

Lending Club Case Study

Presented by-

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Introduction

- Lending club is the largest online loan marketplace, facilitating personal loans, business loans, and financing of medical procedures.
- Lending a loan is risky decision that a company takes and the borrowers who default cause loss to the lenders, reduces lender's cash flow. Identifying those risky applicants helps in cutting down the amount of credit loss to the organization.

Problem Statement:

- Agenda is to understand the driving factors (or driver variables) behind loan default, i.e. the variables which are strong indicators of default. The company can utilize this knowledge for its portfolio and risk assessment.

Business Understanding

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

Dataset Details:

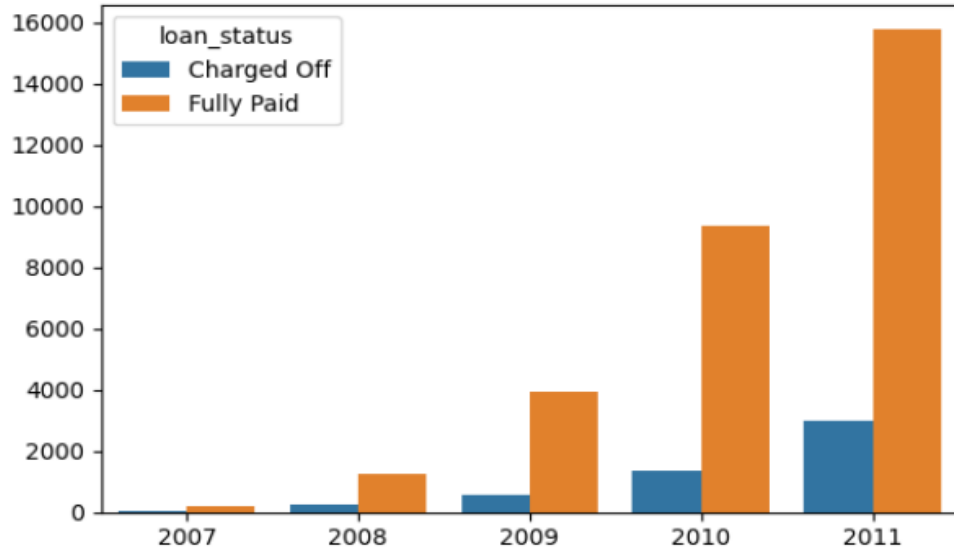
Dataset contains complete loan data for all loans issued through the time period 2007 to 2011. It has details regarding approved loans and has 3 status of loan which is Fully Paid, Current and Charged-Off. In the analysis, applicants with Fully Paid and Charged off status are taken into consideration.

Data Clean-up and preparation process:

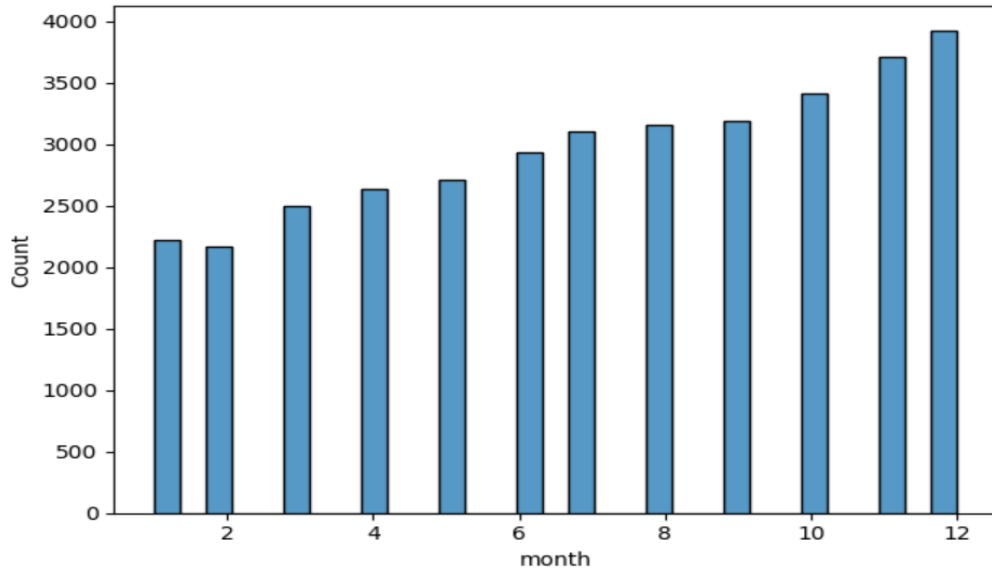


Loan Distribution and Status

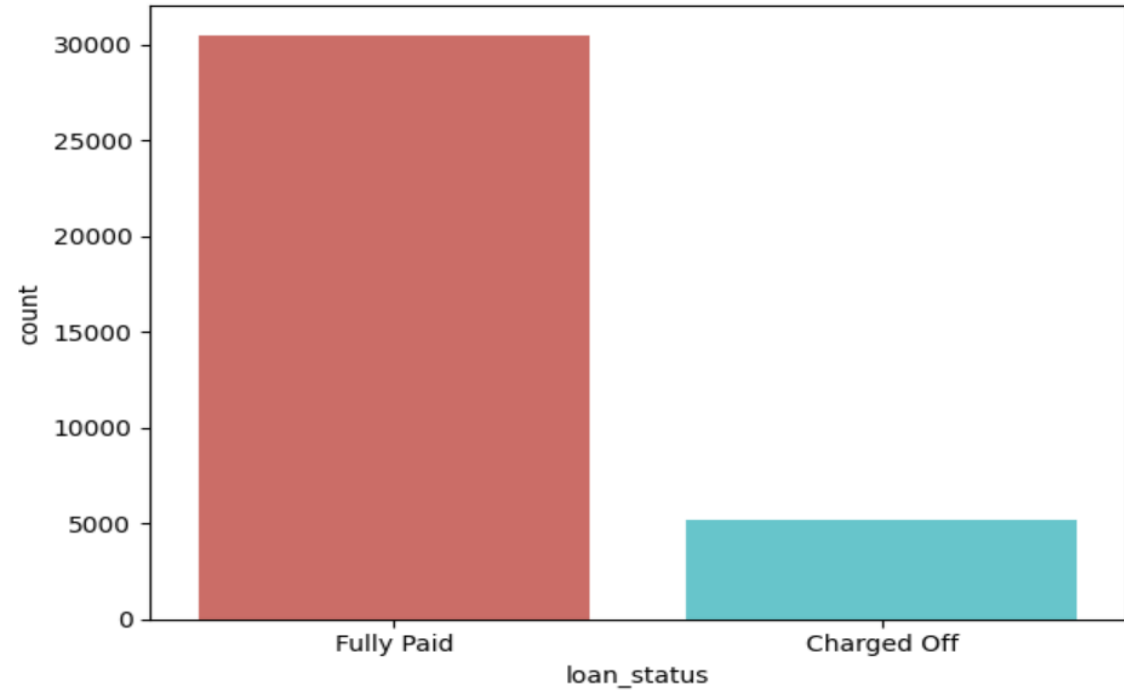
Variation of year vs Loan Status



Distribution of month

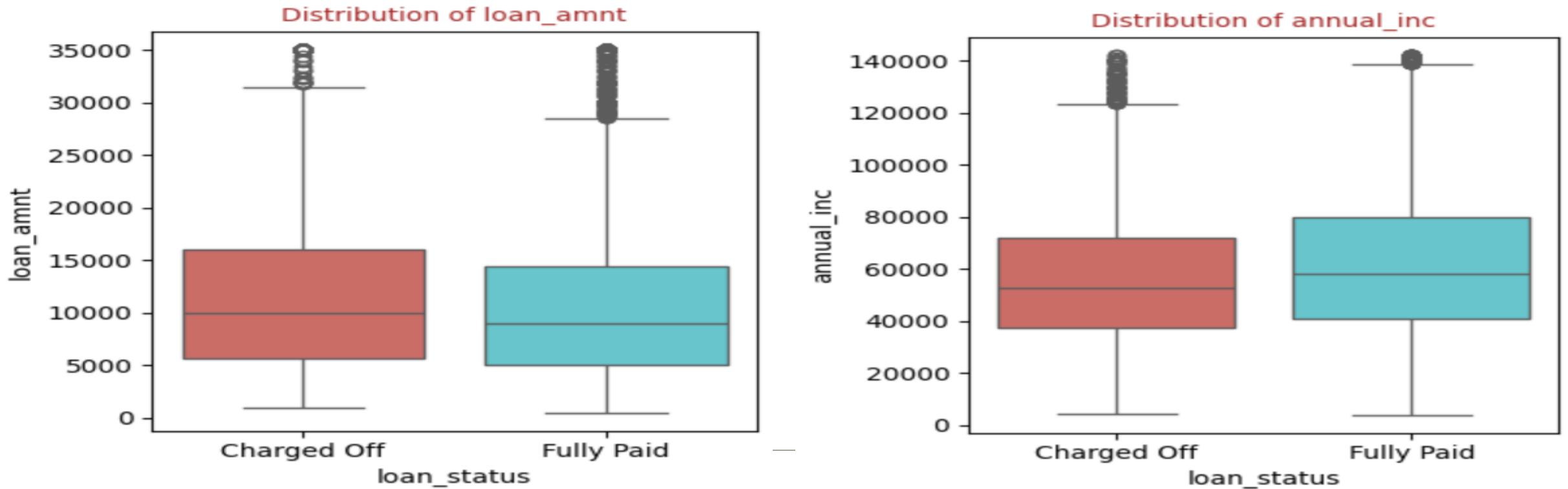


Frequency of loan_status



- Number of loans increases exponentially every year which indicates growth in company's business.
- Number of loans issued increases in the last quarter of year, with the highest observed in December.
- Defaulted loans are very low in numbers (15%) as compared to Fully paid loans

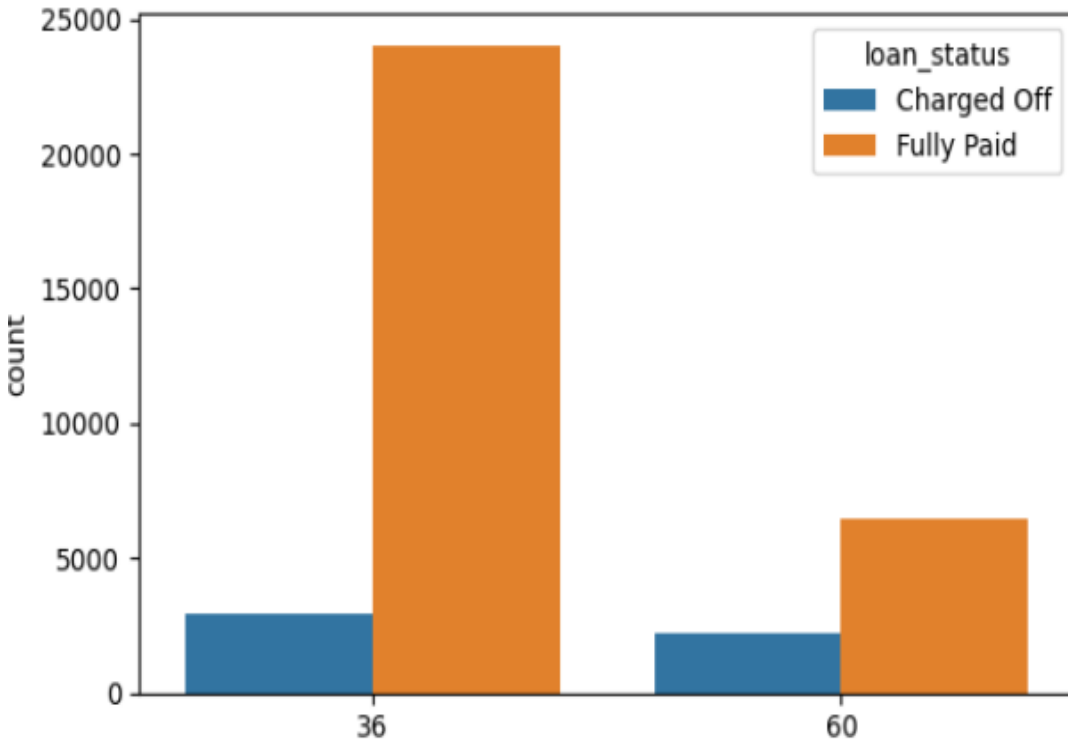
Loan Amount & Annual Income



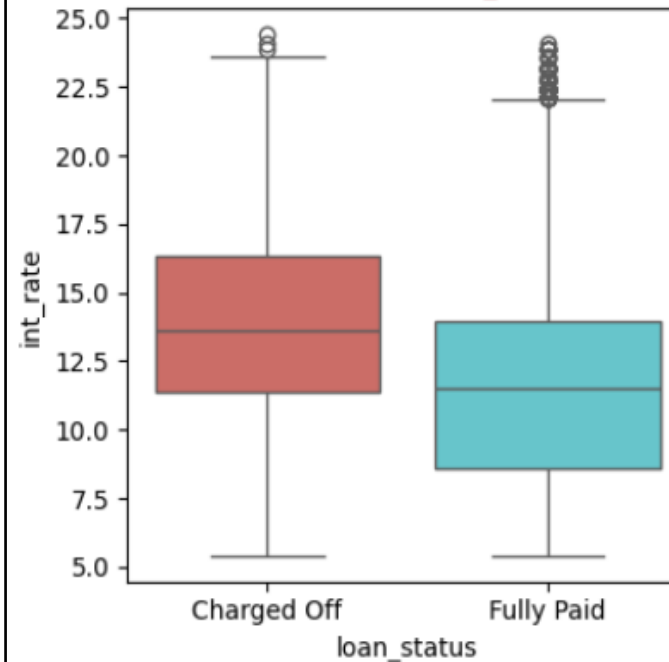
- Loan amount spreads from 500 to 35000. 50% of loan amount lies below 10k and very few of them are on higher side
- Majority of the people who are charged off have taken high loan amount as compared to people who fully paid the loan. High number of borrowers are defaulters who took loan in the range 0-16k as compared to other ranges.
- Fully paid borrowers shown to have more annual income than charged off borrowers. Defaulters have 75% of annual income < 70k

Loan Term and Interest Rate

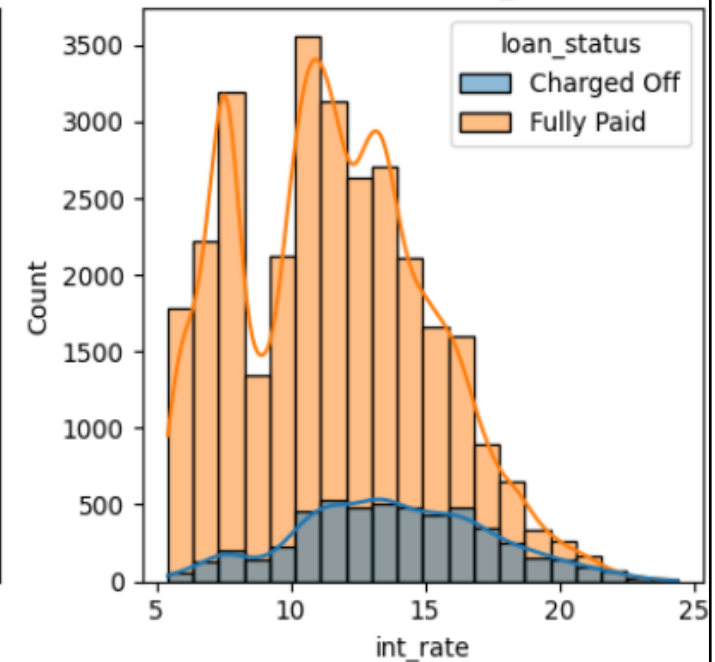
Variation of term vs Loan Status



Distribution of int_rate

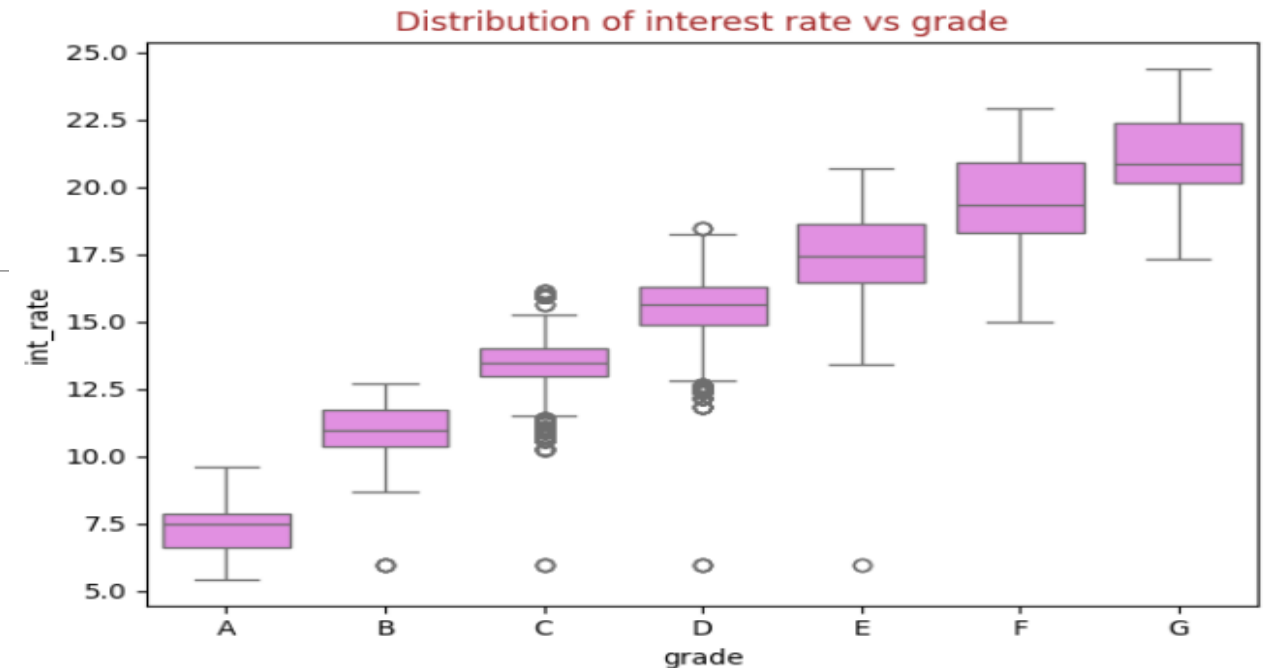
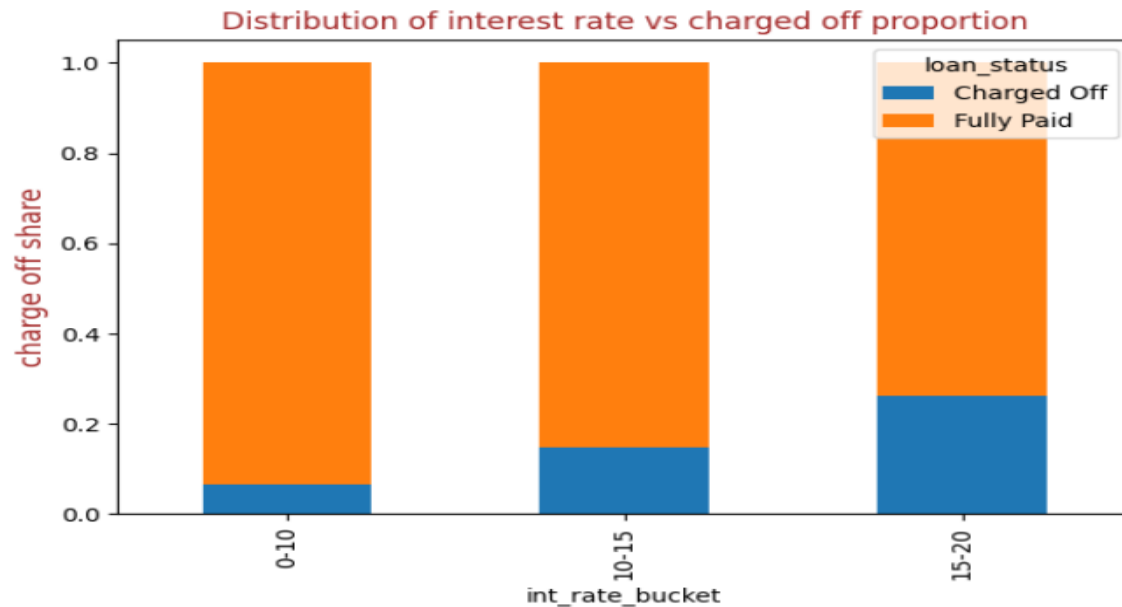
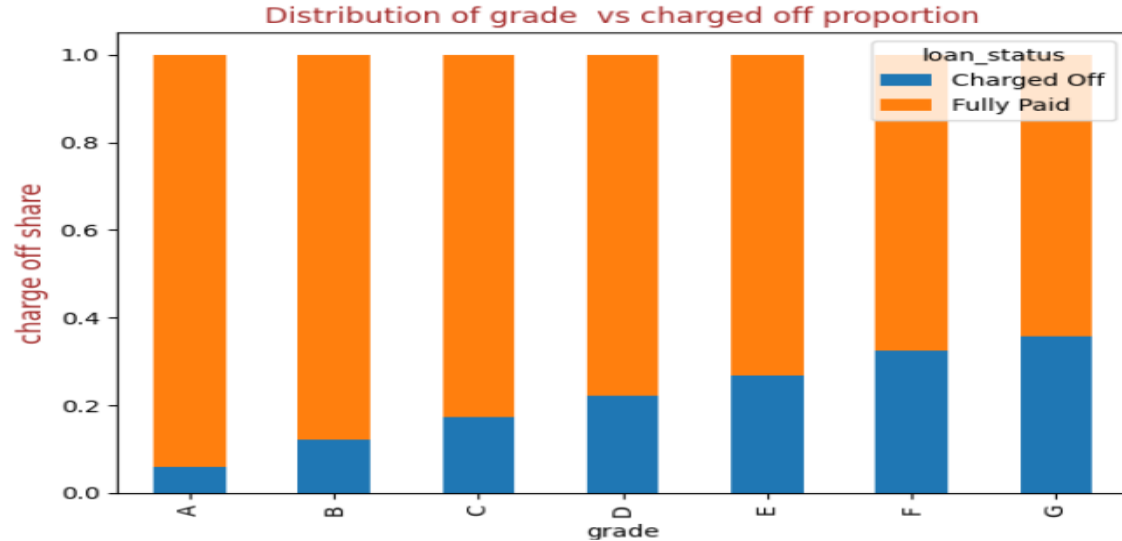


Distribution of int_rate



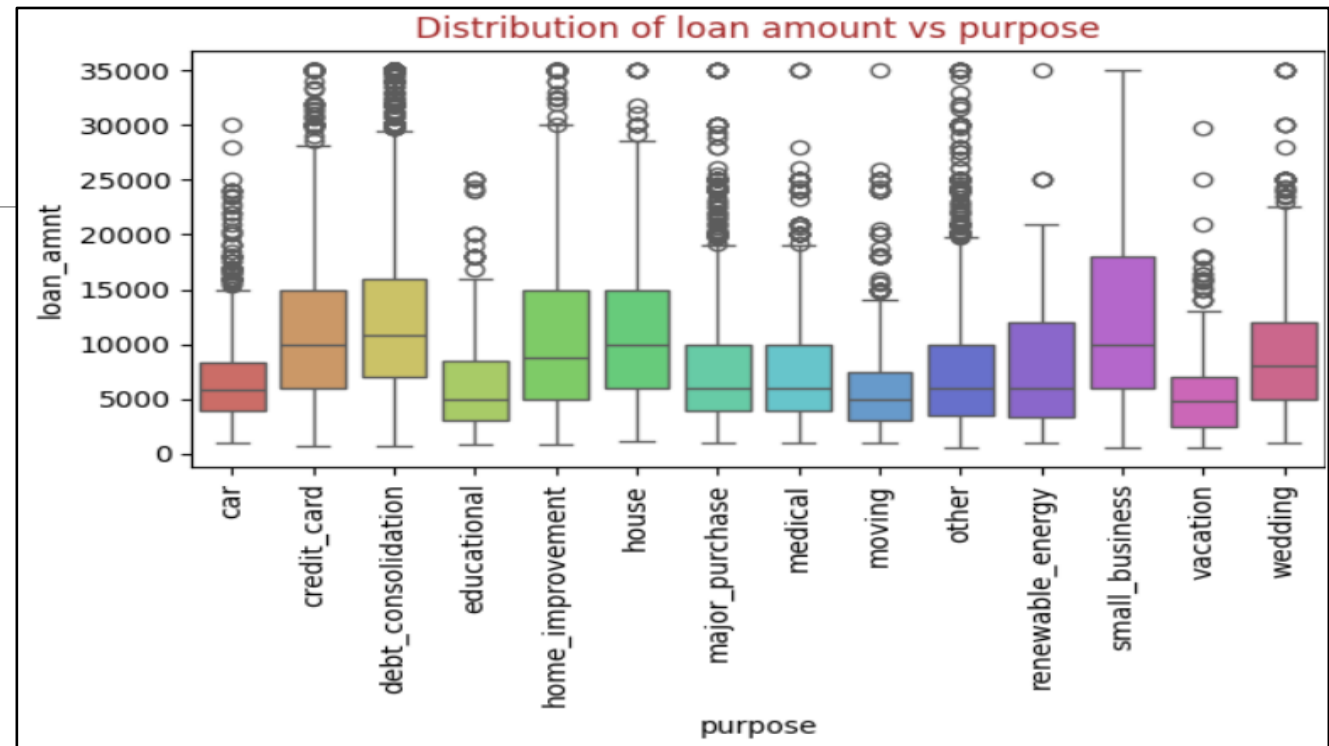
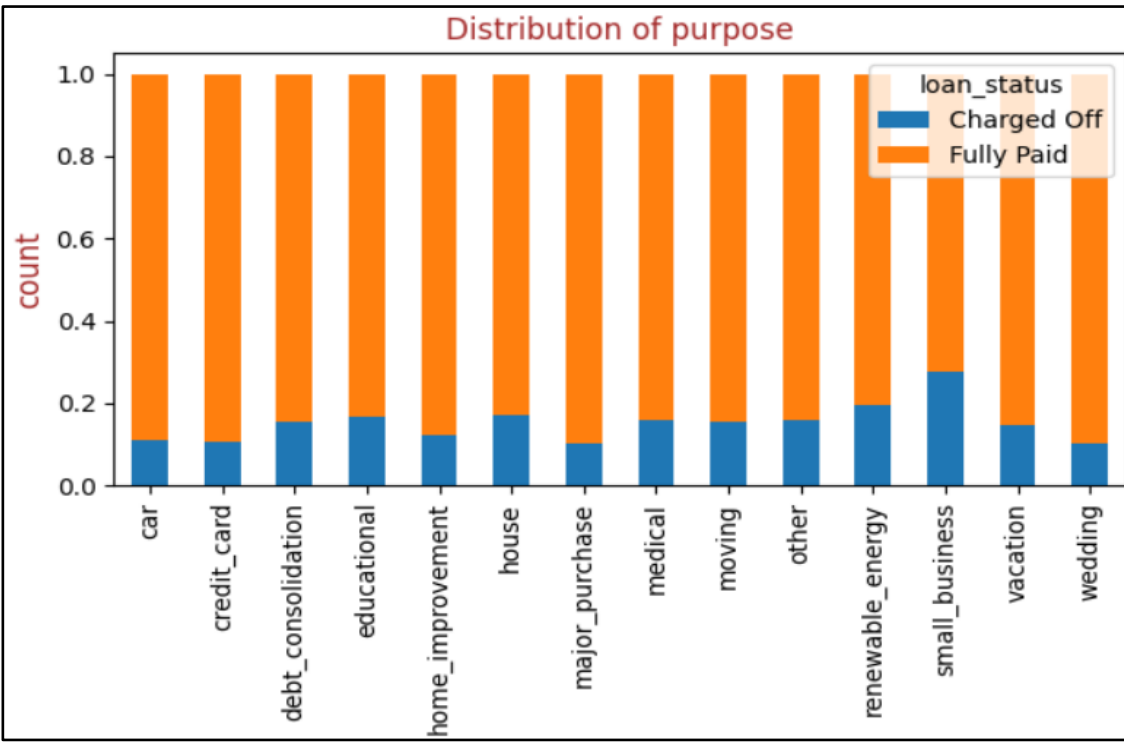
- 36 months of term has higher chances of repaying full loan as compared to 60 months terms
- Interest rate for charged off borrowers is high as compared to fully paid borrowers.
- The spread of defaulters is more than fully paid applicants with increase in interest rate after 15% indicating that high interest rates leads to more defaulters.

Grade & Interest Rates



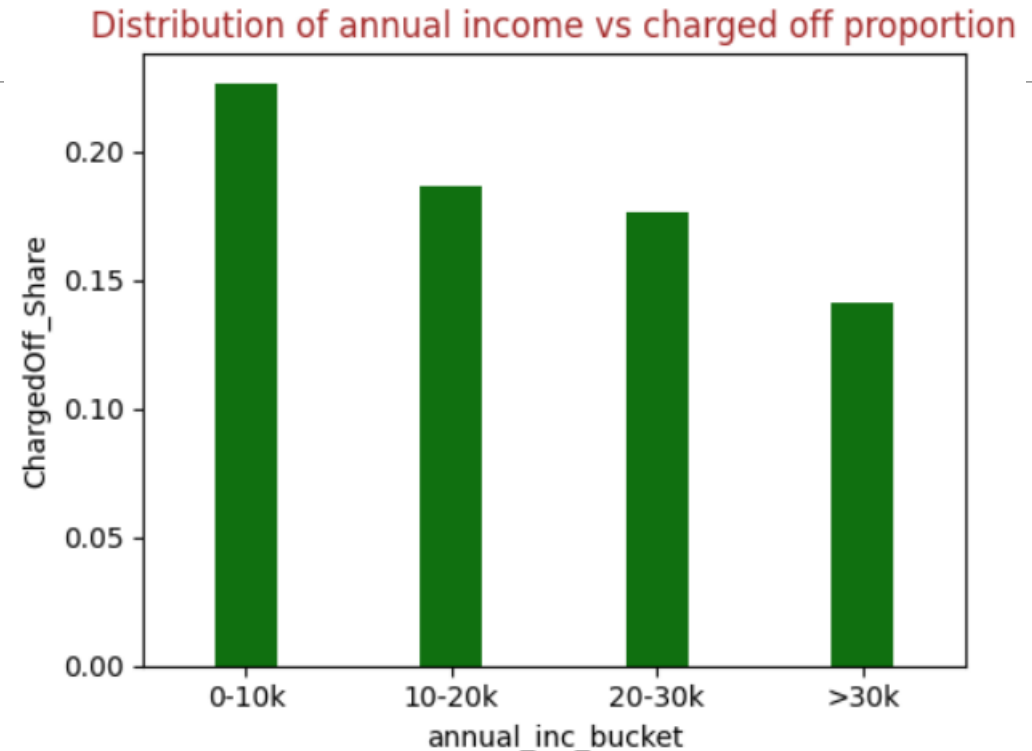
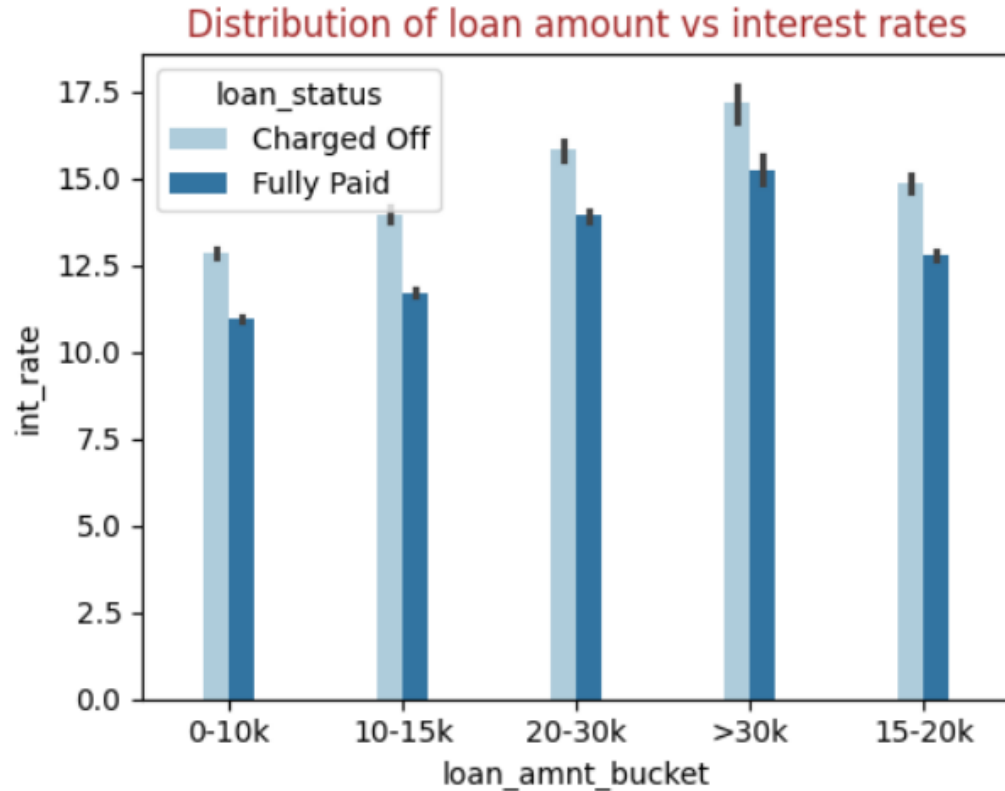
- The grade represent risk factor as chargedoff proportion increases as grades decreases. Low grades E, F, G leads to high default applicants.
- Chargedoff proportion increases with increase in interest rates. Interest rate in 15-20 range shows highest defaulters.
- With decrease in the grades, interest rates increases and thus, applicant with lower grade and high interest rate is likely to be defaulted.

Purpose of Loan



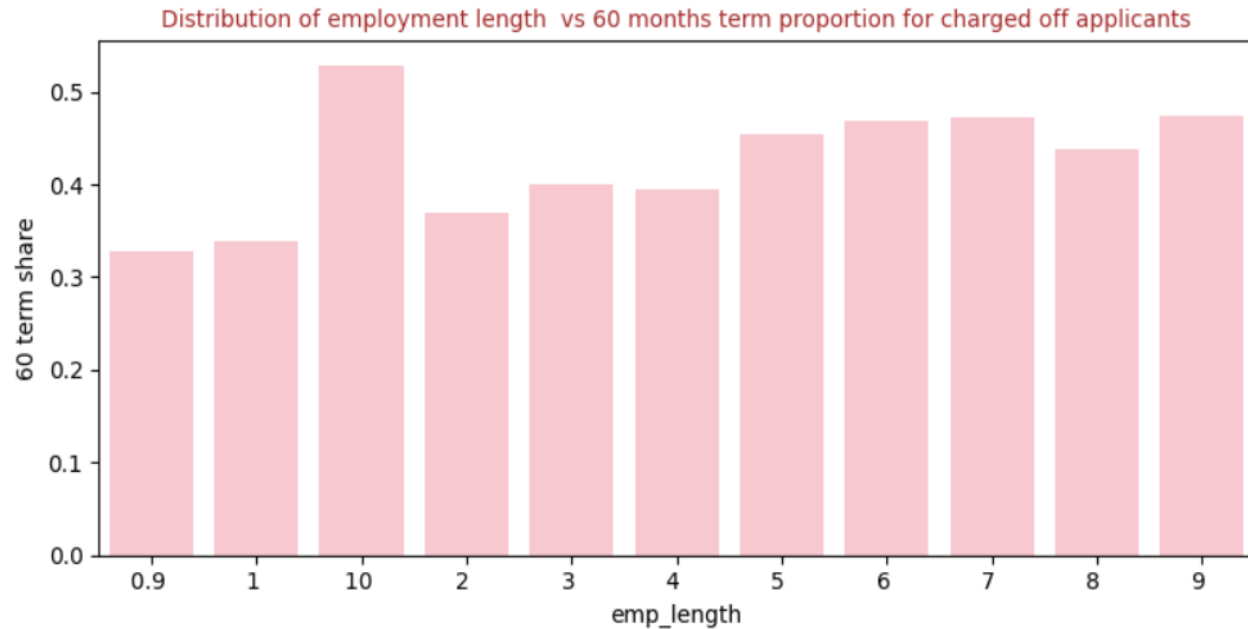
- Borrowers who took loan for the purpose of small business are mostly getting charged off.
- High loan amount is a factor for risky applicants and the spread of loan amount allocated to small business category is highest among other categories, hence people taking loan for small business have a higher probability of defaulter.

Loan amount & Interest Rate

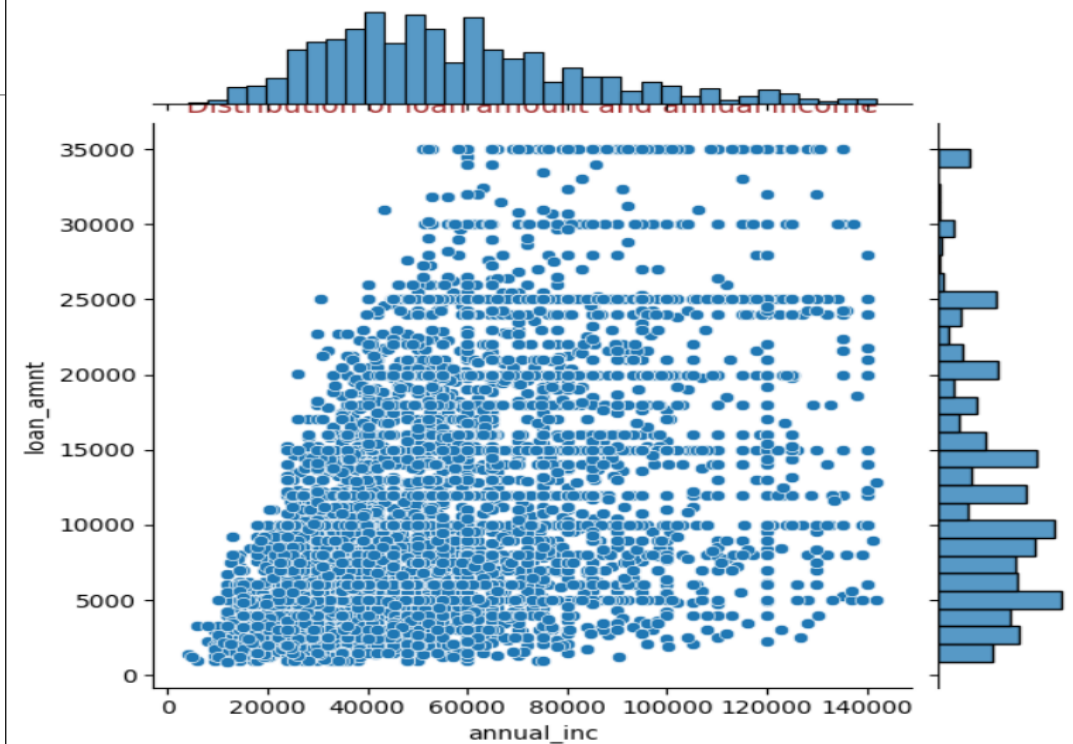


- For each category of loan amounts, charged off groups have high mean interest rates (fig. 1)
- Charge off proportion is highest in 0-10k annual income range and decrease with increase in annual income. People having high annual income are less risky applicants.

Employment Length & Loan Term for chargedoff applicants



Annual Income & Loan Amount for charge off applicants



- Charged off borrowers having >10 years of experience have high proportion of 60 months term i.e. majority of defaulted people in 10+ years of experience have taken 60 months loan term.
- There is a cluster of defaulters (fig.2) in 30k-50k annual income range and 4k-10k loan amount range so this combination of loan amounts and income might lead to default borrowers.

Conclusion

Driver variables to predict defaulters-

- Grade
- Interest Rate
- Annual Income
- Loan Term
- Purpose
- Loan amount
- Employment length

Considerations for predicting 'default' borrowers-

- Borrowers with >10 years of experience with term 60 months
- Borrowers who request high loan for the purpose of small business.
- Borrowers with annual salary between 30k-50k and loan amount 4k-10k
- Avoid approving loans on high interest rates (15-20%) for applicants with grades on lower side like E,F,G
- Applicants having low income and requesting for high loan amounts

Thank you
