Lending Club Case Study

Objective and Business Problem:

- The goal of this case study is to use EDA and solve the real-world problem of loan lending company and gain insights from the historical data and preset to the customer the insights through presentation.

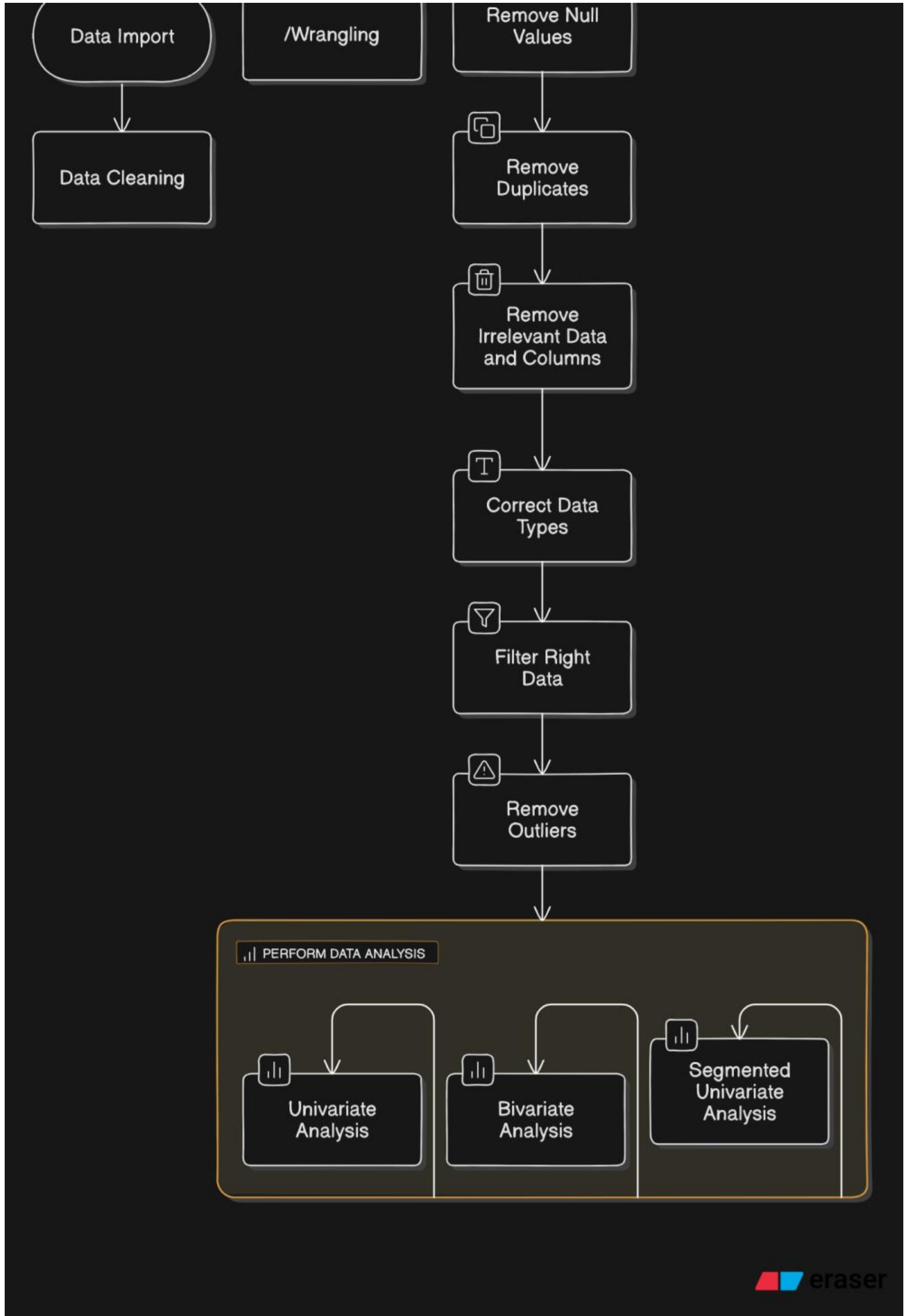
What are the problems addressed in this case study?

- Gives idea on different drivers which might cause financial or business loss to the company.
- Measure risk analytics and its importance in Banking and Financial Organizations
- Minimize the loss of money or defaulters by performing certain checks gained from analysis and use them to approve/reject the loan application.

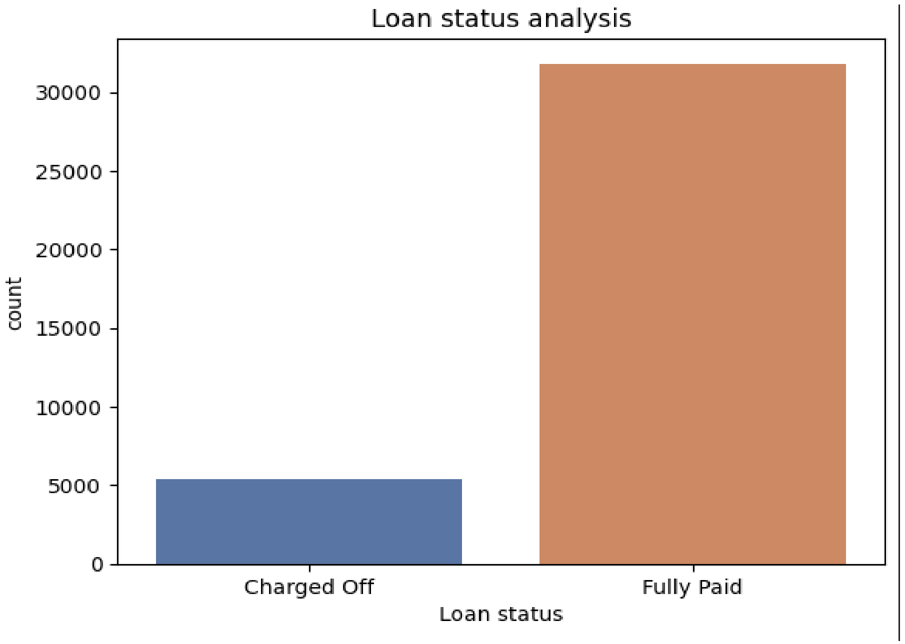
Outcome/Goal of analysis:

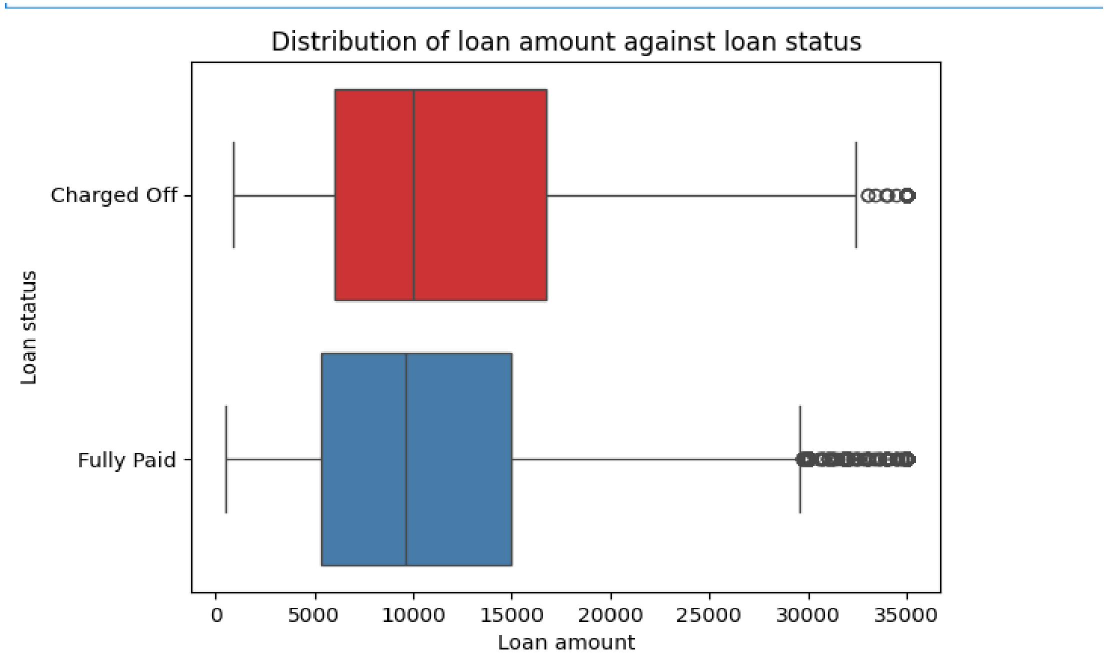
- Analyze the dataset which has historic data of the applicants and if the borrower has defaulted loan or not based on the EDA techniques identify what could be the possible driver parameters of the dataset which cause the loan to be defaulted.
- Based on the outcome, company should take a call to grant/reject the loan

EDA: Exploratory Data Analysis



Loan amount and status trend analysis

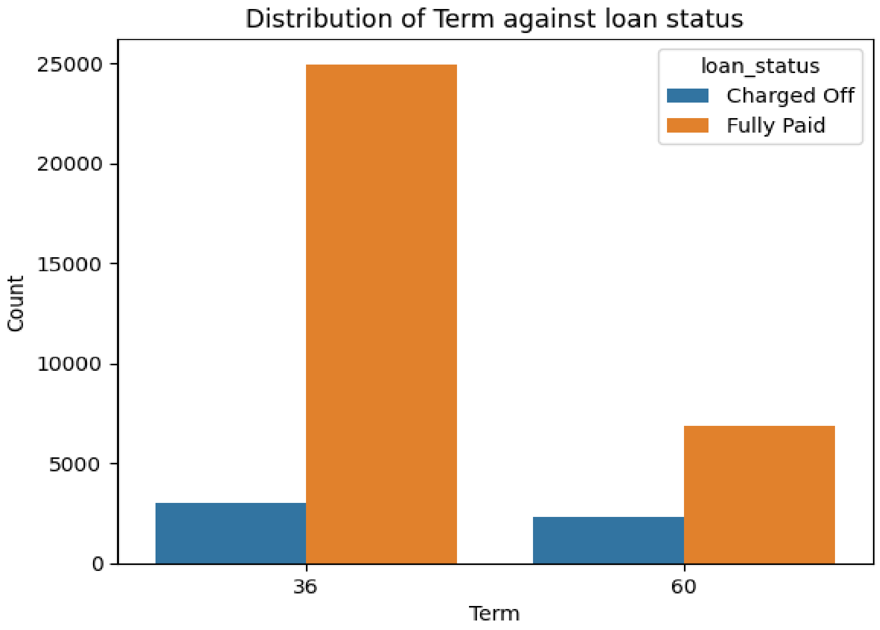


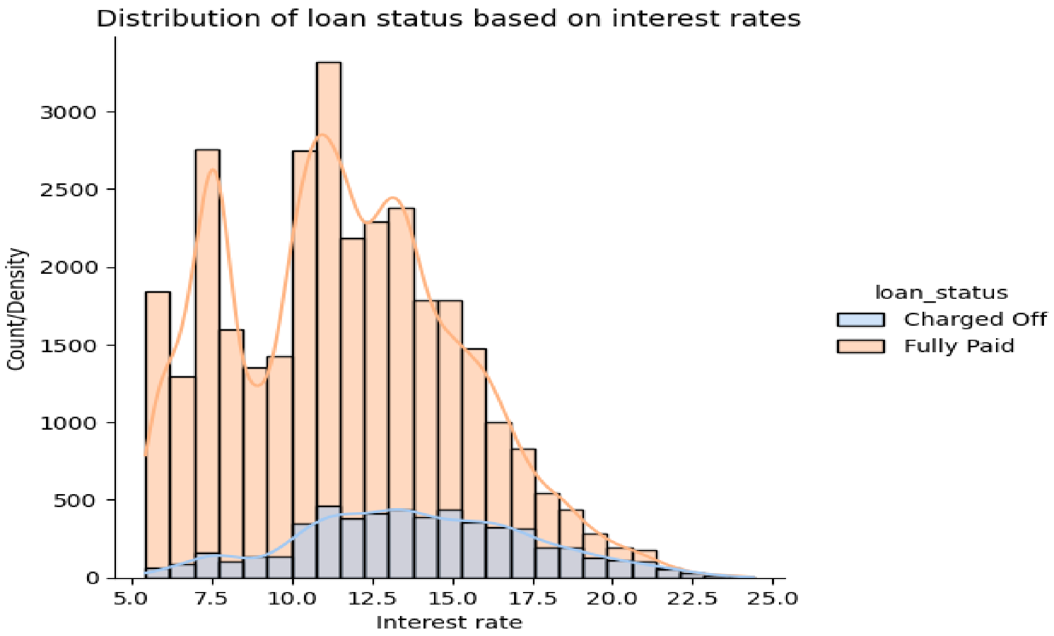


- **Loan Status:** Percentage of Charged Off loan is much smaller than paid loans around 14.5%

- **Loan Amount:** From the plot, it shows that the Charged off are where relatively the loan amount is higher.

Term and Interest offered

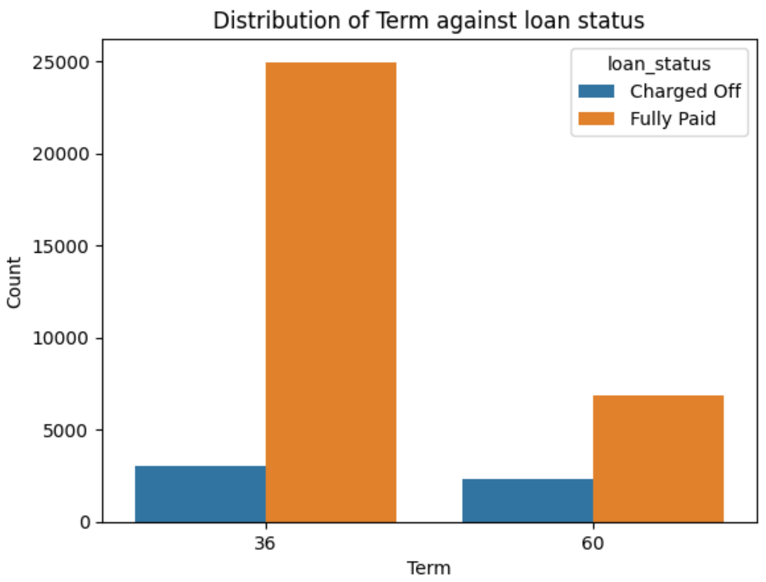


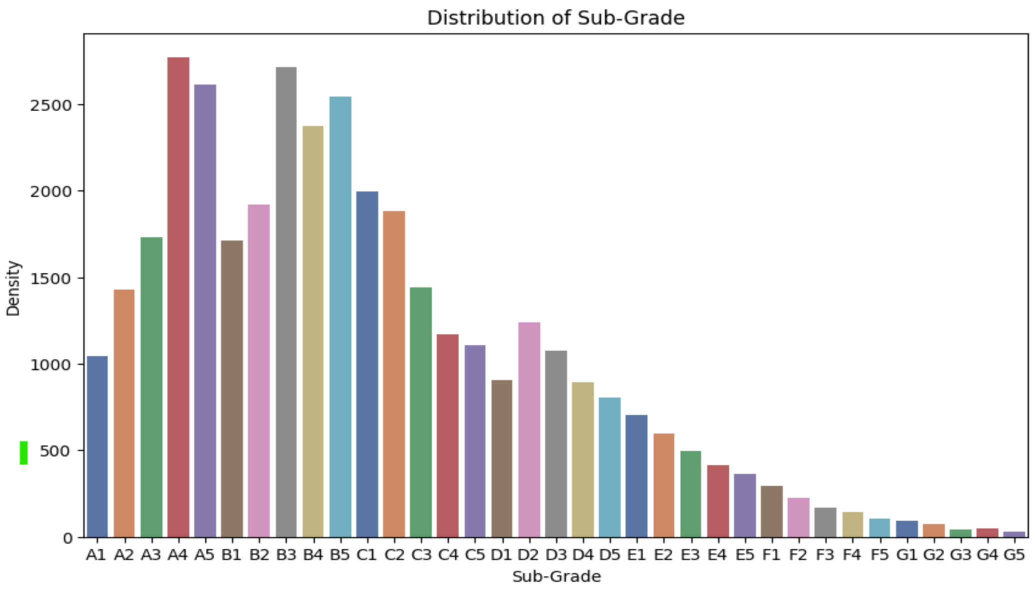


- **Loan Term:** Loans taken for 36 months are more than 60 month loans and 36 months have higher chance of defaulting

- **Interest rate:** Loan taken varies among different salary groups and it has its peak near 10-15 group and next peak at 5-10

Grade and Sub grade

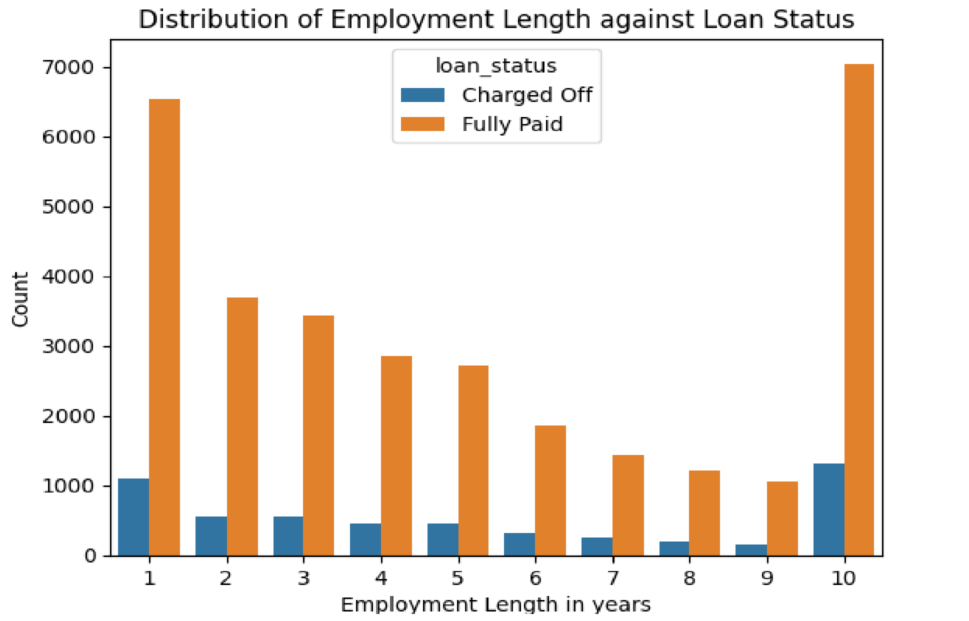


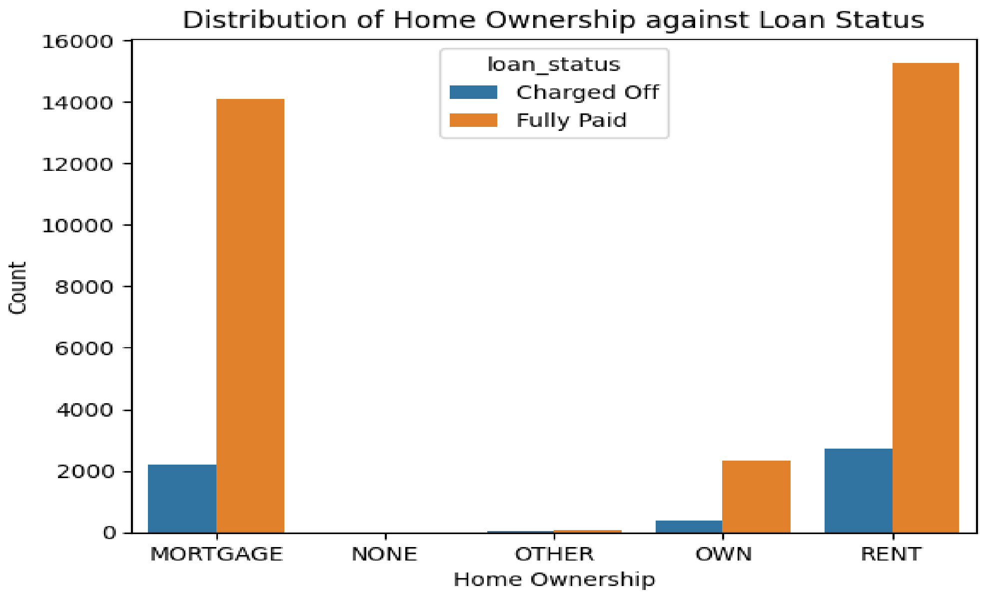


- **Grade:** 36 months tenure loans are more than 60 and the defaulters in 36 months is comparatively more than 60

- **Sub Grade:** Majority of loans are under A4 and A5 under A grade and B4, B5 grades under B

Employee experience and Homeowners

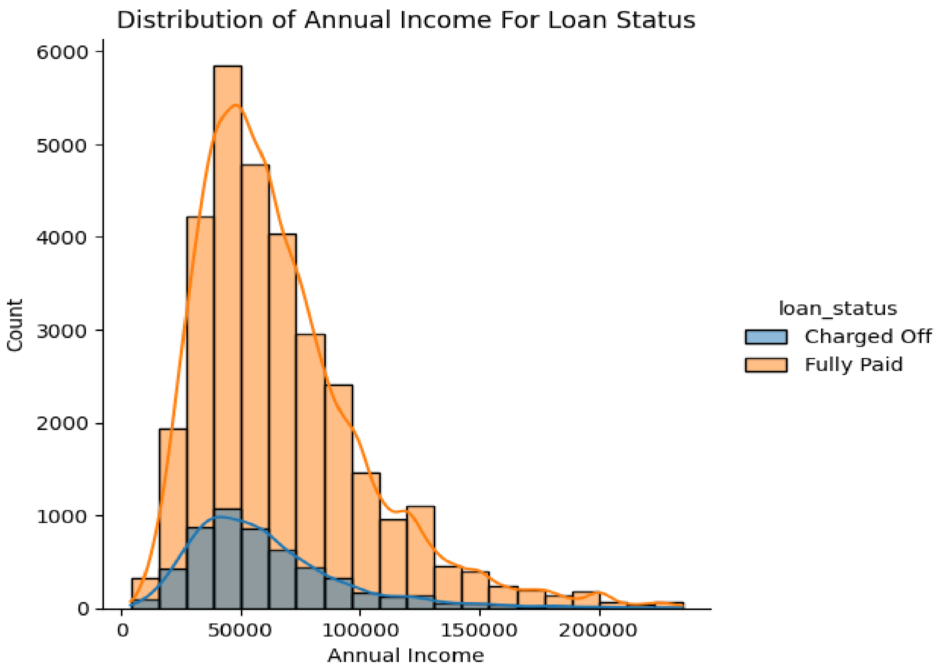


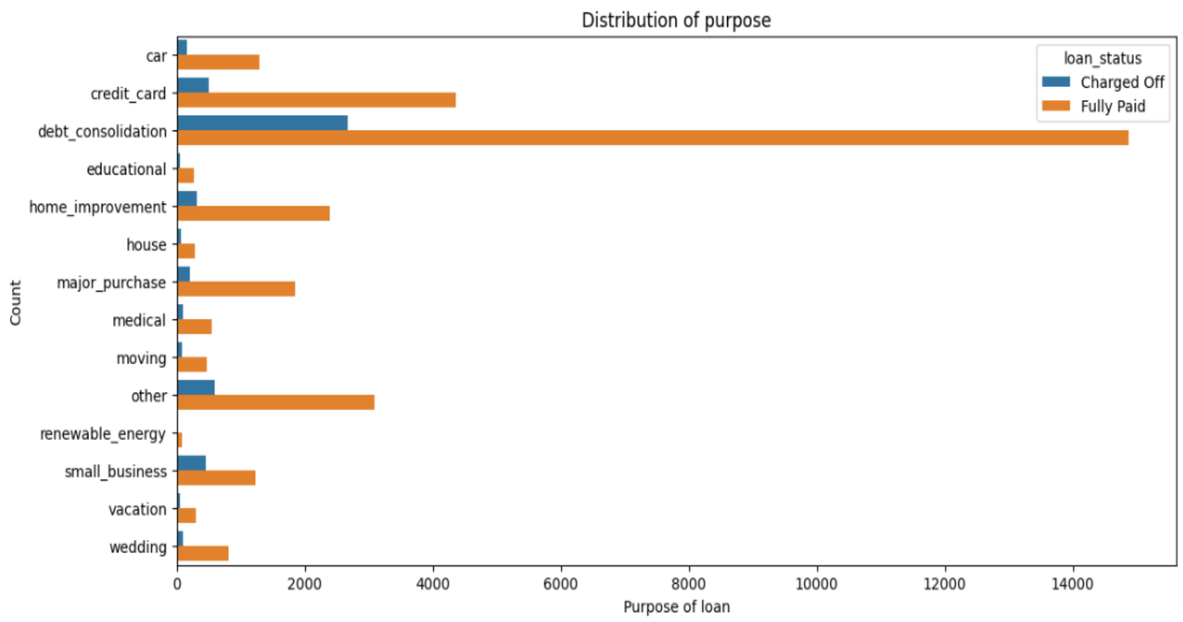


Employee length: As we can see and infer from the image, employees with 10 years and then 1 year experience followed by more clothes

Home Owner: Majority of customers who borrowed loan lack their own house and stay in mortgaged or rent

Income in millions and Purpose

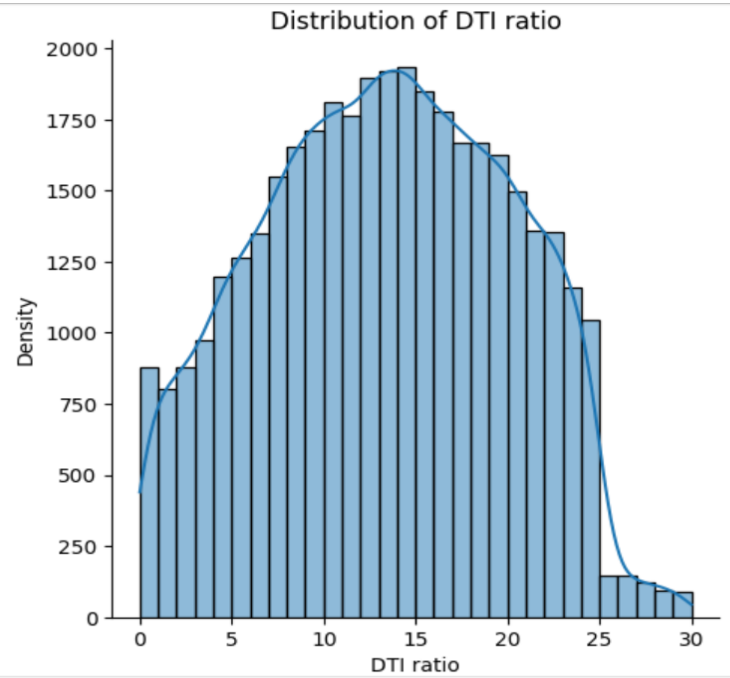


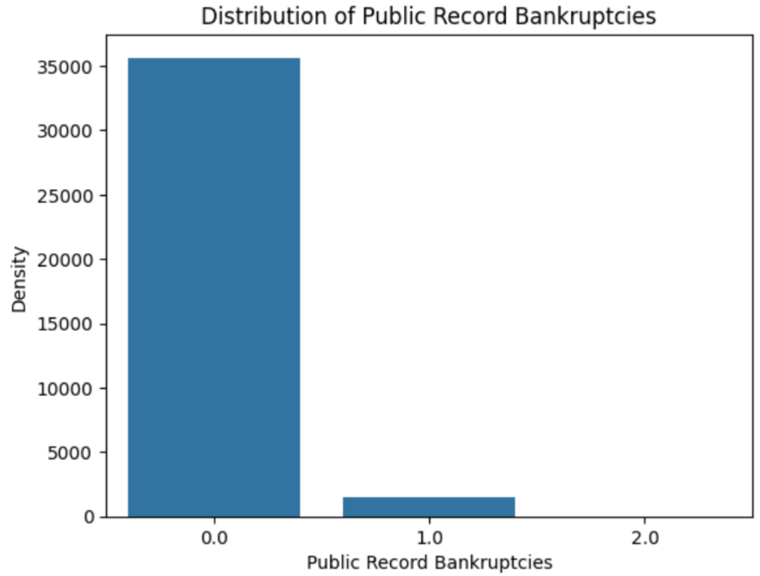


Income: Majority of clients have low annual income range compared to other income and has higher chance of defaulting

Purpose: Loans are taken either debt consolidation followed by credit card.

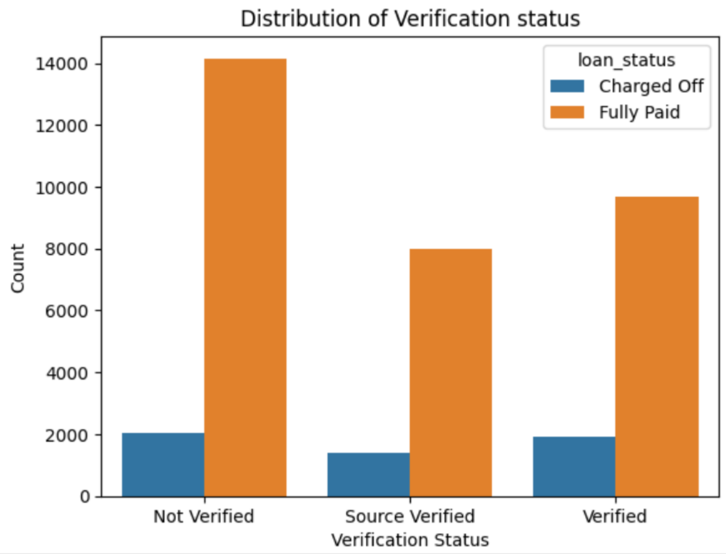
DTI ratio & Public record bankruptcy

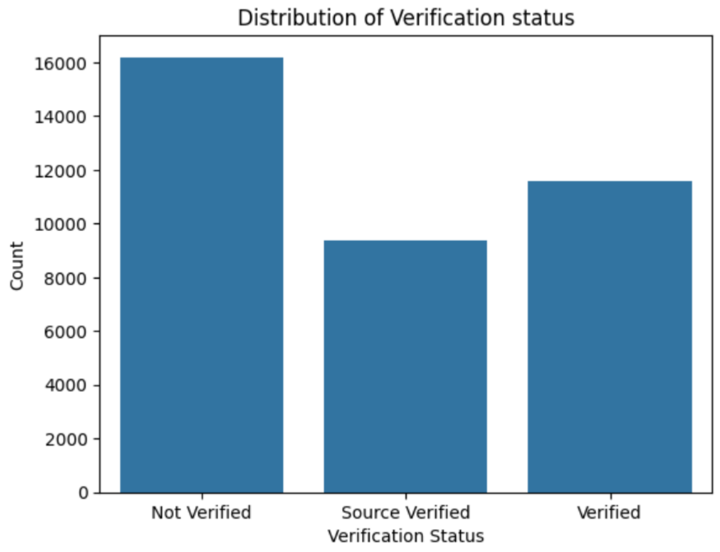




- **DTI:** Majority of borrowers have a large Debt to Income ratio which clearly states that the borrower with such high DTI ratio may default and is very risky for the company

- **Public record bankruptcy:** There are hardly any borrowers with recorded bankruptcy

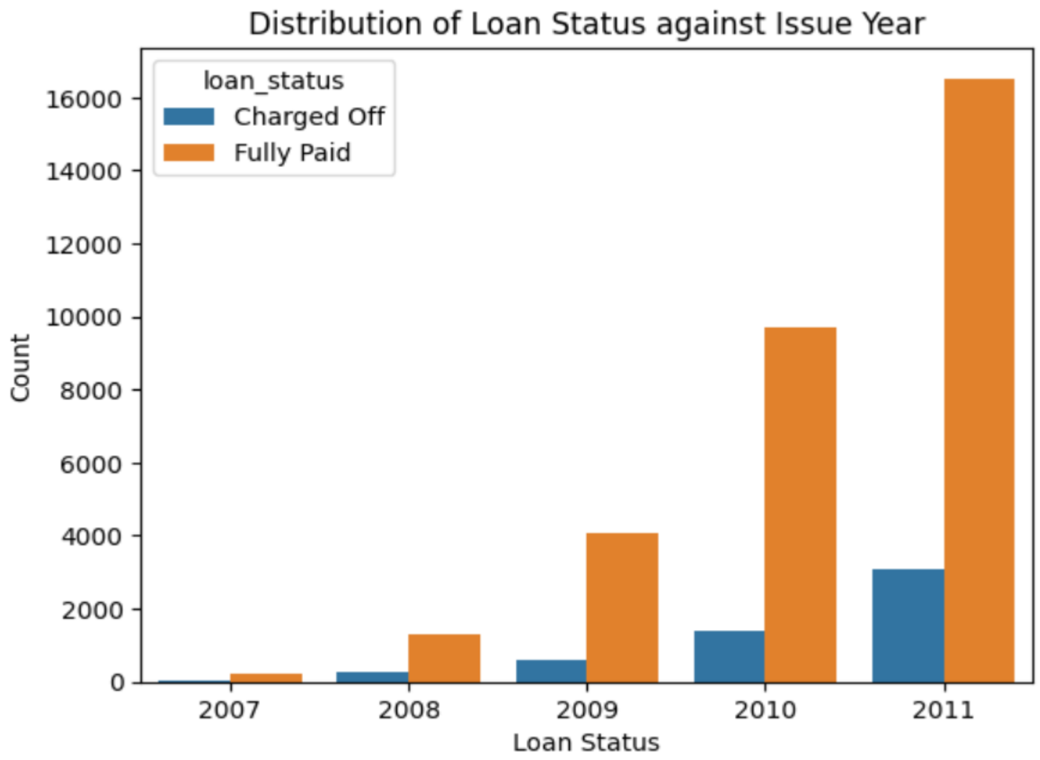




Verification status trend w.r.t loan status

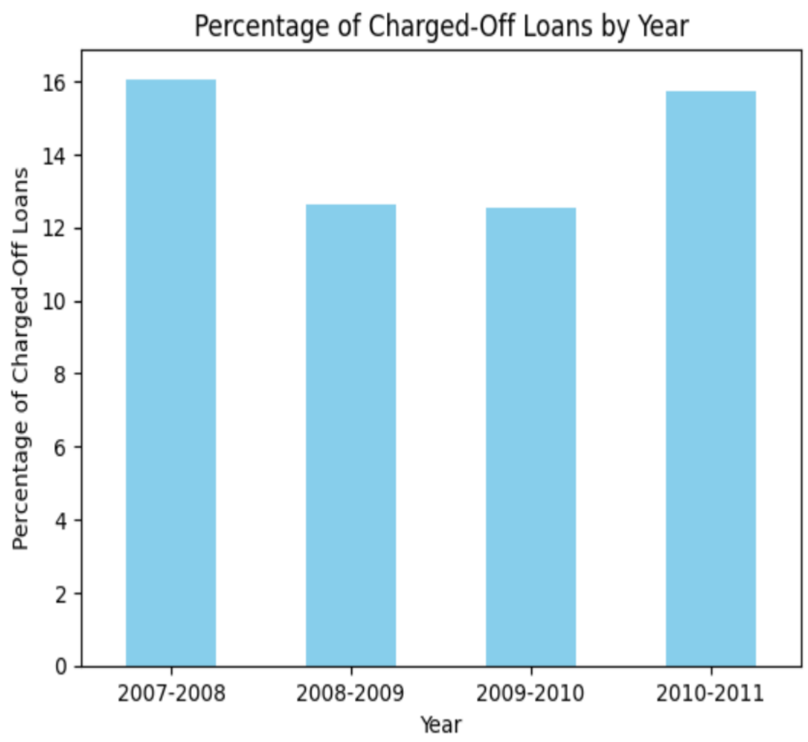
- **Verification Status:** This shows the trend of loan verification and defaulters of the loan, it do not have clear indication that non verified loans have high defaulters, source verified has lowest defaulters

Loan trend over years



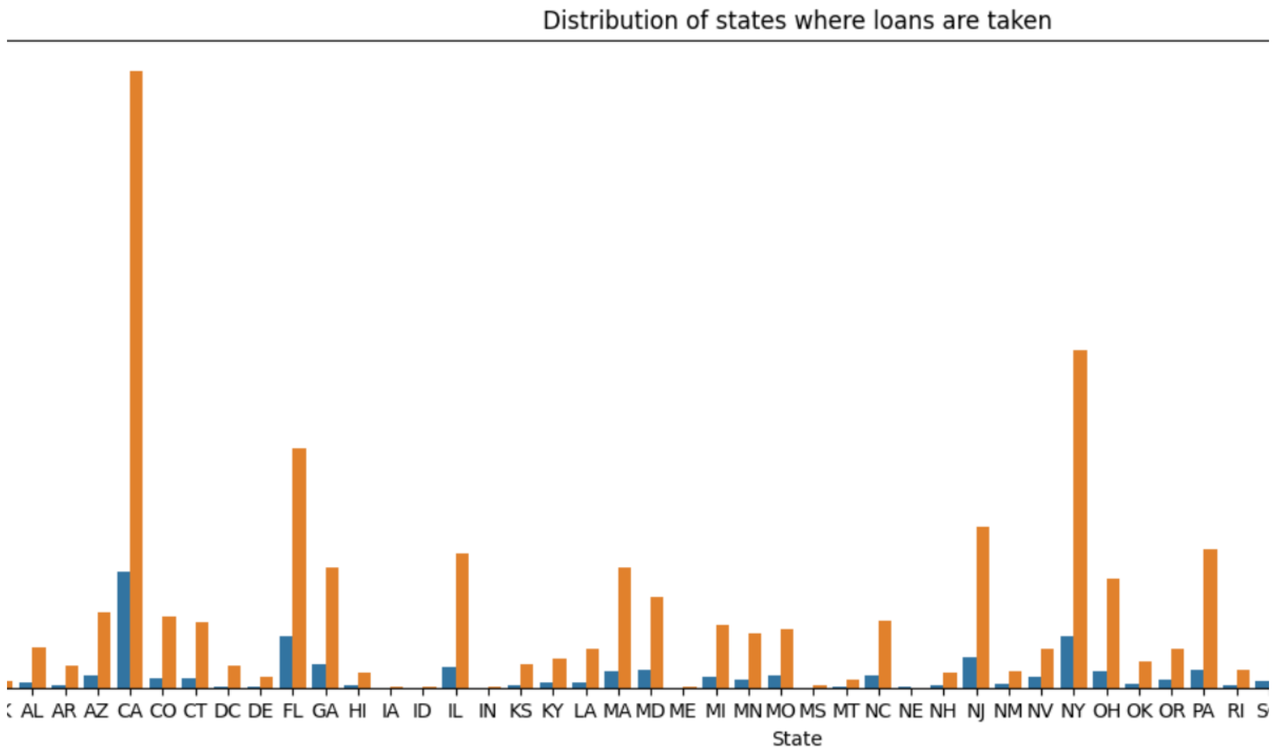
- We see that the loans approval rate has been increasing year on year with an exponential raise in 2011
- We are seeing loans have been increasing and DTI ratio, also each passing year with more loans, defaulted loans are also increasing

Percentage of defaulted loans to total loans per year



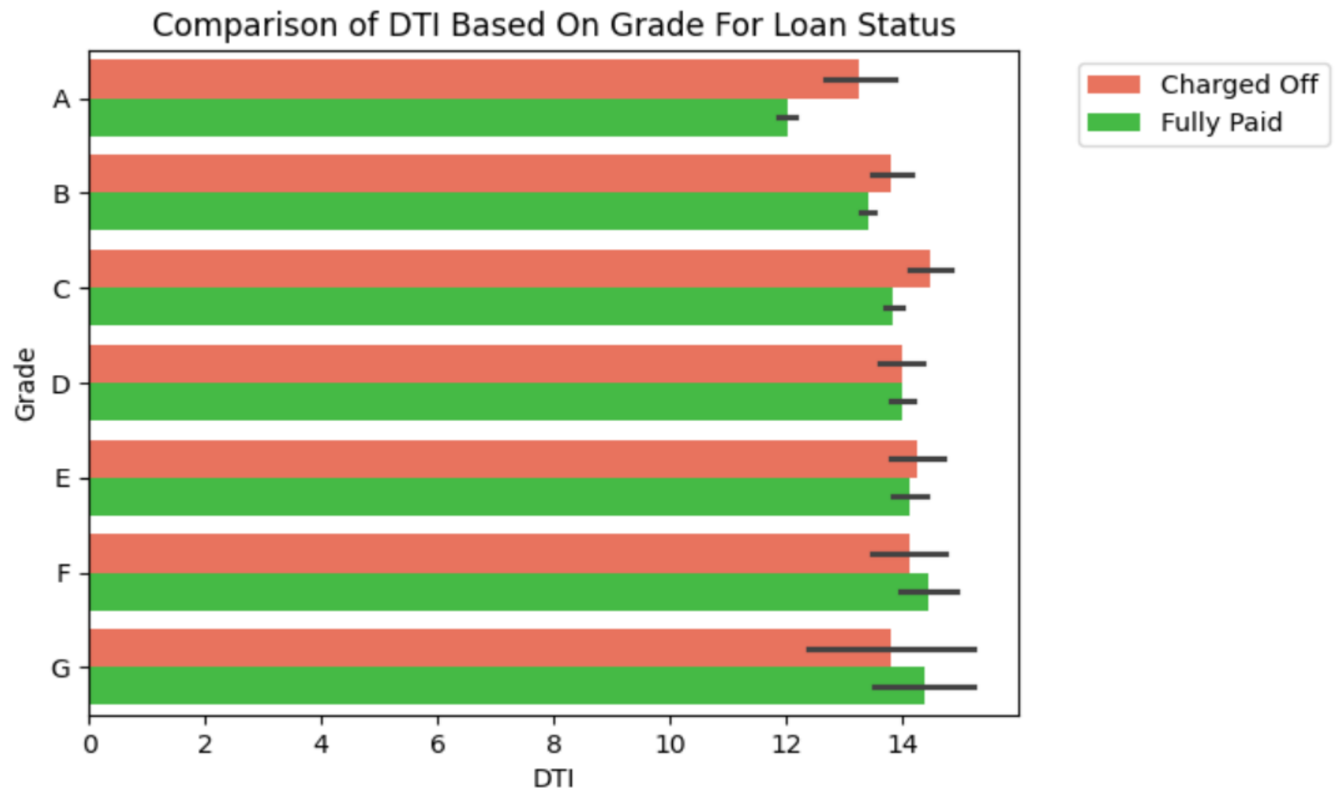
- Clearly it shows the defaulted loans are not increasing with exponential increase in loan approvals.
- We see steep decrease in charged off loans in 2008-2010 and again the percentage increased in 2010.
- If the source verification and verification are done carefully, there will be chance of decrease in charged off loans

Location Based trend



- Loans are taken more in large metropolitan cities like California, New York, Texas and Florida but the percentage of defaulted loans is very minimal/less
- We can consider there is less defaulting if we look at the loan approval rate to defaulted rate

Trend of Loan status based on grade and DTI



- Loans are given with low grades based on the DTI ratio, higher the DTI ratio, lower will be the grade of the loan which means interest will be higher for such loans
- Most of the loans defaulted are in segment of "B", "C", "D", "E" grades and high DTI ratio
- From this again we can draw the conclusion saying that when the credit history or the borrower is not good, we will have to verify other parameters like income, location where they stay, loan purpose etc.,

Recommendation from analysis

Driving factor to predict defaulters:

- DTI ratio
- Loan grades
- Verification status
- Annual income
- Employee tenure of working
- Bankruptcy

Considerations and good to know reasons of defaulters other than driving factors

- Borrowers not from metropolitan cities like New York, California, Florida etc.,
- Borrowers having income 0-100000.
- Borrowers having grades of E,F,G indicates high chance of defaulting.
- Borrowers with highest DTI ratio
- Employee who has working experience who has 1 year and 10+ years.
- Over the years the defaulting of loans to total loans is decreasing which is a good indication but overall, the defaulted loans are increasing in number as number of loans getting approved are increasing in number.
- Source verified has least number of defaulted loans, can consider to source verify if the defaulters have higher DTI ratio and less income to check if the borrower can turn into potential defaulter or not.