Bank-Loan Dataset Presentation

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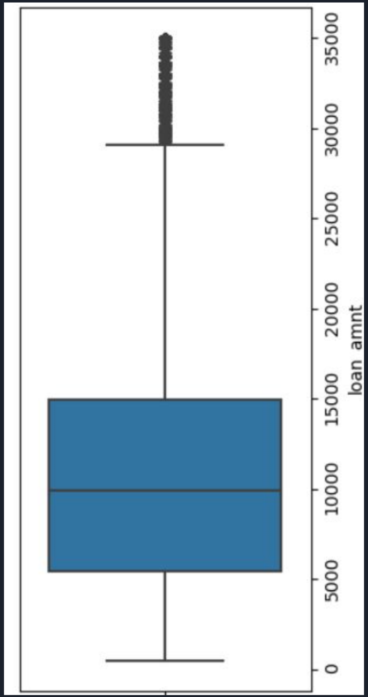
Problem Statement

Apply Exploratory Data Analysis (EDA) to pinpoint key patterns or variables signaling a customer's likelihood of loan default.

The goal is to optimize risk assessment, enabling the identification and mitigation of potential high-risk loan applicants.

Univariate Analysis

1.Loan Amount analysis

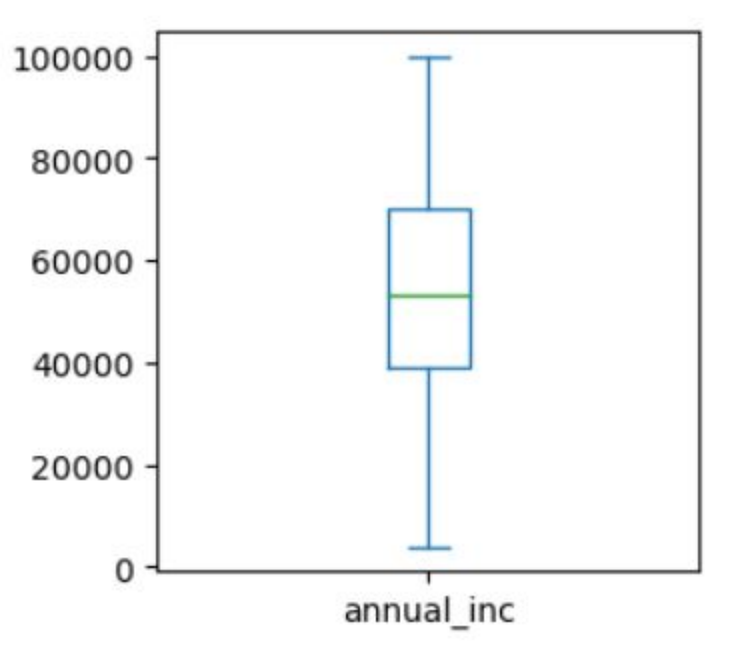


- Customer on an average borrow around 10k and most of the customer are likely to take loan in the range between 5k to 15k .

2.Annual Income below 1lack

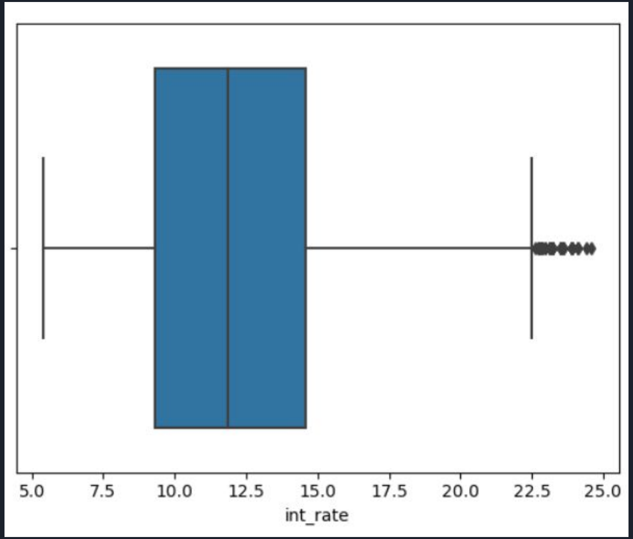
- The average income of the customers during registration is around 55k and most of the them fall in range 39k to 70k.

- Most of customer availing loan fall into below 1 lakh annual income category.



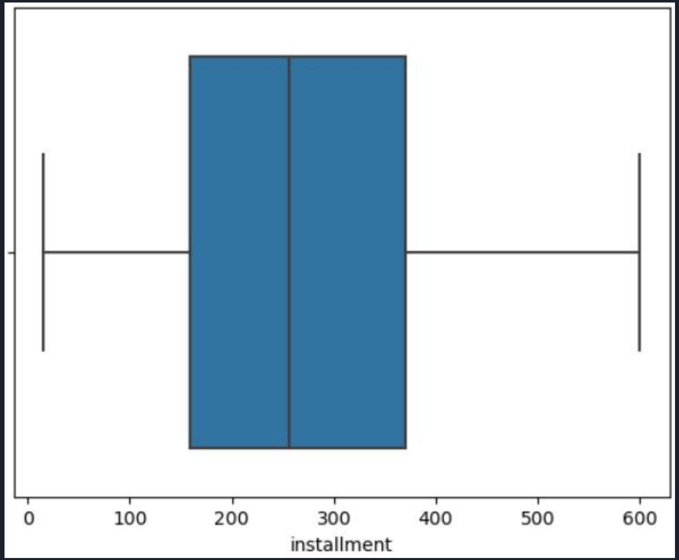
3.Interest Rate

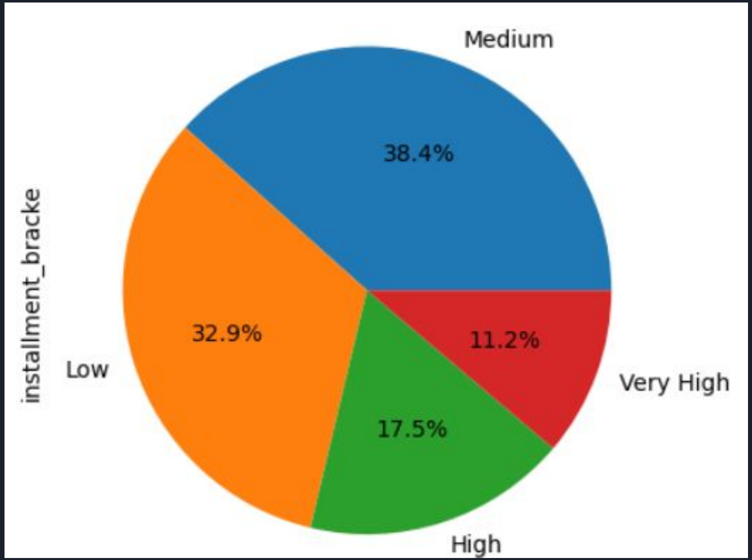
The average interest rate of the loan applicant is 12 percent.



4. Installment

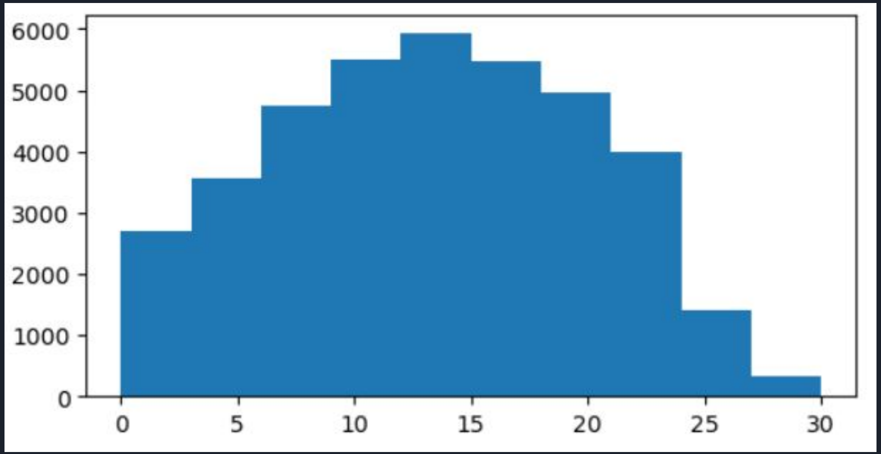
Most of the customers opting for installments between 160 to 400 Rs per month.(Low and Medium Category)





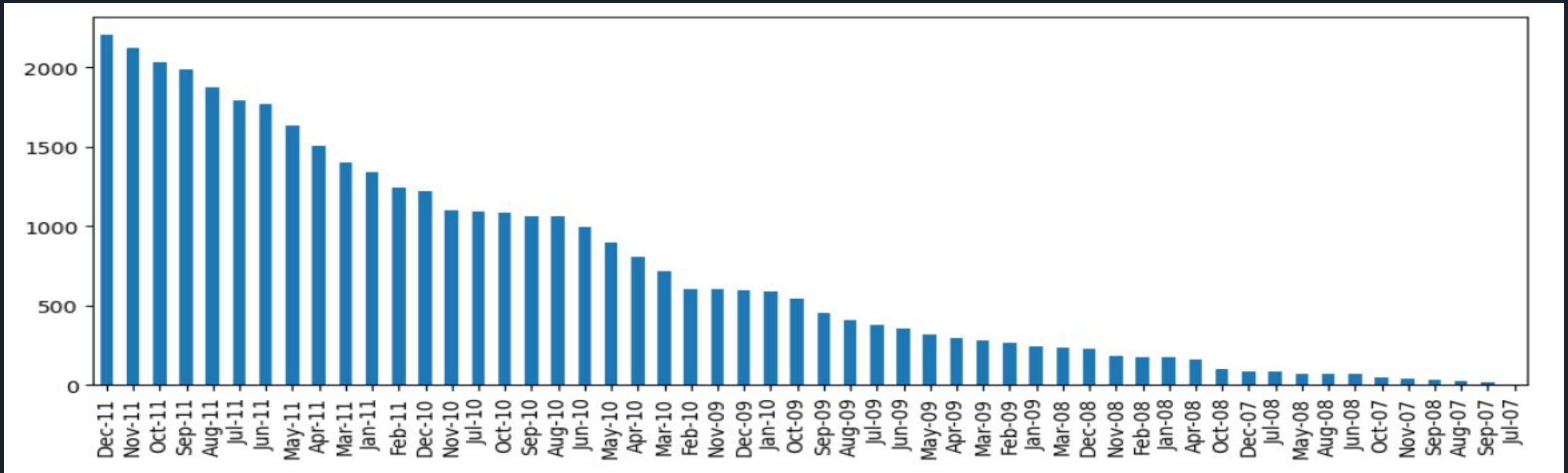
5. Debt to Income Ratio

A significant portion of loan applicants exhibit a debt-to-income ratio falling within the 5% to 25% range.



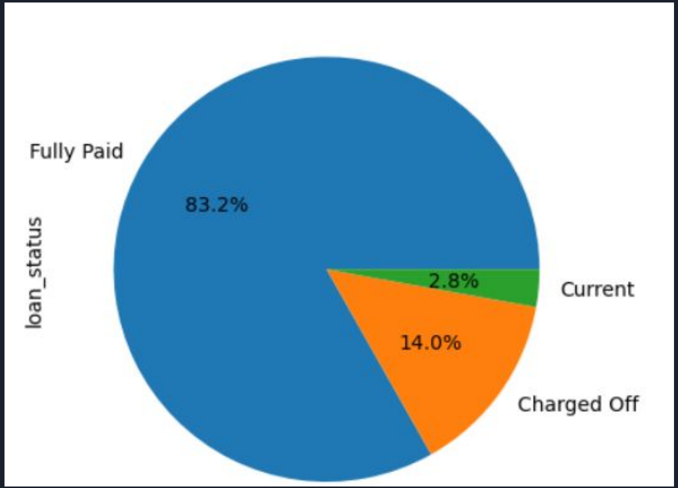
6.The month-year in which the loan was funded.

- We can see a strong increase in borrower from less than 500 borrowings per month in 2007 to more than 2000 borrowings per month .
- The firm increased borrowings by whopping four time in four years.



7.Default Rate

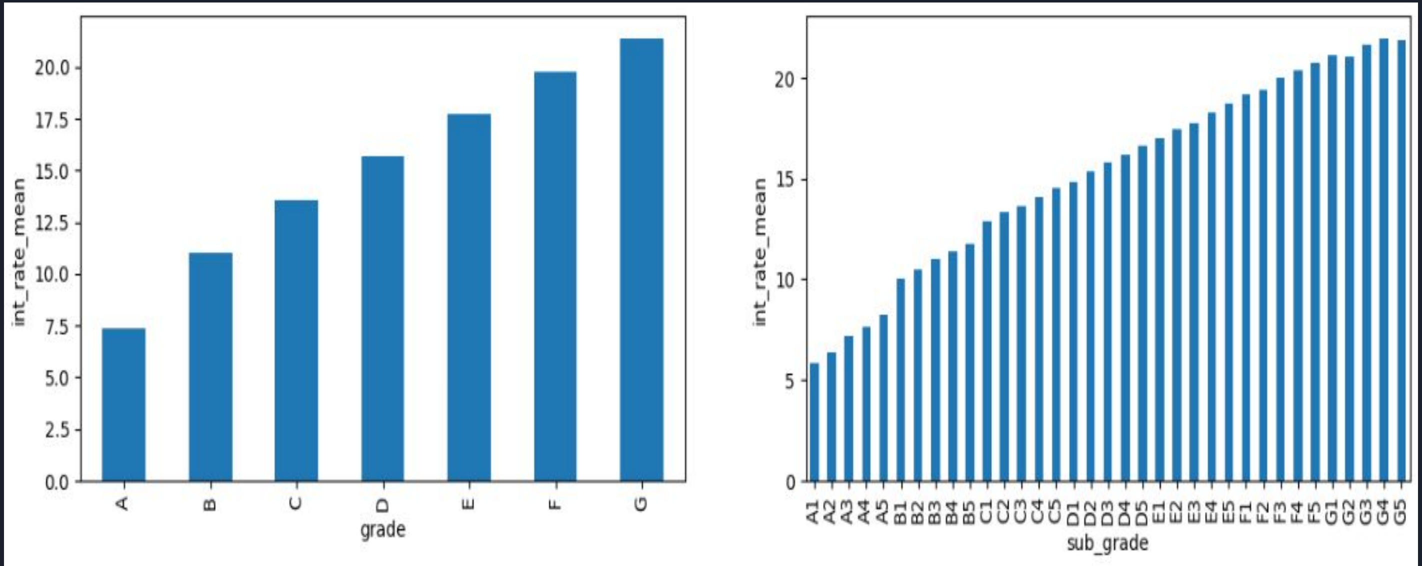
- This dataset contains a total of 14 percentage of default category or charged off category .
- Eighty three percentage of customers have settled the loan amount and 3 percent are in the process of settling the loan amount.



Bivariate Analysis

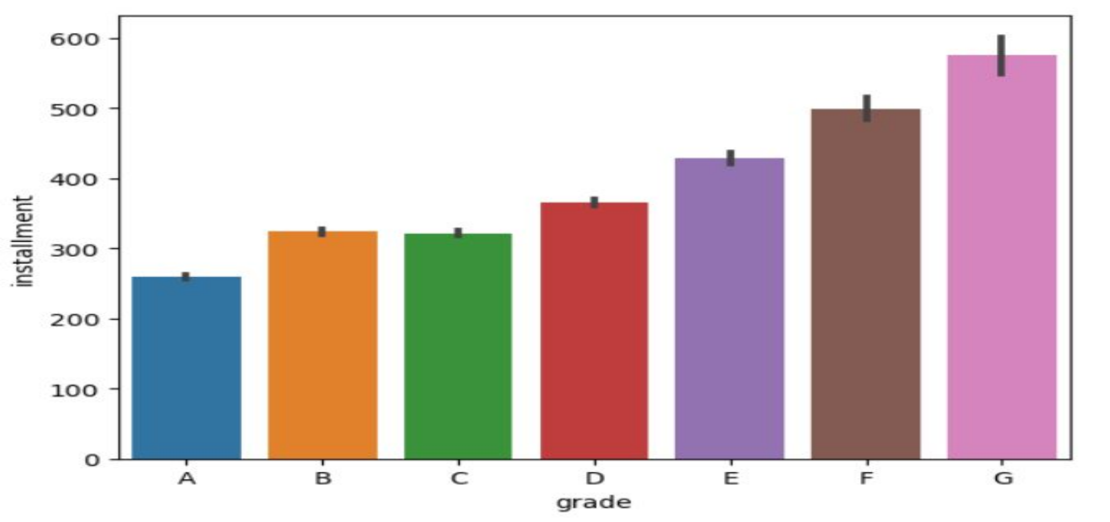
1.Grade vs interest rate

- Better is the grade , lower are the average interest rates.
- **Increase borrowings for grades A, B and C.**
- **Implement risk based pricing where interest rates are determined by risk of default.**



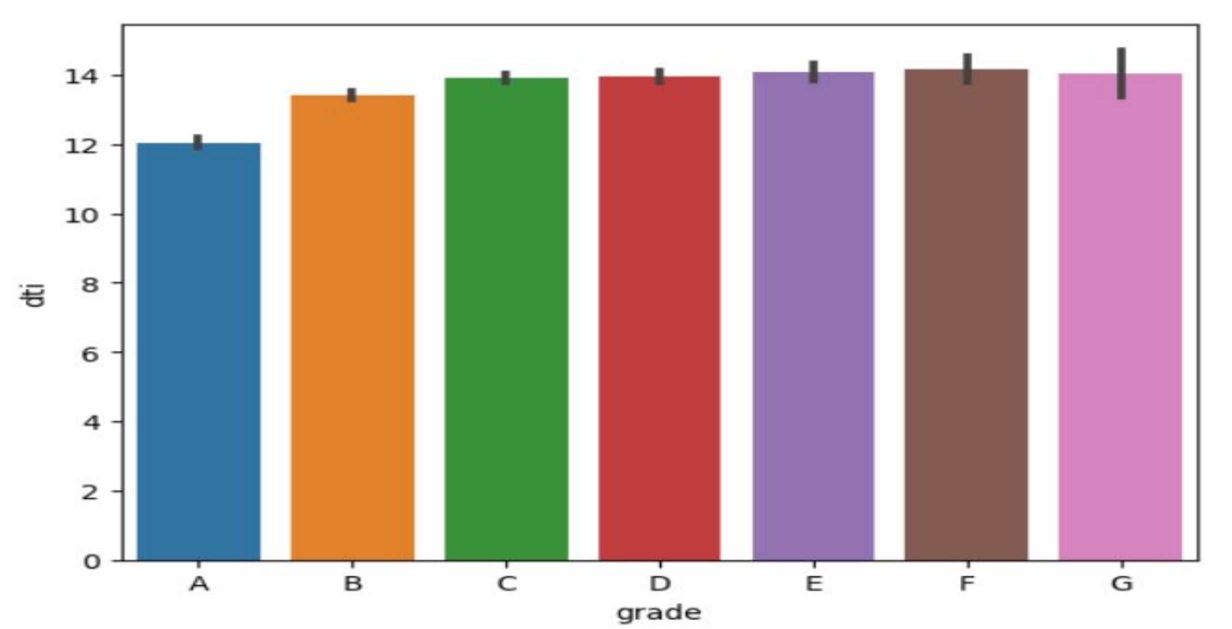
2.Grade vs installment

- Grade A to D customers opt for smaller installments to reduce the their debt to income ratio .
- While, grade E to G pay in high installments .
- **Provide financial counselling to reduce individual dti and get a right installment plan.**



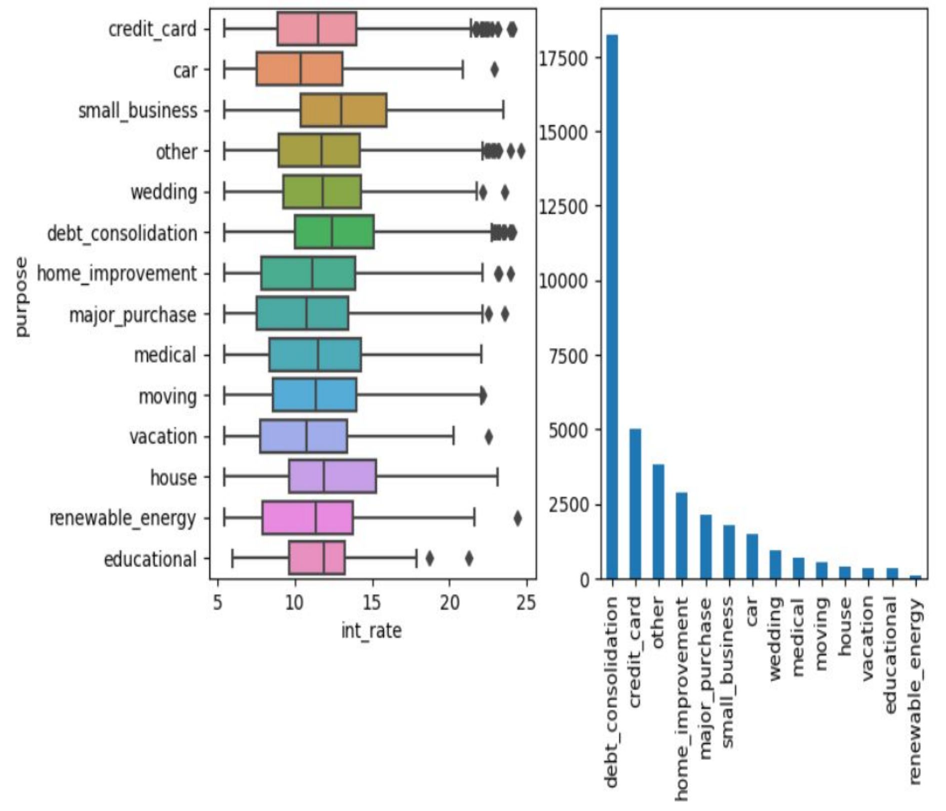
3.Grade vs Debt to income ratio(DTI)

- The debt-to-income ratio (DTI) remains relatively stable across all grades, showing minimal significant changes.



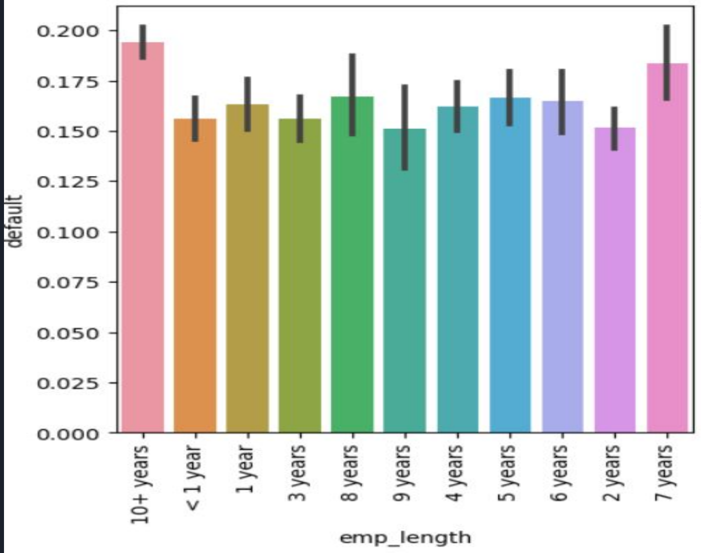
4.Interest Rate vs Purpose

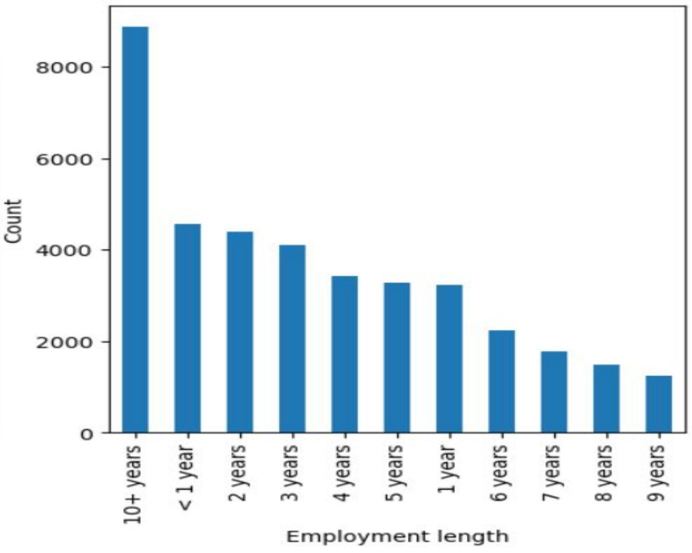
- **Decrease interest rates on education , medical and housing to boost borrowings.**
- **Since debt consolidation has large customer segment the bank can increase interest rate to grab good profits.**



5.Emp_length vs default

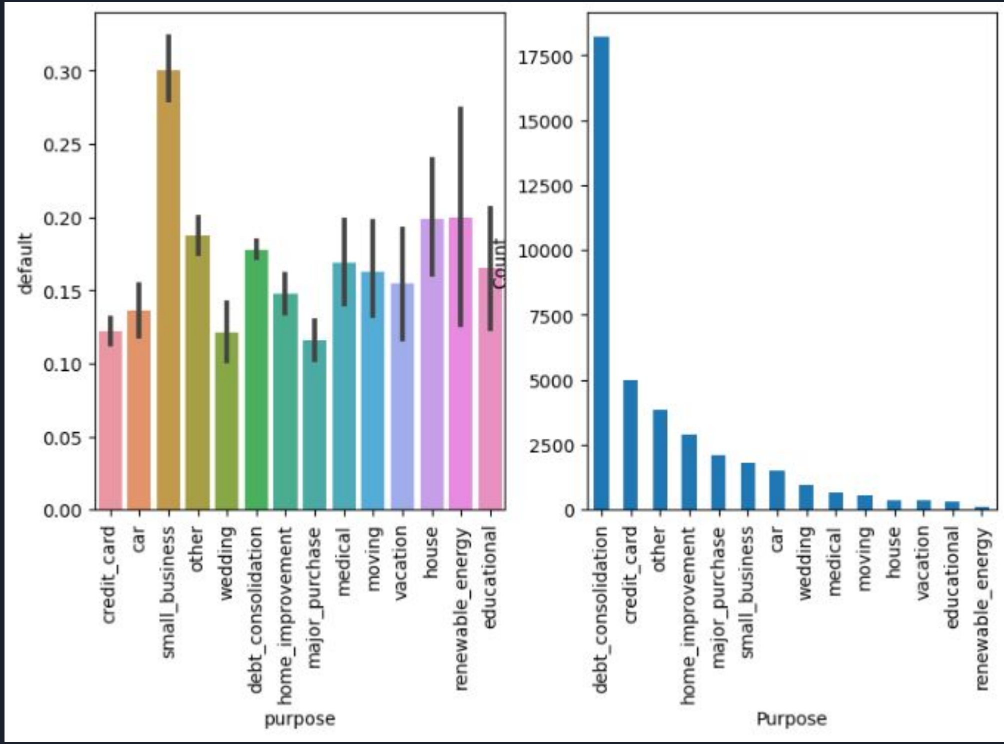
- Employee who having 10+ years experience are likely to take more loans, and exhibiting slightly higher chance of loan charge-offs.
- **Ensure to take high collateral on very high loan borrowings.**
- **Continuously monitor the loan portfolio for signs of risks.**





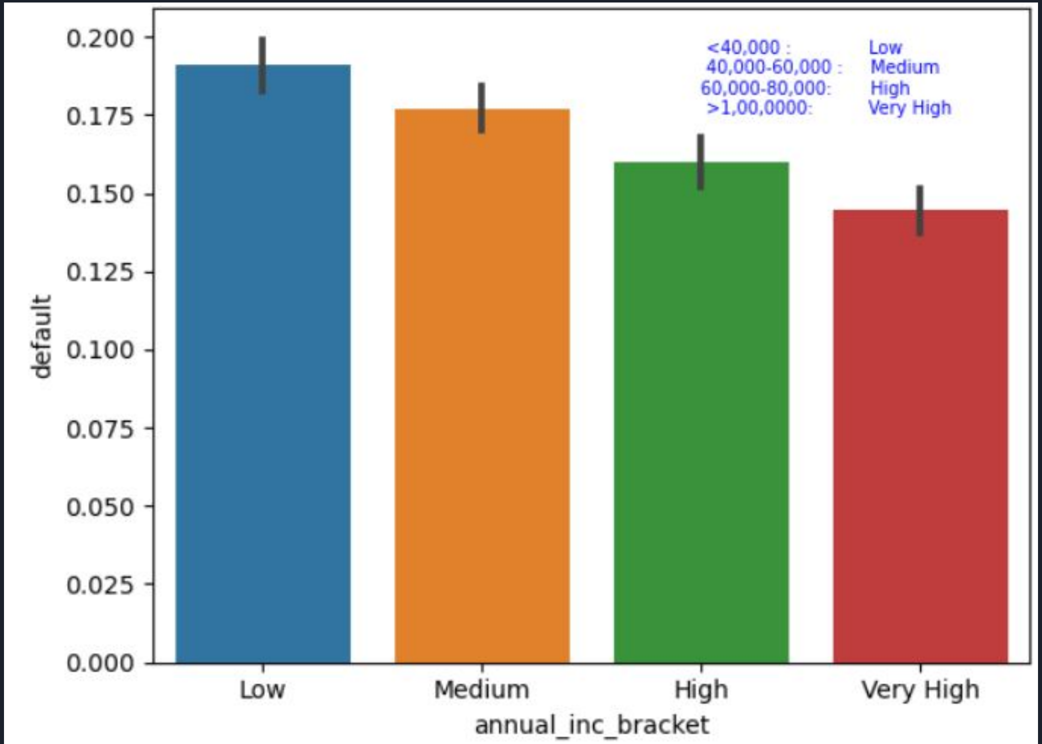
6.Purpose and Default

- Small_business loan are very likely to fall into default followed by house loans.
- **While, it is comparatively safer to give loans for debt_consolidation, car, wedding category etc.**



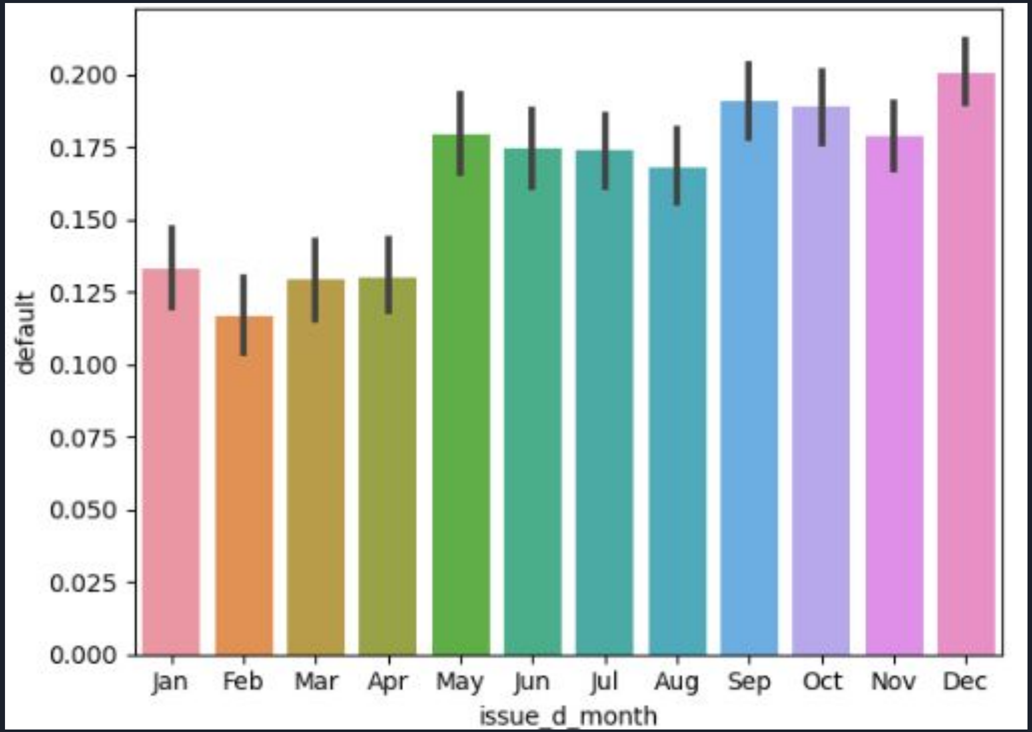
7.Annual income bracket vs default

- The default rate tends to increase with lower income levels.
- **Increase borrowings from good income streams .**



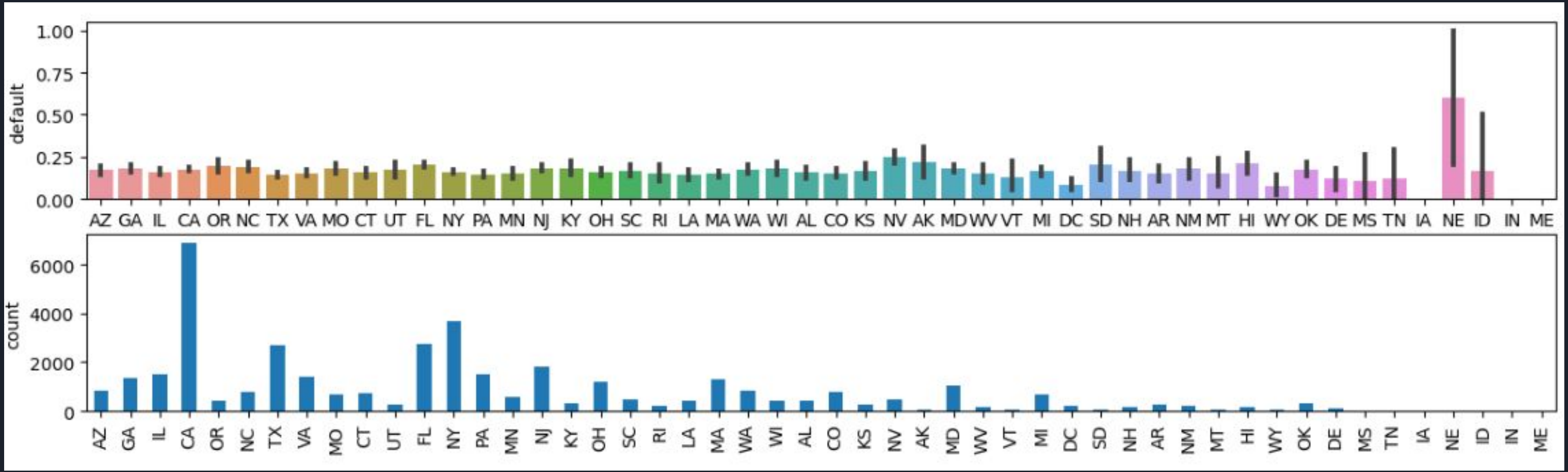
8.Issued_month vs default

- A noteworthy pattern indicates that significant defaults happen in second half of year.
- **Introduce debt consolidation with lower interest rate.**
- **Give incentives for early loan payment .**



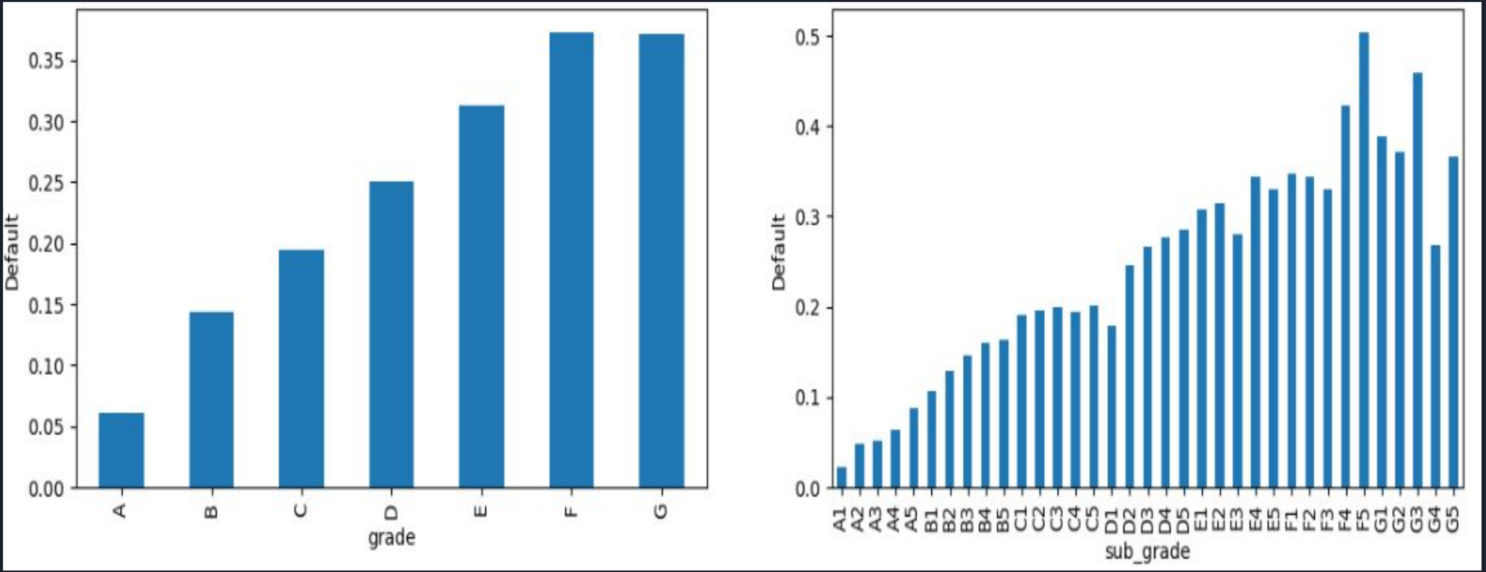
9.State_address vs default

- There is exceptional high chance of customer from NE (Nebraska),ID etc state falling into default.
- The State CA (California) has lowest default rates, despite large number of borrowings followed by NY,FL and TX.



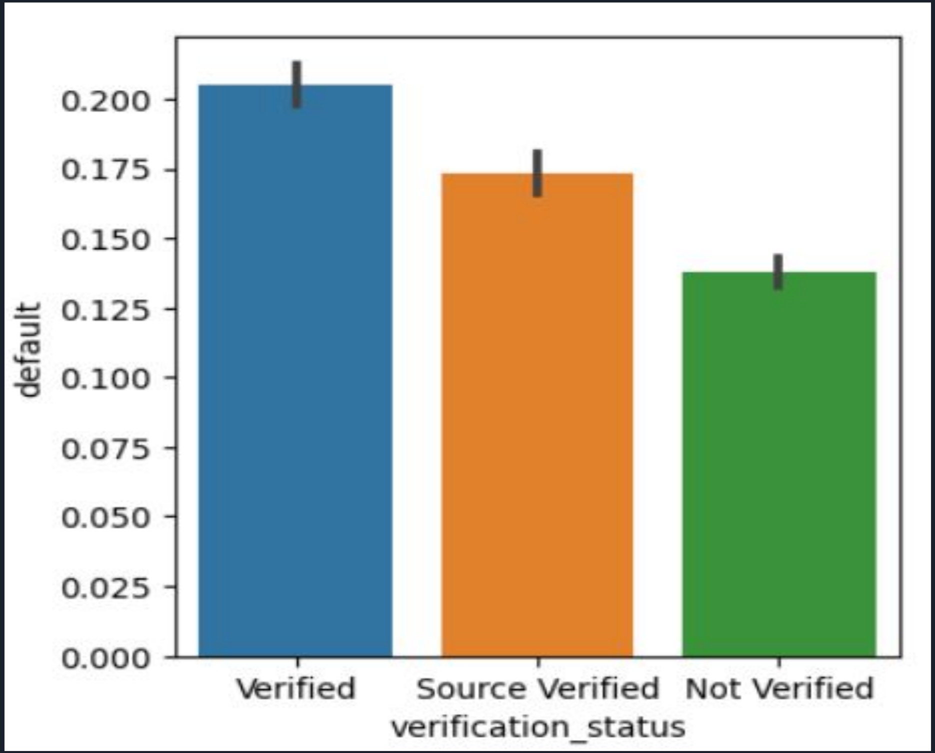
10.Grade and sub_grade vs default

- **Most default are happening in grade F and G hence bank must give small loan to diminish losses.**
- **It is safer option to give more number of loans to A, B and C grades to enhance profits.**



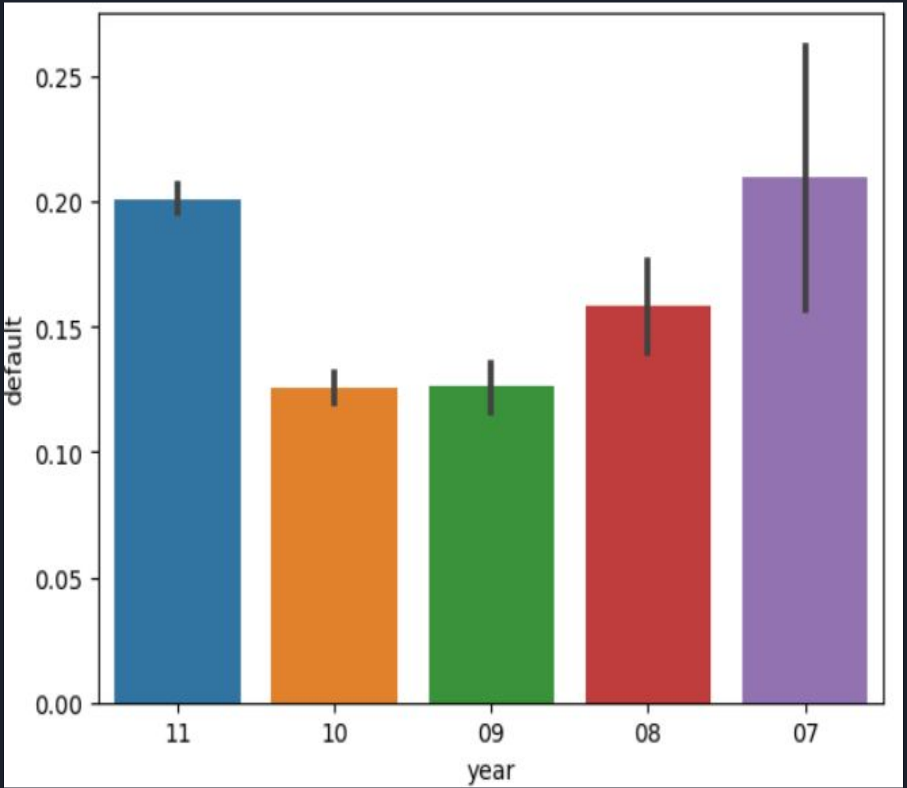
11. Verification_status vs default

- Verified source customers have slightly higher chance of falling into default.



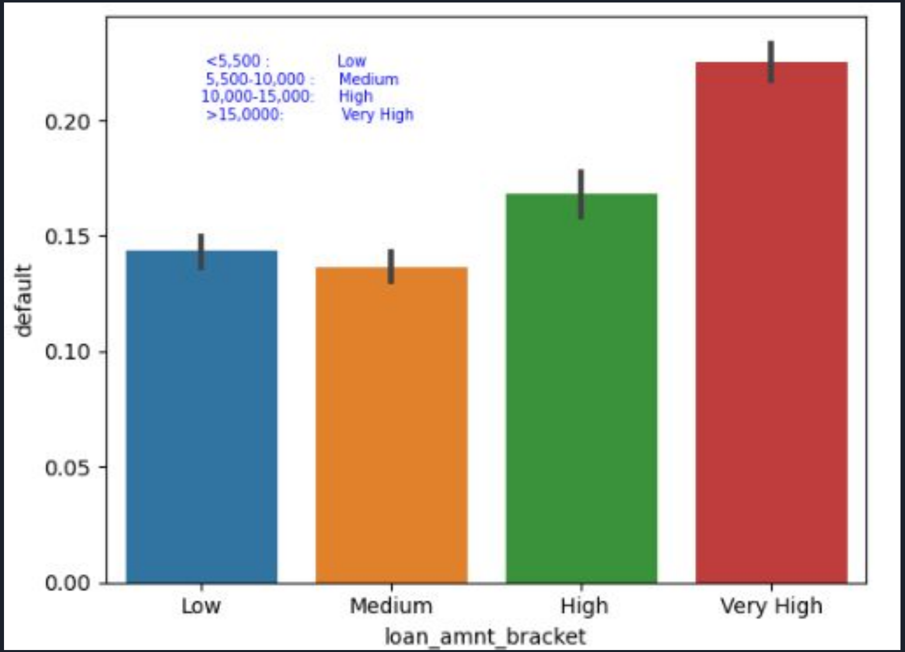
12.Year vs default

- The default rate has suddenly increased in 2011 , despite decrease from the year 2008 to 2010.



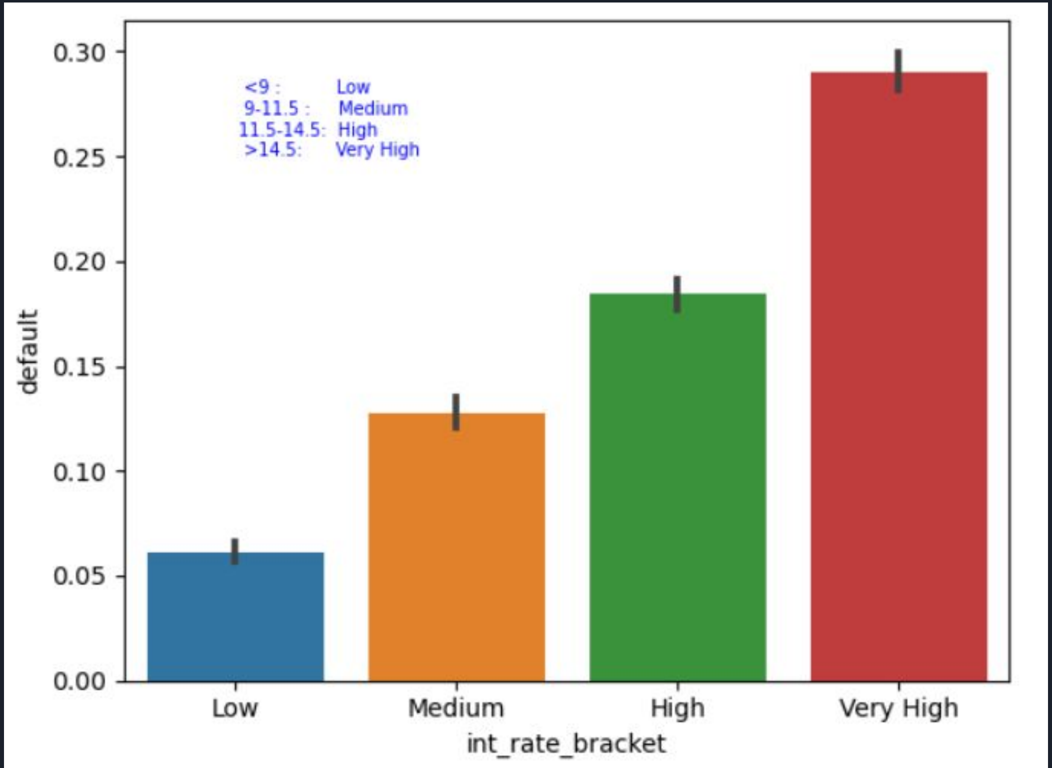
13.Loan_amount_bracket vs default

- The is an elevated likelihood of default associated with higher loan amounts .
- **Bank should avoid funding a large number of very high category loans amounts to avoid losses.**



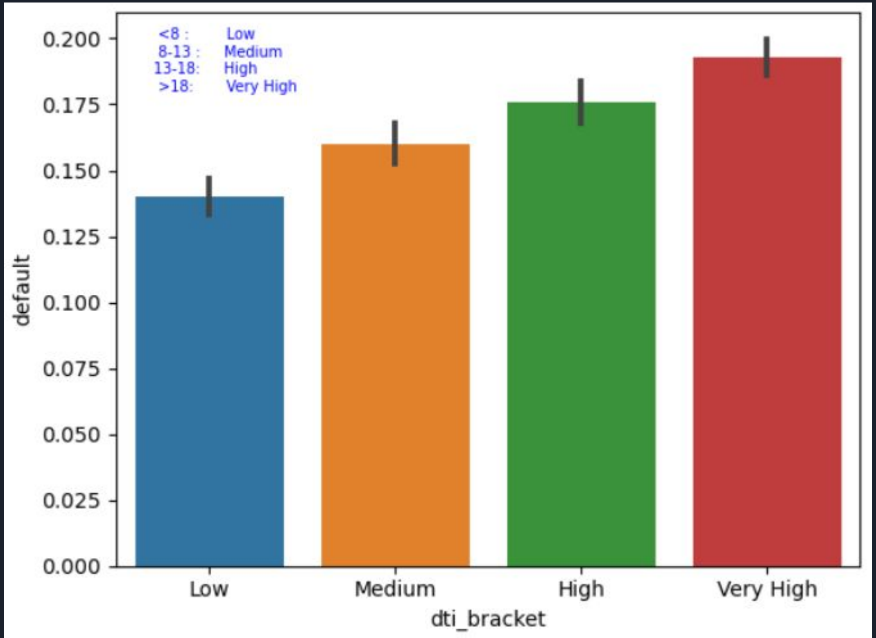
14.Interest rate bracket vs default

- Higher is the interest rate , higher is the default.



15. Debt to income bracket vs default

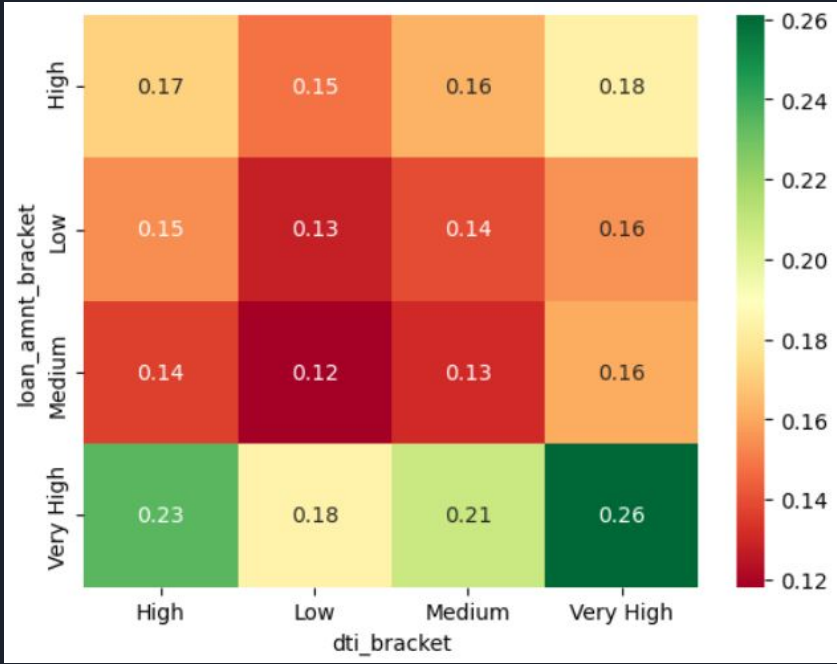
- The likelihood of default increases with higher Debt to Income ratio(DTI).



Multivariate Analysis

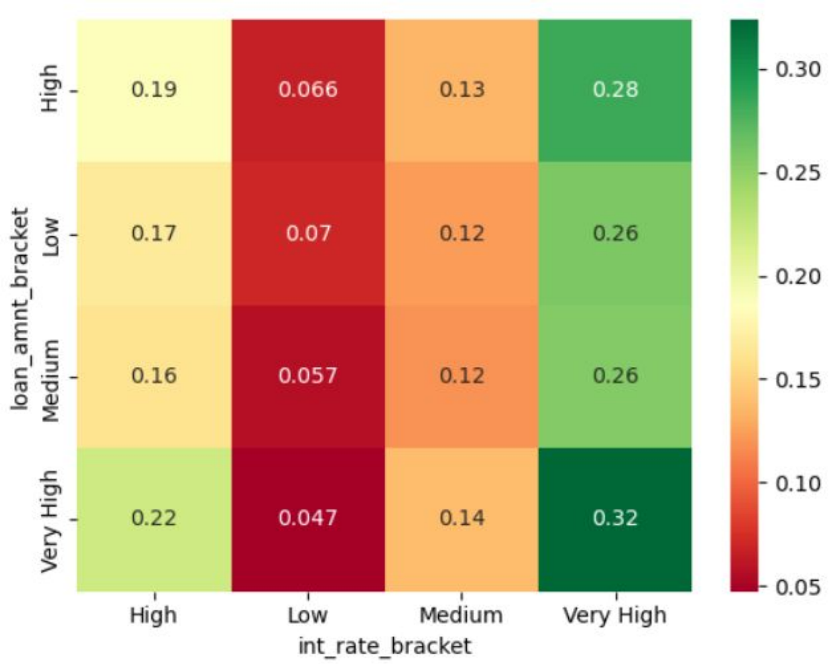
1. loan_amount vs dti_bracket vs default

- The combination of very high loan amount and high dti_bracket increases the likelihood of default.



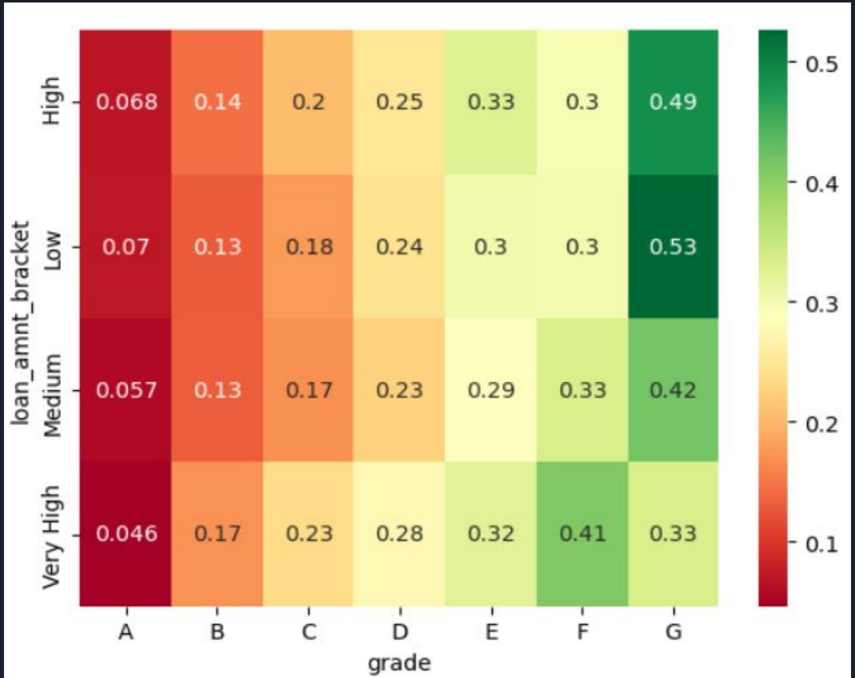
2. loan_amount vs int_rate_bracket vs default

- Regardless of the loan amount, if there is very high debt-to-income (DTI) ratio, the likelihood of default increases.



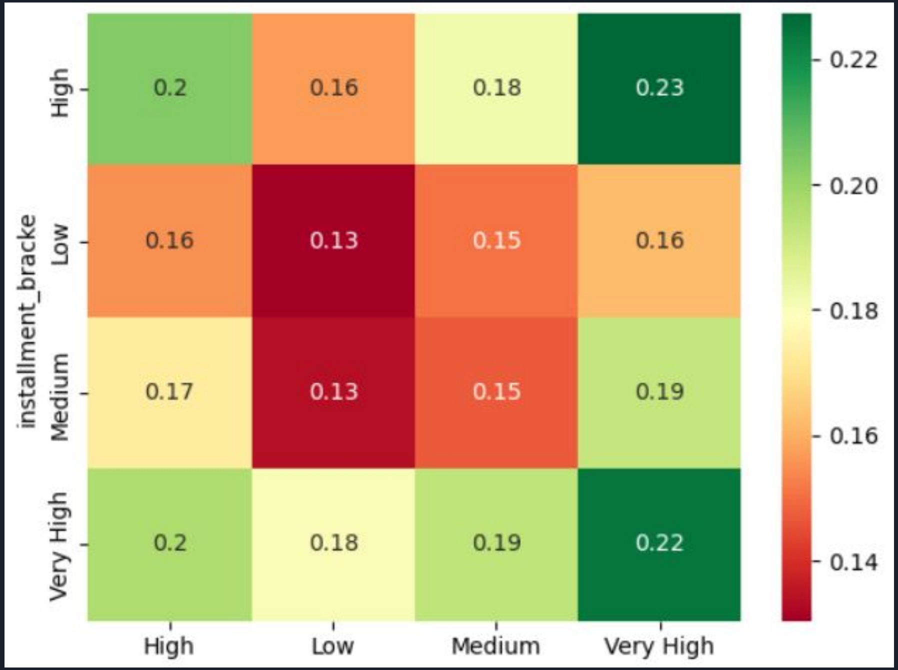
3. loan_amnt_bracket vs grade vs default

- Within the F grade, default risk is associated with Very high loan amounts, whereas in grade G, default tendencies are influenced by all loan category holders.



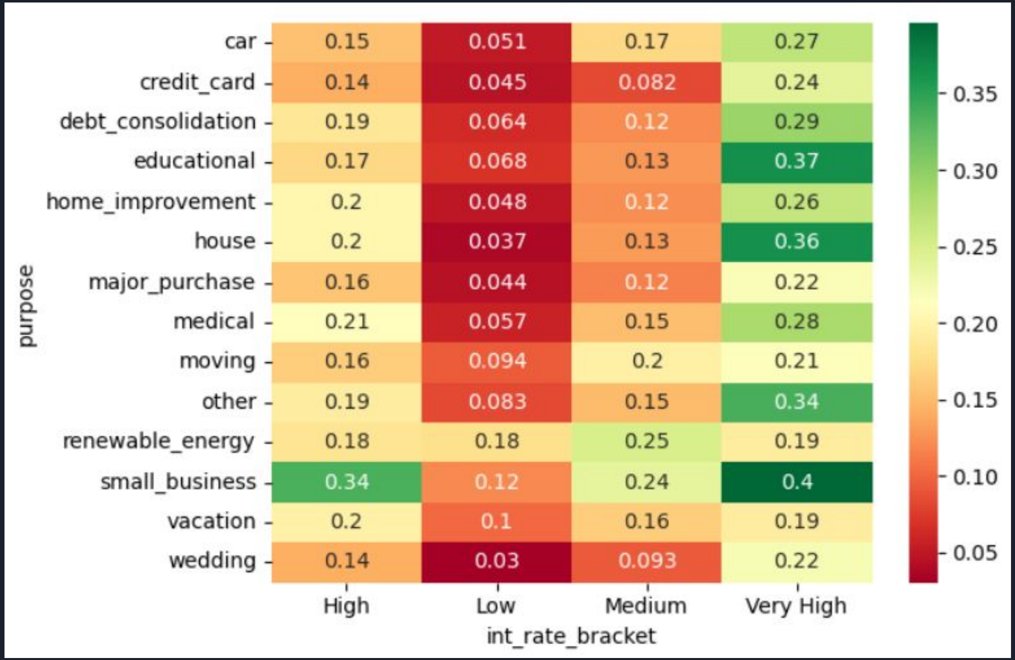
4. Installment_Bracket vs dti_bracket vs default

- High installment brackets and elevated debt-to-income (DTI) brackets significantly increase the likelihood of default.



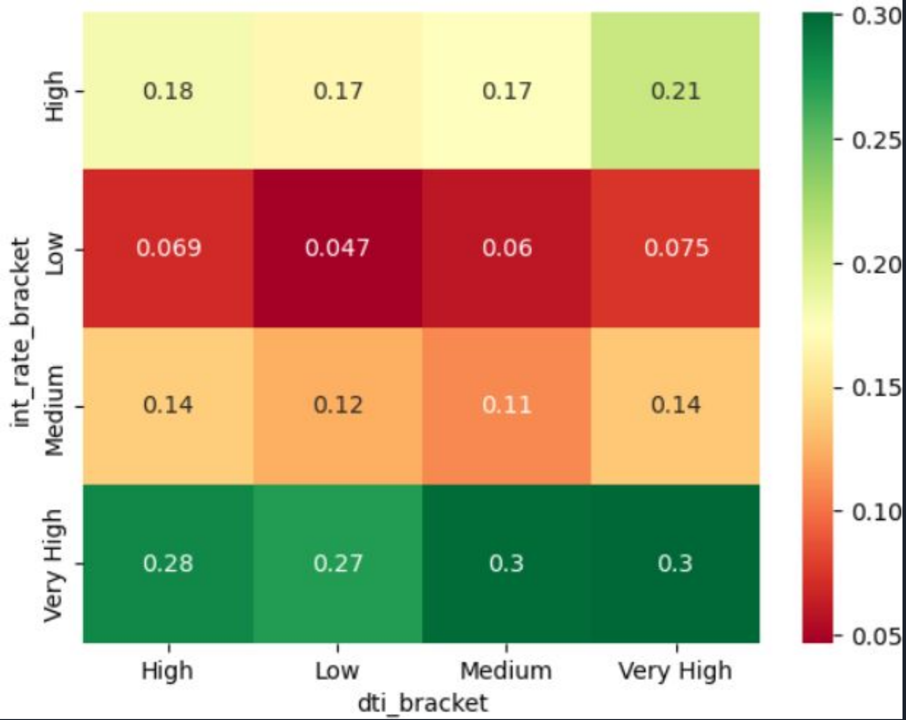
5.Purpose vs int_rate_bracket vs default

- High interest rates on small business, education, and home loans contribute to a higher incidence of defaults.



6.Interest Rate vs DTI vs Default

- Regardless of the debt-to-income (DTI) ratio, a high interest rate increases the likelihood of default.



Recommendations : -

- Lower the number of loans for low income streams(<40k) requesting very high loans.
- Look for more number of customers from grade A to D and give loans with slightly less interest rate or demand adequate collateral. Avoid funding loans for grade F and G who are requesting high loan amount.
- Focus on providing loans for debt_consolidation category , since customers are easy to find and also have lower defaults.

- Diminish loan funding for small business , since they have a high risk of falling into default this will mitigate potential losses.
- Increase interest rates in debt consolidation category and decrease interest rates on education , medical and housing to boost borrowings.
- Bank should avoid funding a large number of very high category loans amounts to avoid losses.
- Introduce debt consolidation with lower interest rate, and give incentives for early loan payment .
- Provide financial counselling to reduce individual dti and get a right installment plan.