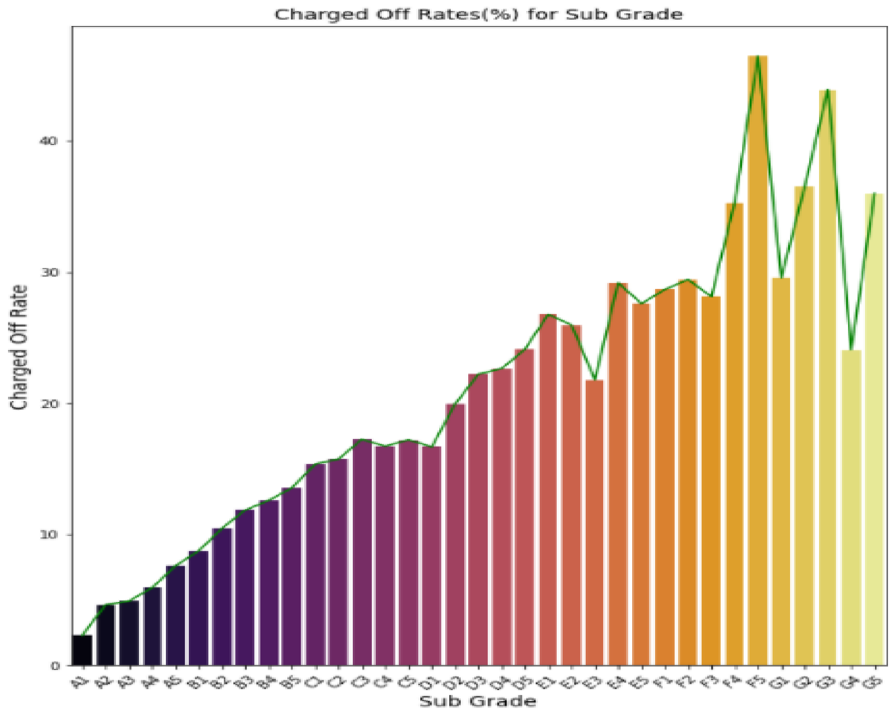


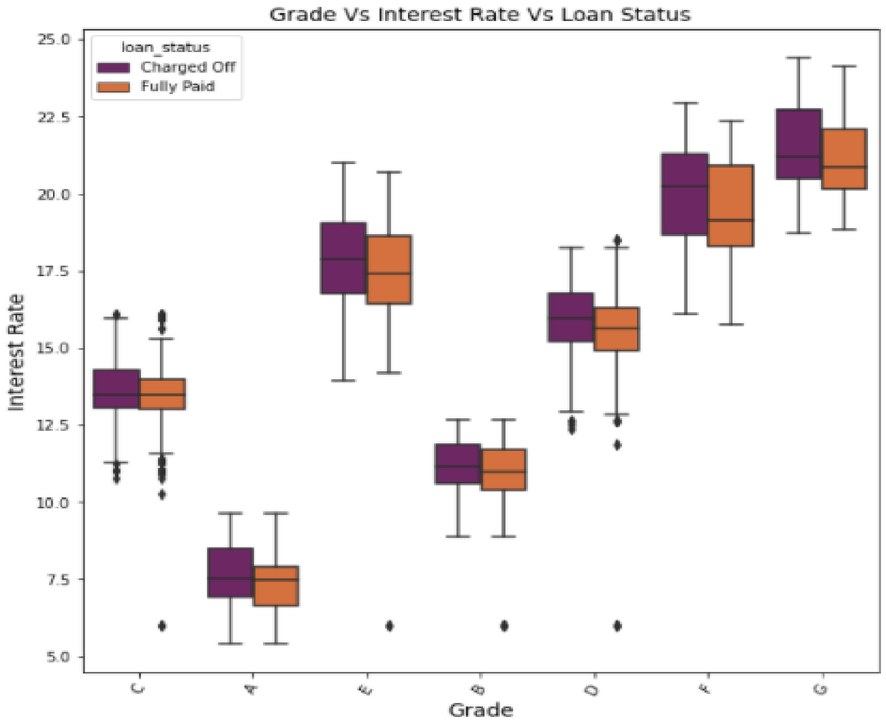
- People with lower annual income had defaulted the most.
- As we see from the above plot, lower the annual income bin, higher is the Charged Off rate.
- Despite taking the loans at a relatively lower interest rates, low earning people had trouble paying the loan the most.

Analysis: Grade & Sub Grade

UpGrad

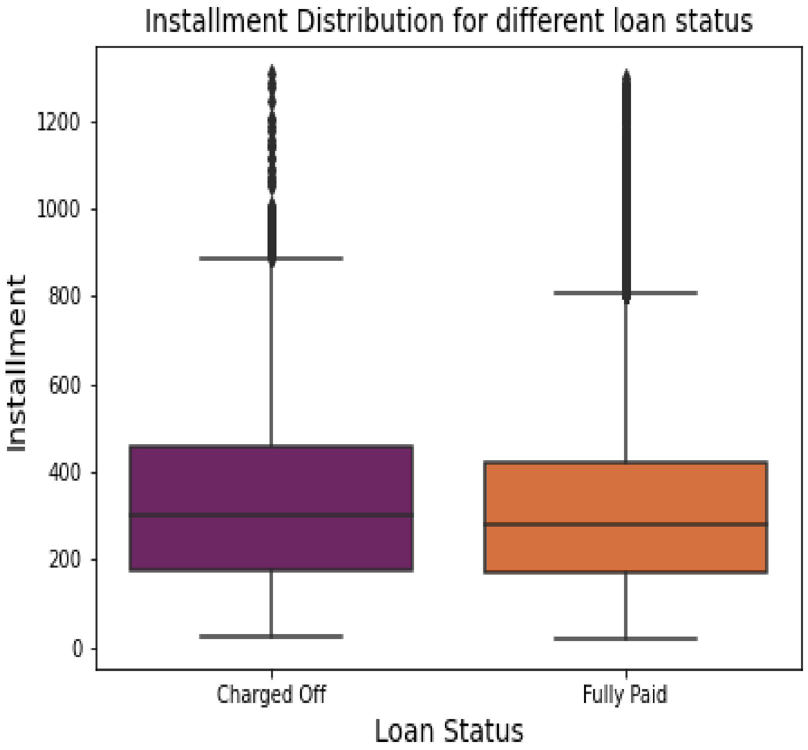


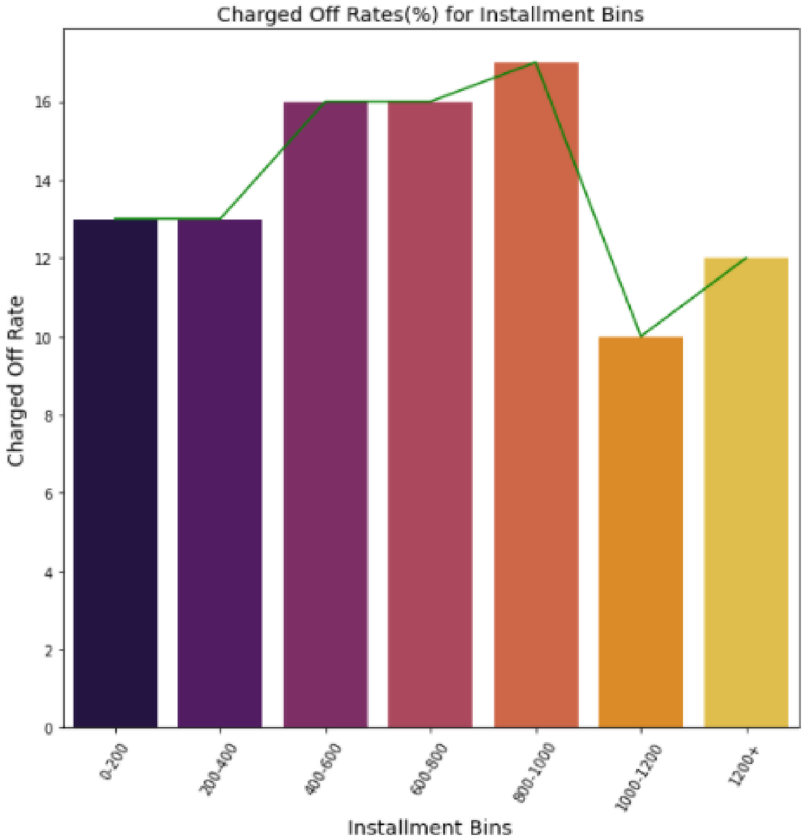


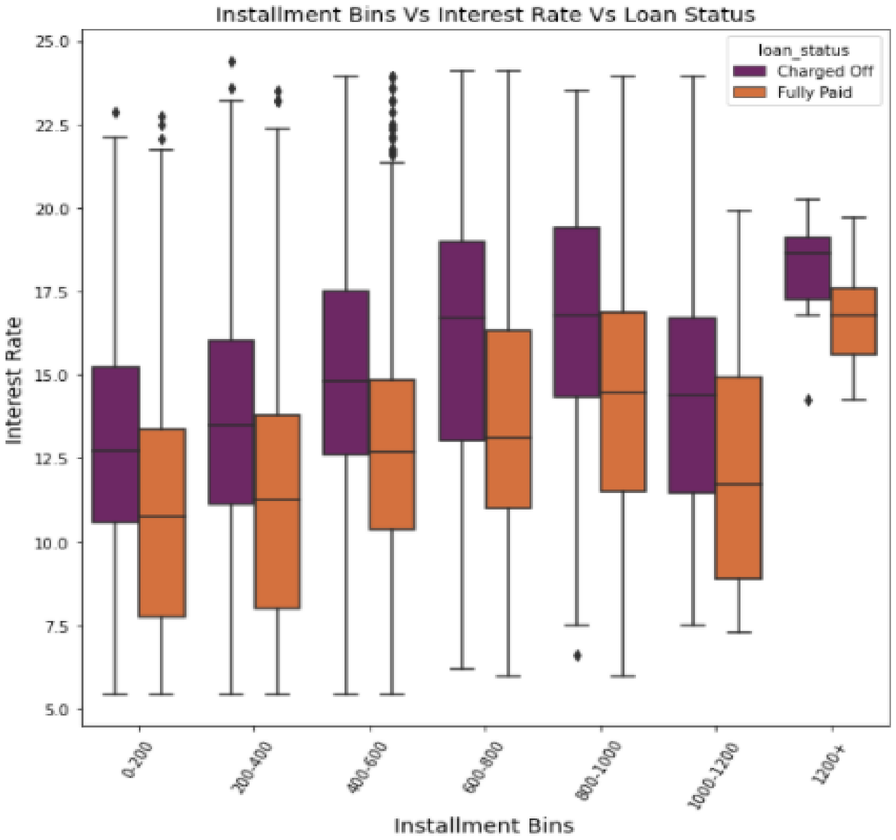


- ➢ Higher is their grade, more likely they will default the loan. Borrowers with higher sub grades had higher charged off rates.
- ➢ Hence the order of risk would be:
  - Grades: G > F > E > D > C > B > A
  - Sub grades: 5 > 4 > 3 > 2 > 1
- ➢ Also, people with higher grades, tend to take the loans at higher interest rates and hence they will fail to pay the loans.

Analysis: Installment

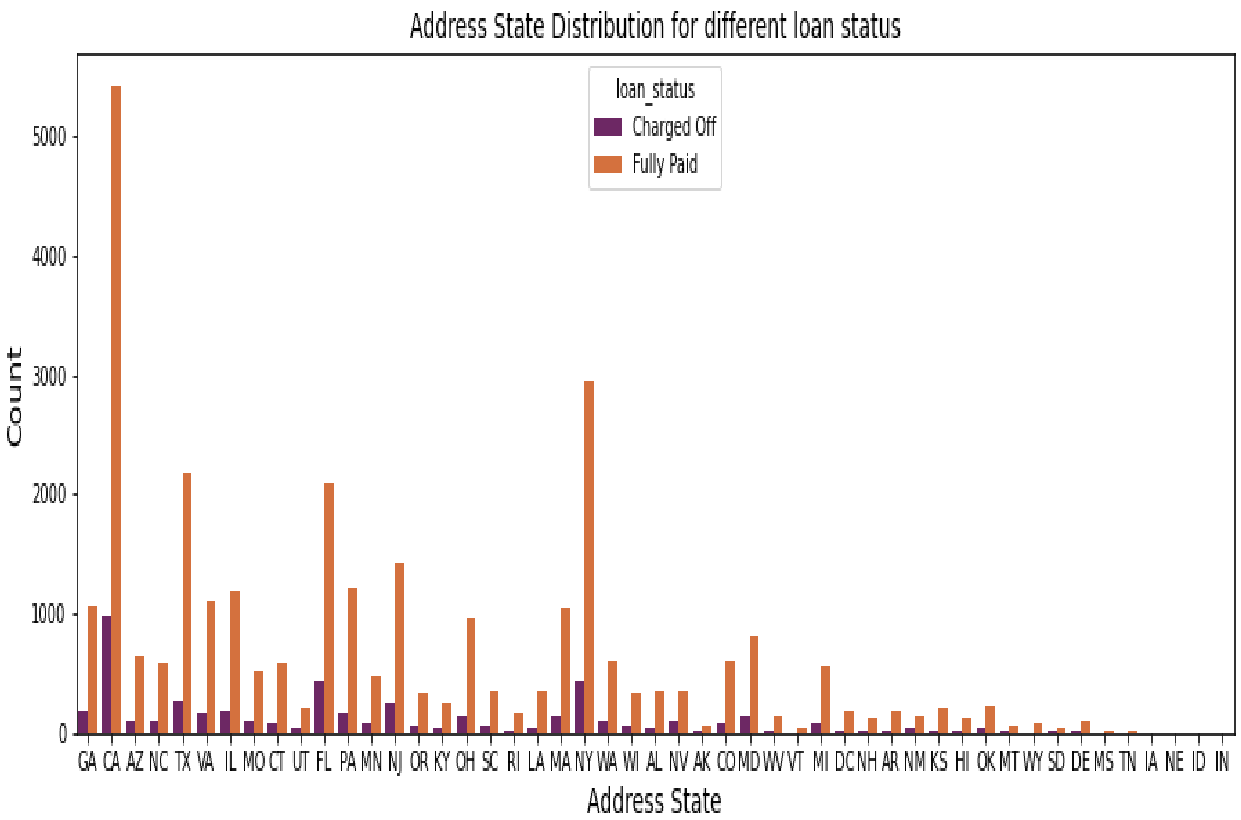


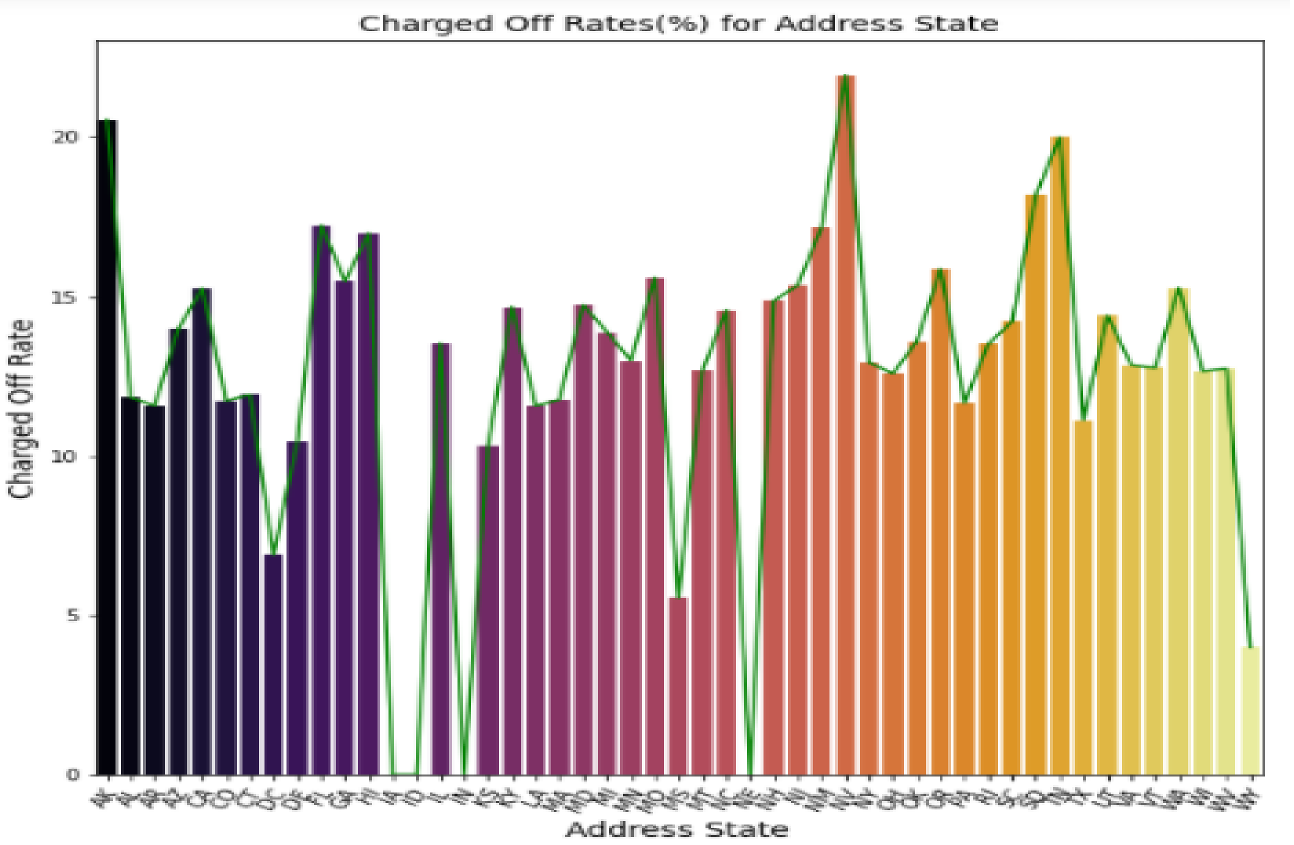




- Higher is the installment amount to be paid, higher is the Charged Off rate.
- Also, for the higher installment bins, the interest rate is also higher and hence more likely to Charge Off.

Analysis: Address State





- Most of the borrowers are from CA, NY and FL.
- However, the charged off rates are higher for the borrowers from NV, AK and TN, which are greater than 20%.

Summary:

- Borrowers choosing 60month term are more likely to Charge Off at 25%.
- Higher the interest rate of the loan, higher are the chances for the loan to get Charged Off.
- Higher the DTI ratio of the borrower, more likely that it will be defaulted.
- Majority of the loan applications had the purpose mentioned as debt consolidation, and the small business loan applications default the most.
- Higher is the loan amounts requested, higher had been the Charged Off rate.
- People with lower annual income had defaulted the most.
- Borrowers with higher grades defaulted the most.
- For a given grade category, borrowers with higher sub grades defaulted the most.
- Borrowers with Rented and Mortgaged homes mostly went for the loans, but the ones with ‘Others’ had higher Charged Off rate.
- Higher is the installment amount to be paid, higher is the Charged Off rate.
- Borrowers with 10+ years of employment length had requested for more number of loans and they are ones who defaulted the most.
- Most of the borrowers are from CA, NY and FL.

Recommendations:

Lending Club can follow the below recommendations to bring down Charged Off loans:

- Prefer applicants who opt for 36months term and low interest rates.
- Borrowers with lower grade/sub-grades, low DTI ratio and higher annual income can be preferred.
- Suggest to avoid higher loan amount disburse with higher installments.
- Have to be cautious approving loans for small businesses.
- Borrowers from NV, AK and TN has to be thoroughly scrutinized.