Lending Club Case Study

Ajit Shinde & Safalya Mohanta

Agenda

Problem Statement

Business Objective

Data Analysis

Observations

Recommendations

Problem Statement

Problem Statement

A consumer finance company which specialises in lending various types of loans to urban customers. When the company receives a loan application, the company has to make a decision for loan approval based on the applicant’s profile. Two types of risks are associated with the bank’s decision:

- If the applicant is likely to repay the loan, then not approving the loan results in a loss of business to the company
- If the applicant is not likely to repay the loan, i.e. he/she is likely to default, then approving the loan may lead to a financial loss for the company

The data given below contains information about past loan applicants and whether they ‘defaulted’ or not. The aim is to identify patterns which indicate if a person is likely to default, which may be used for taking actions such as denying the loan, reducing the amount of loan, lending (to risky applicants) at a higher interest rate, etc.

Business Objective

Business Objective

Like most other lending companies, lending loans to ‘risky’ applicants is the largest source of financial loss (called credit loss). Credit loss is the amount of money lost by the lender when the borrower refuses to pay or runs away with the money owed. In other words, borrowers who default cause the largest amount of loss to the lenders. In this case, the customers labelled as 'charged-off' are the 'defaulters'.

If one is able to identify these 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.

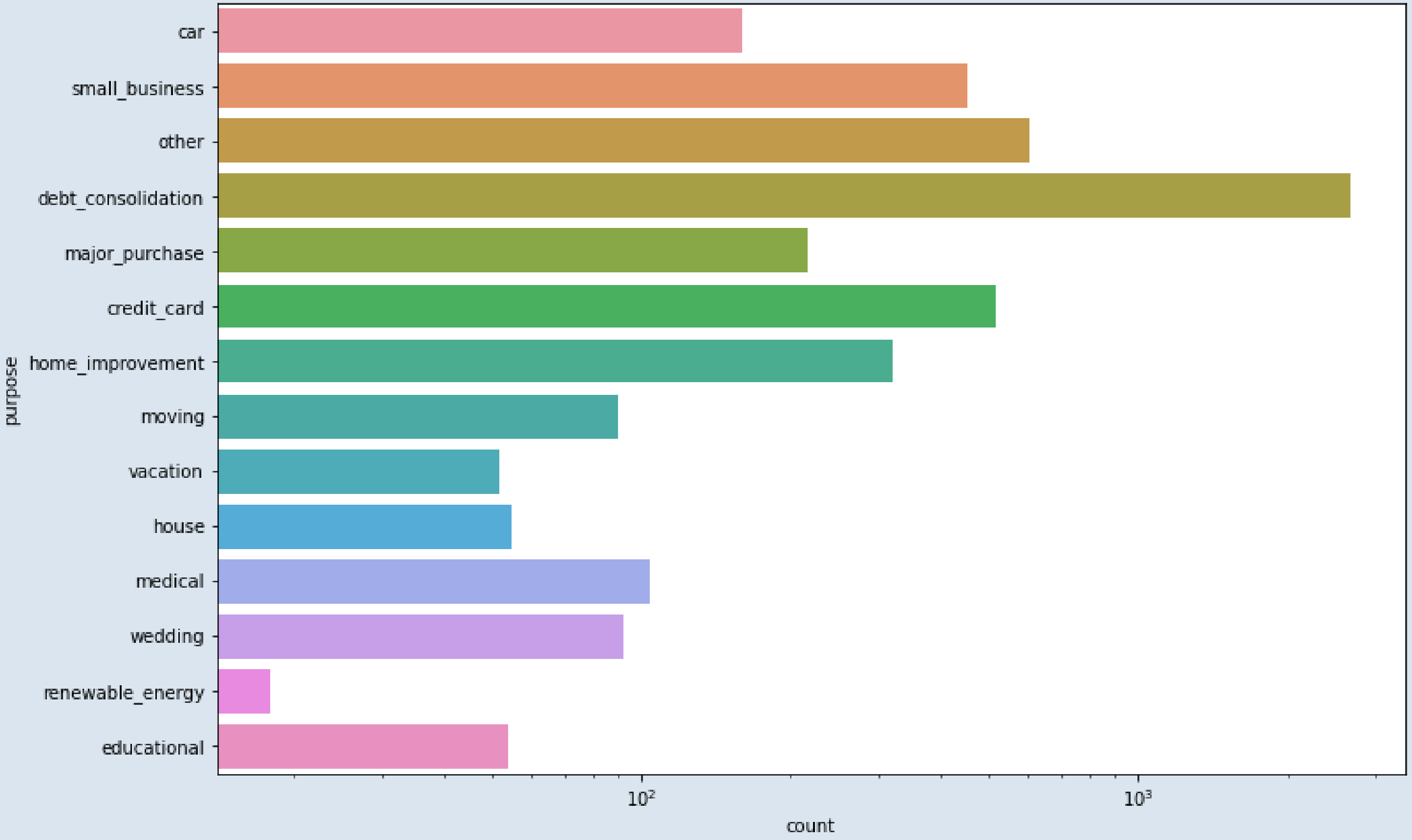
In other words, the company wants to understand the driving factors (or driver variables) behind loan default, i.e. the variables which are strong indicators of default. The company can utilise this knowledge for its portfolio and risk assessment.

Data Analysis

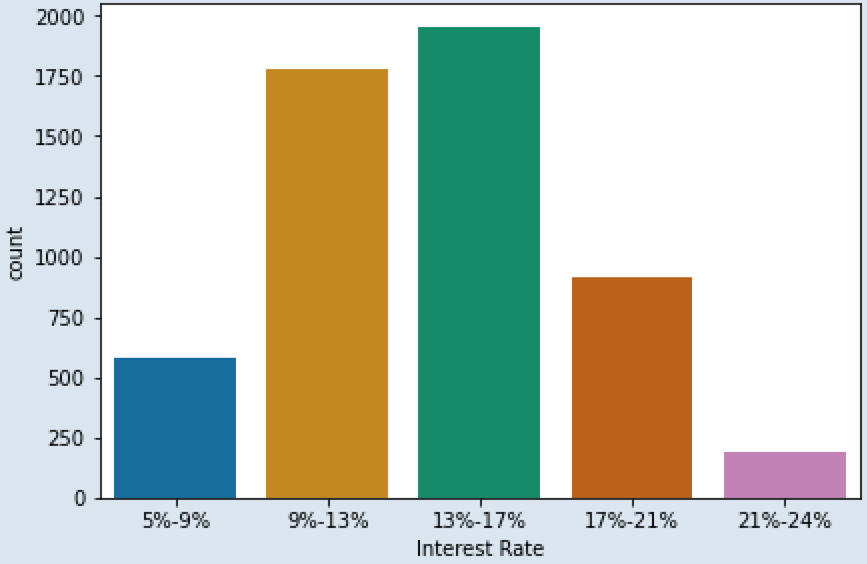
Analysis

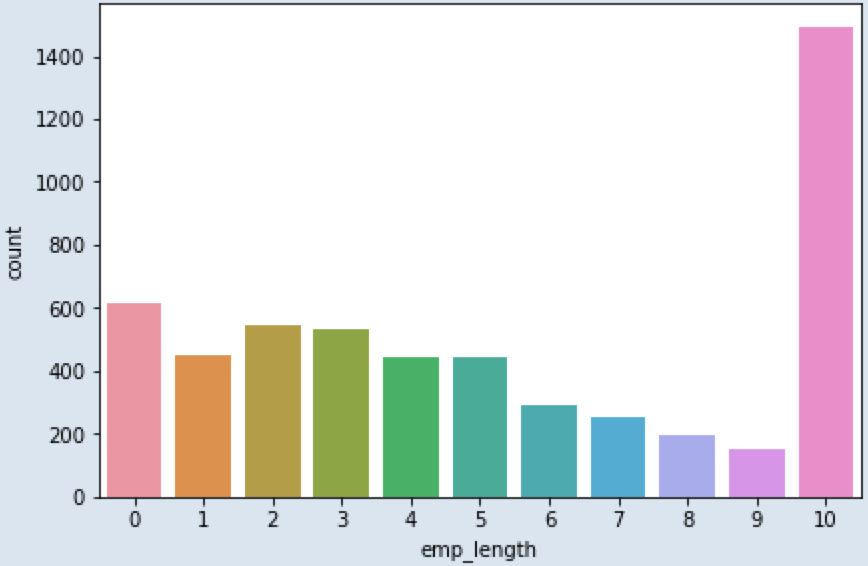
- Analysing Home Ownership - Applicants having house_ownership as 'RENT' and somewhat 'MORTGAGE'

- Analysing purpose columns - Applicants who use the loan to clear other debts



Analysis

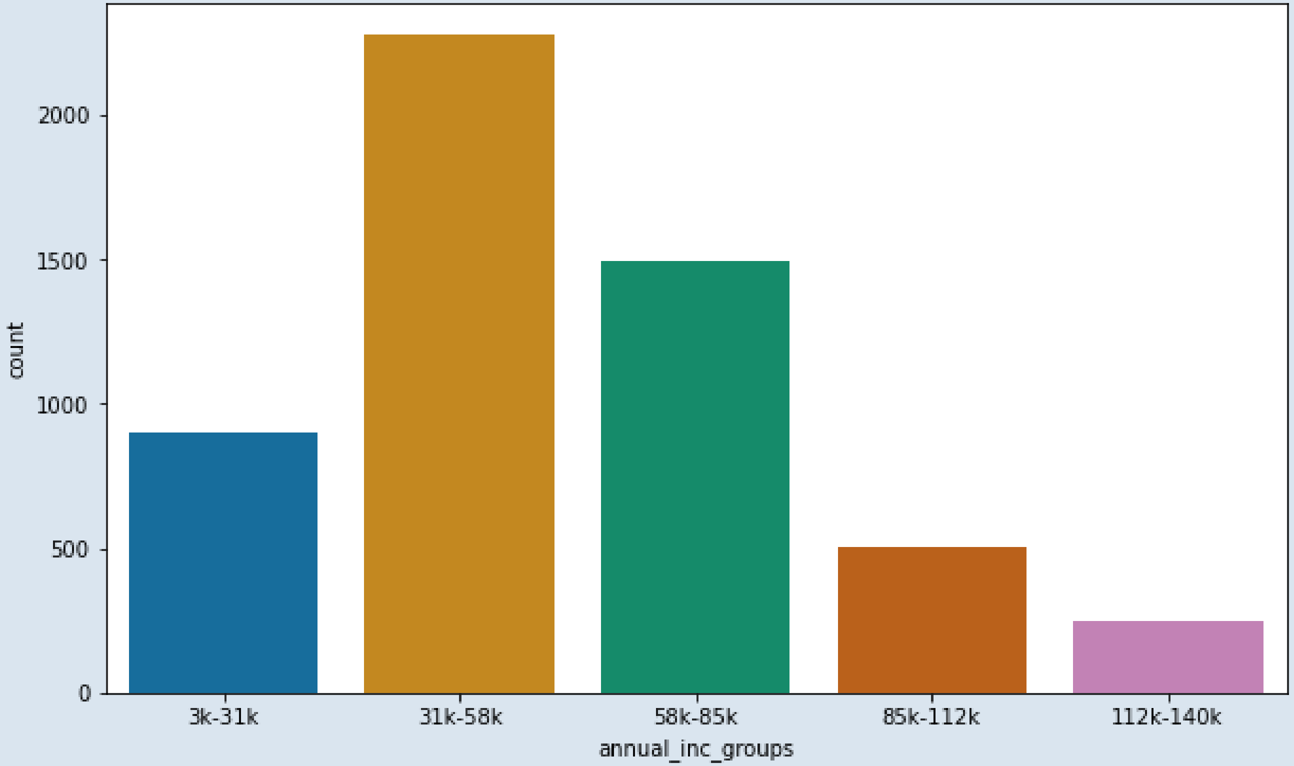




Having high probability of defaulting when:

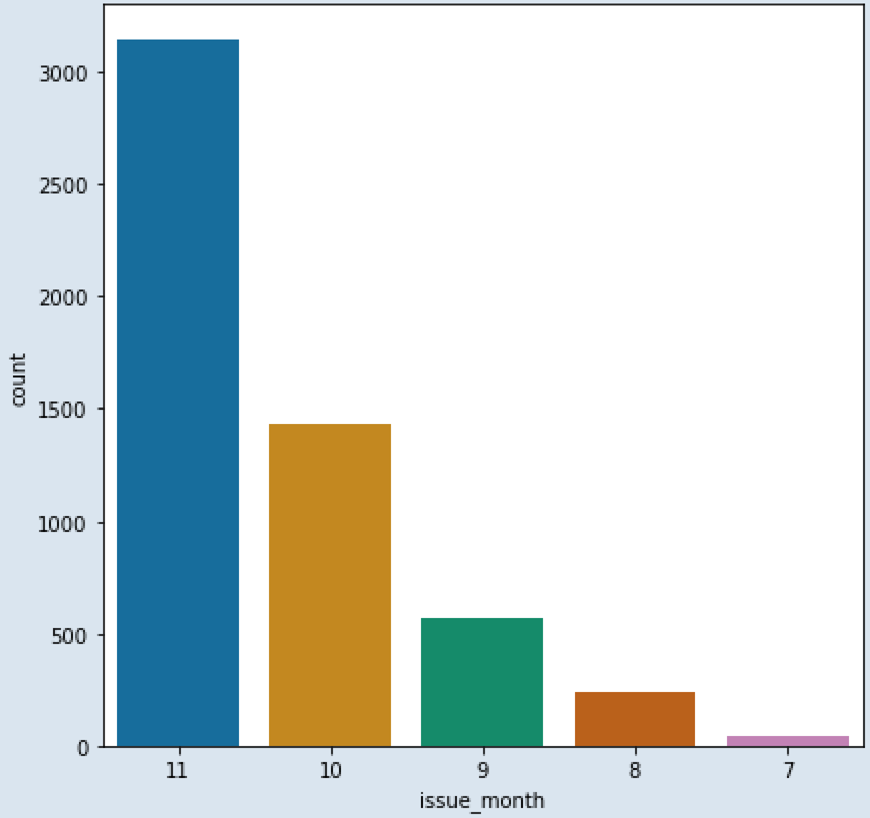
- Analyzing interest rate wrt the interest rate bins created
- Analyzing emp_length - Applicants with employment length of 10

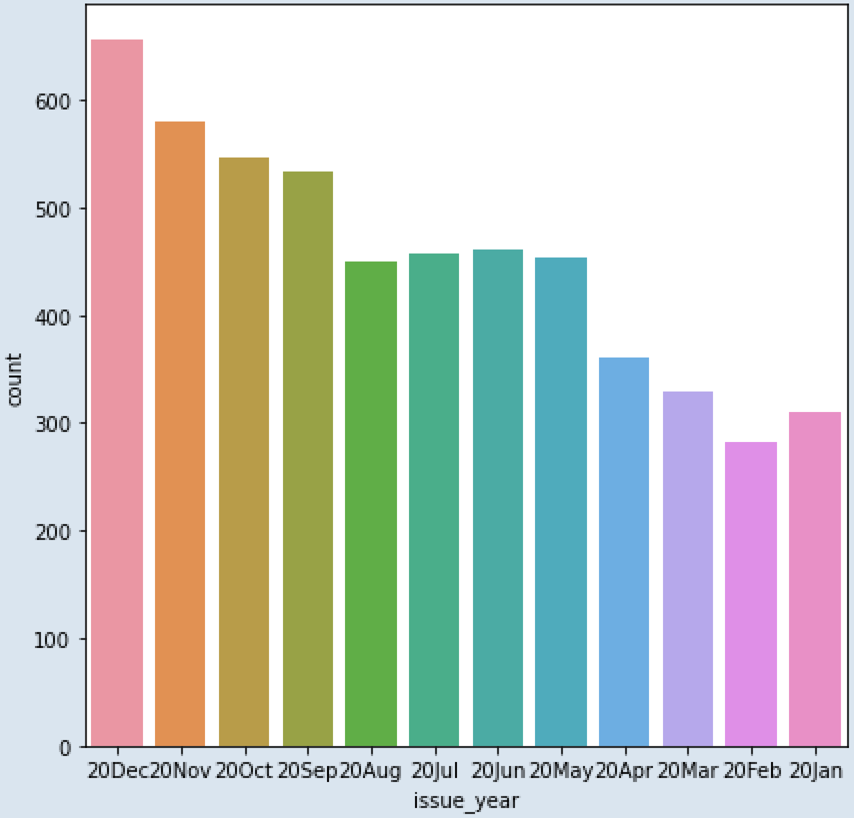
Analysis



- Analyzing annual_inc - Applicants who have an income of range 31k - 58k is having high probability of defaulting

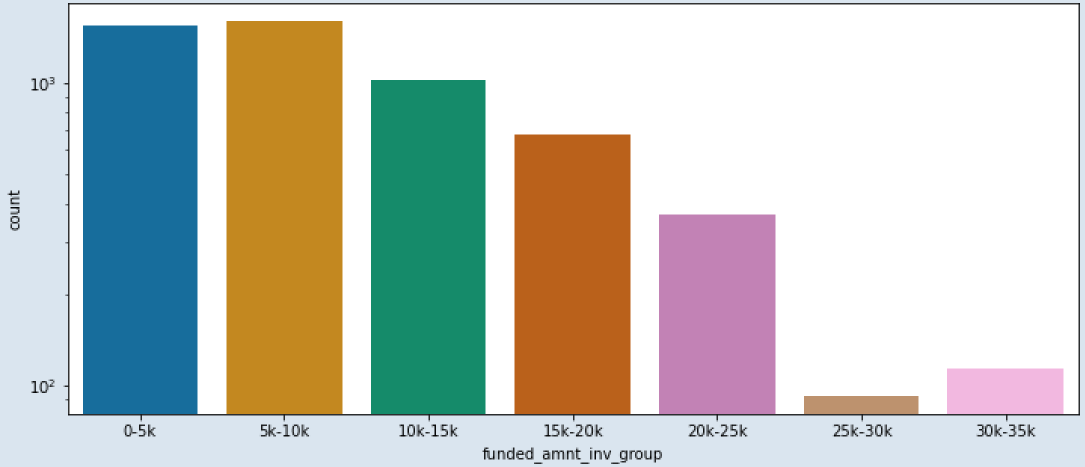
Analysis

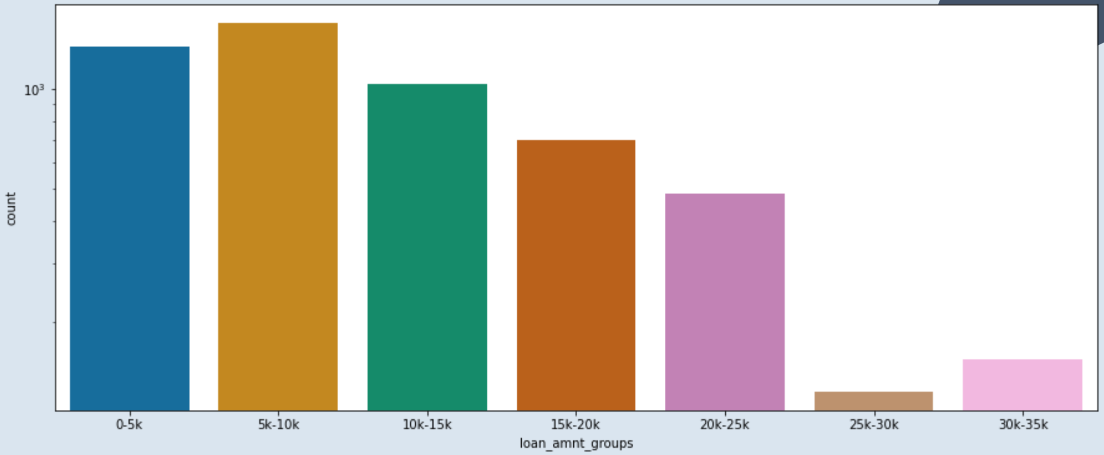


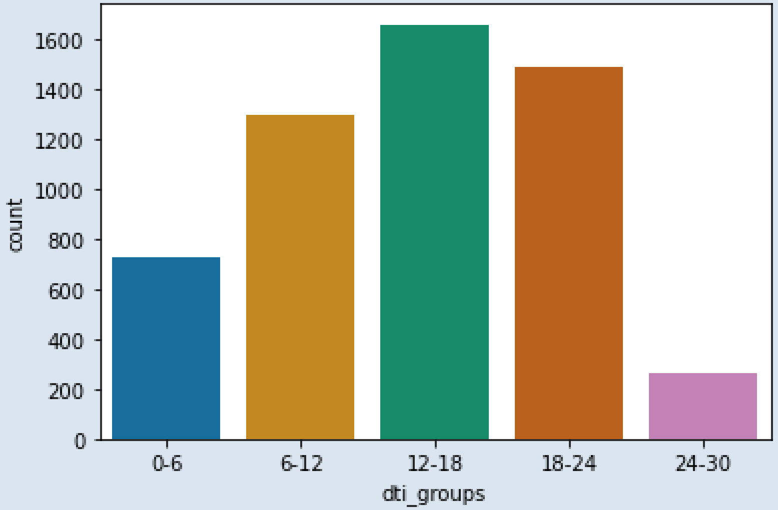


- Lending club has really expanded year by year, the number of loan issued are doubled every year
- As per above charts Maximum number of defaults occurred when the loan was sanctioned/issued in Dec. Loan issued in the year 2011 were also high as compared to other years

Analysis

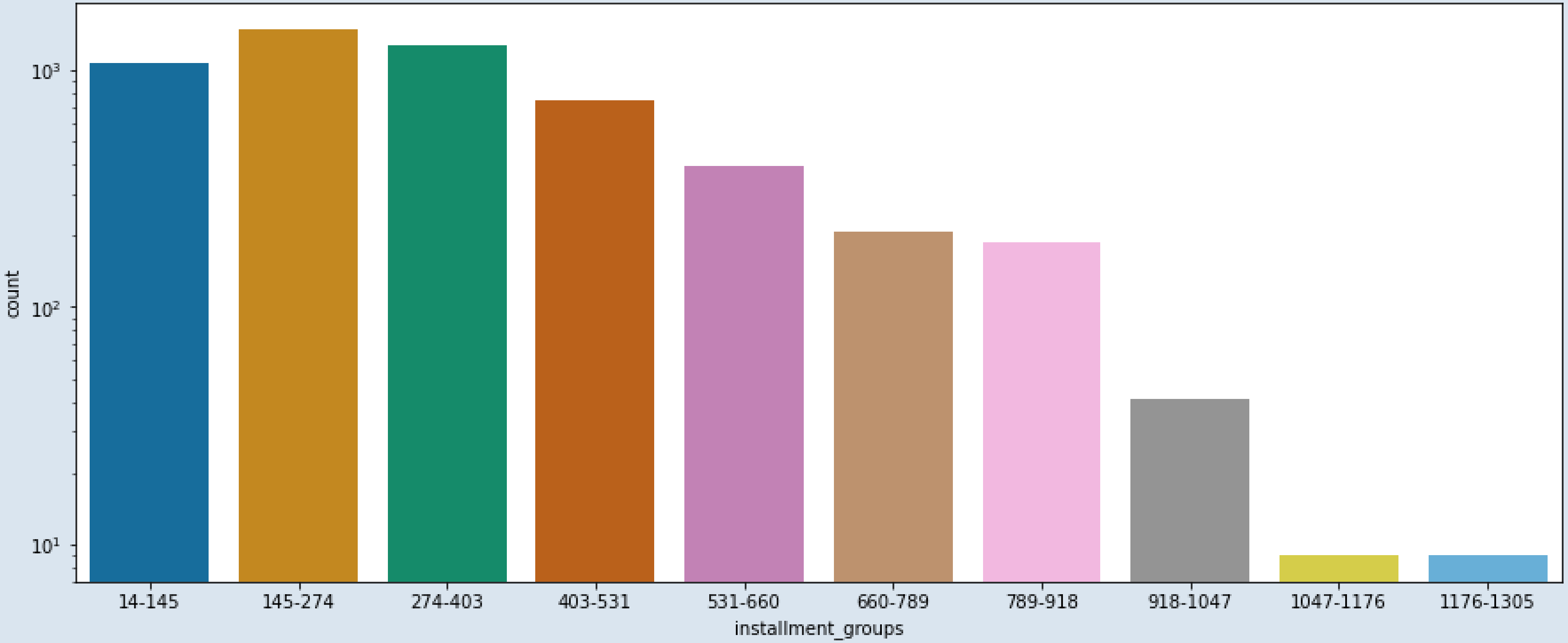






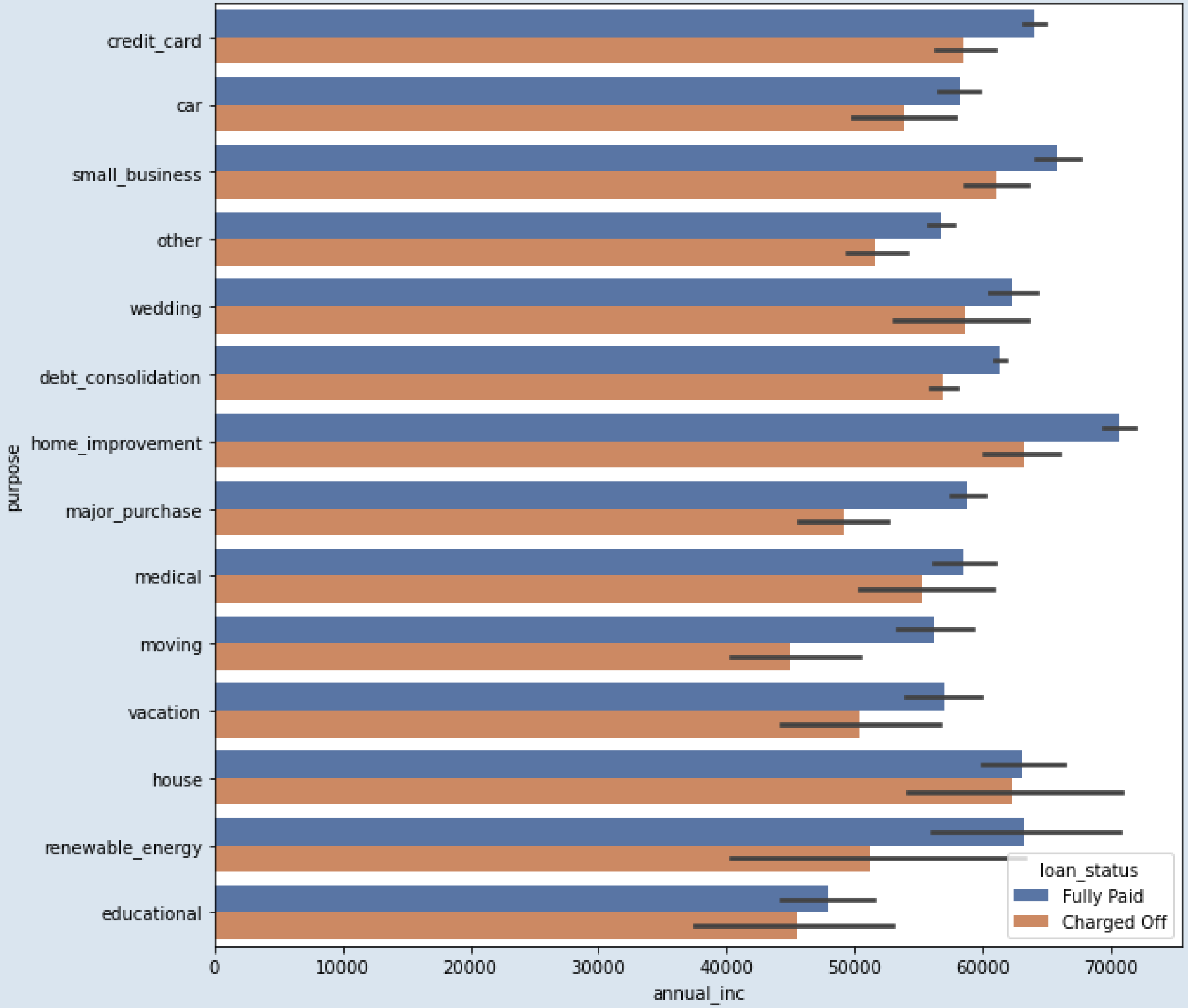
- Analysis of funded_amnt_inv_group, dti (12-18), loan_amnt_groups (between 5-10k) indicates high probability of defaulting

Analysis



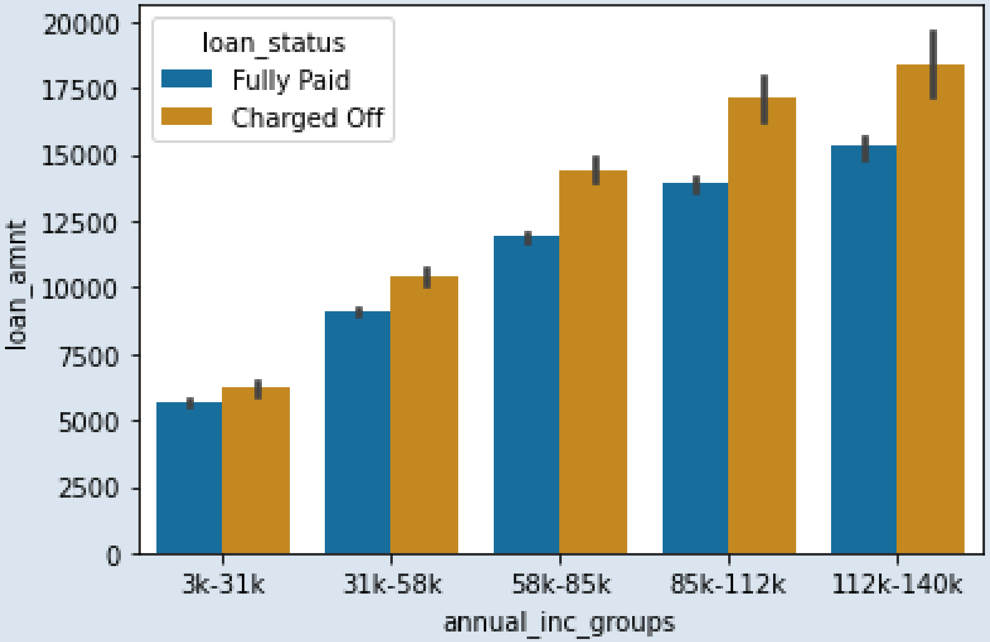
- There is a high probability of defaulting when monthly installments are between 145-274

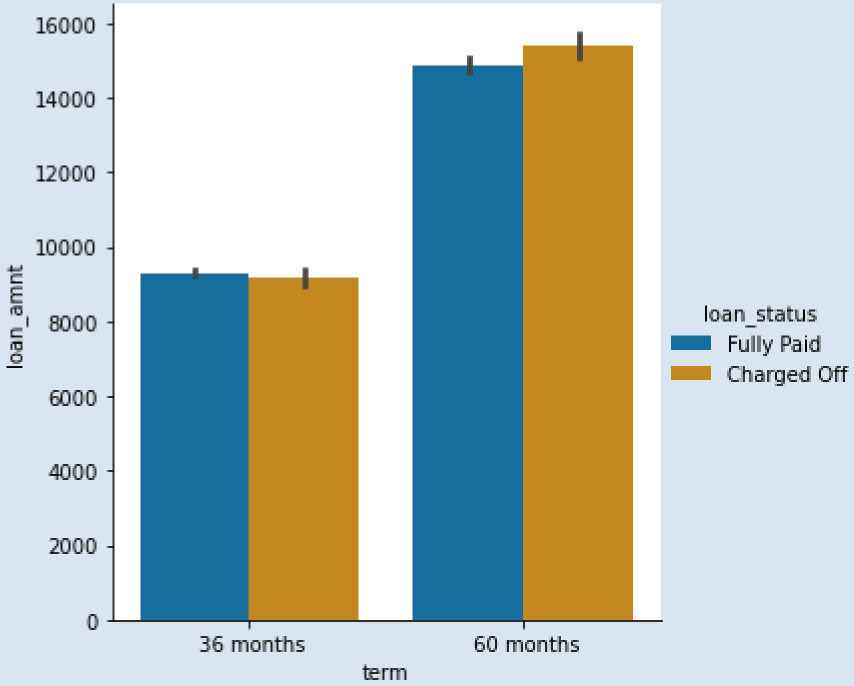
Analysis



- Looks like Applicants with higher salary mostly applied loans for "home_improvment", "house", "renewable_energy" and "small_businesses"

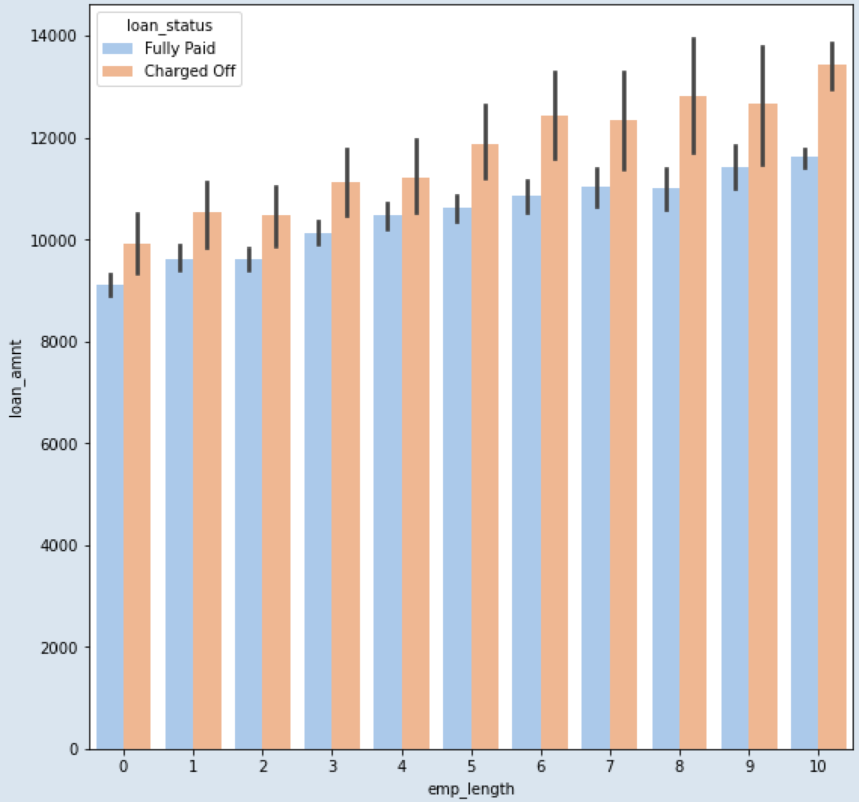
Analysis

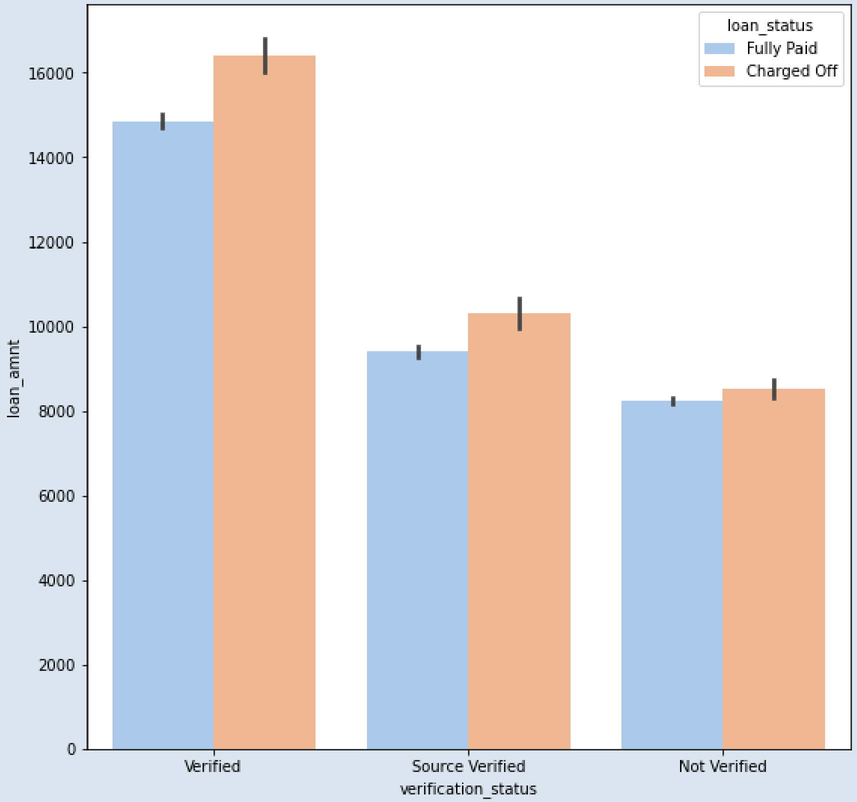




- Across all the income groups, the loan_amount is higher for people who defaulted
- Applicants who applied and defaulted have no significant difference in loan_amounts which means that applicants applying for long term has applied for more loan

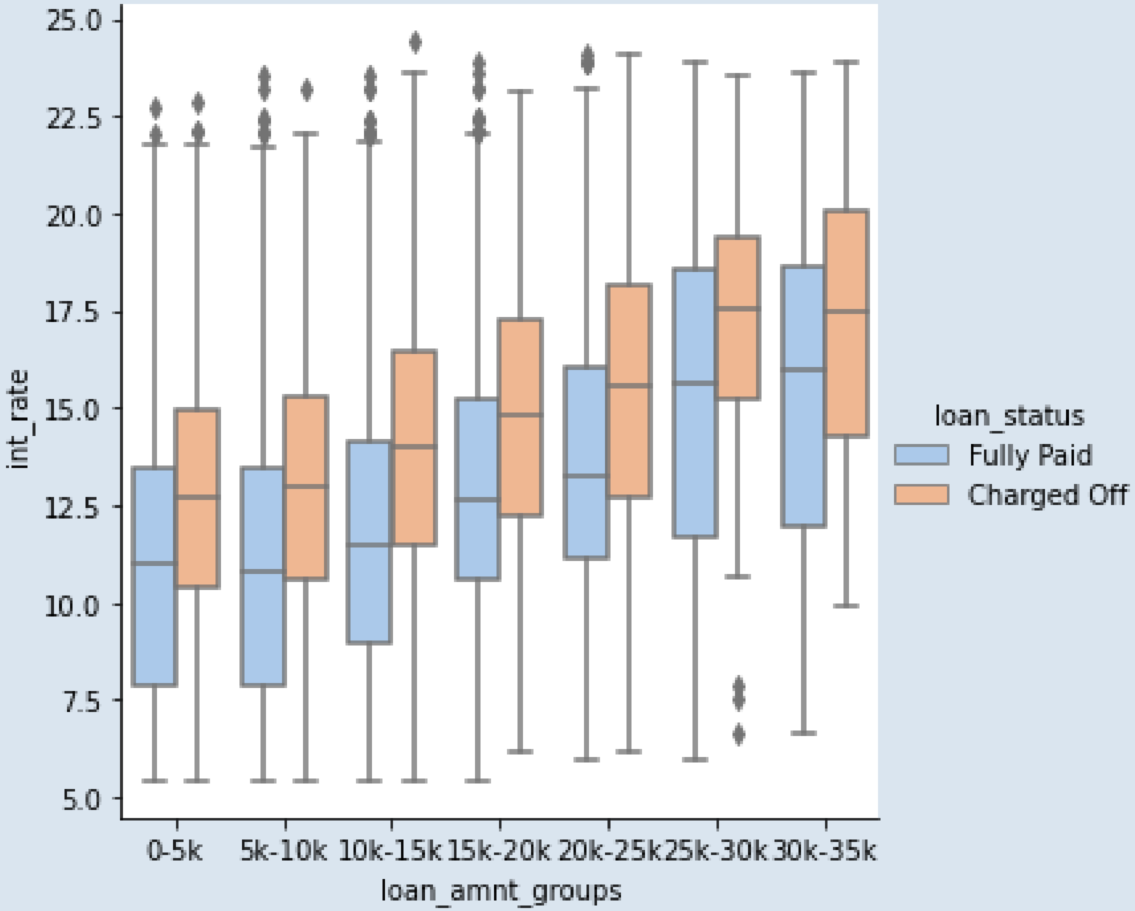
Analysis





- Employees with longer working history got the loan approved for a higher amount
- Looking at the verification status data, verified loan applications tend to have higher loan amount. Which might indicate that the firms are first verifying the loans with higher values

Analysis



- The interest rate for charged off loans is pretty high than that of fully paid loans in all the loan_amount groups

Observations

Observations

Based on above initial analysis with respect to the charged off loans for each variable suggests the following. There is a high probability of defaulting when:

- Applicants having house_ownership as 'RENT' and somewhat 'MORTGAGE'
- Applicants who use the loan to clear other debts
- Applicants who receive interest at the rate of 13-17%
- Applicants who have an income of range 31k - 58k
- Applicants with employment length of 10
- When funded amount by investor is between 5k-10k
- Loan amount is between 5k - 10k
- Dti is between 12-18

Observations

- When monthly installments are between 145-274
- Term of 36 months
- When the loan status is Not verified
- When the purpose is 'debt_consolidation'
- Grade is 'B'
- And a total grade of 'B5' level
- The high number of loan defaults in 2011
- Applicants taking loan for 'home improvement' and have income of 60k - 70k
- Applicants whose home ownership is 'MORTGAGE and have income of 60-70k

Observations

- Applicants who receive interest at the rate of 21-24% and have an income of 70k-80k
- Applicants who have taken a loan in the range 30k - 35k and are charged interest rate of 15-17.5 %
- Applicants who have taken a loan for small business and the loan amount is greater than 14k
- Applicants whose home ownership is 'MORTGAGE and have loan of 14-16k
- When grade is F and loan amount is between 15k-20k
- When employment length is 10yrs and loan amount is 12k-14k
- When the loan is verified and loan amount is above 16k
- For grade G and interest rate above 20%

Recommendations

Recommendations

- Lending club should reduce the high interest loans for 60 months tenure, they are prone to loan default
- Grades are good metric for detecting defaulters. Lending club should examine more information from borrowers before issuing loans to Low grade (G to A)
- Small business loans are defaulted more. Lending club should stop/reduce issuing the loans to them
- Borrowers with mortgage home ownership are taking higher loans and defaulting the approved loans. Lending club should stop giving loans to this category when loan amount requested is more than 12000
- People with more number of public derogatory records are having more chance of filing a bankruptcy. Lending club should make sure there are no public derogatory records for borrower

Thank you

Ajit Shinde

Safalya Mohanta