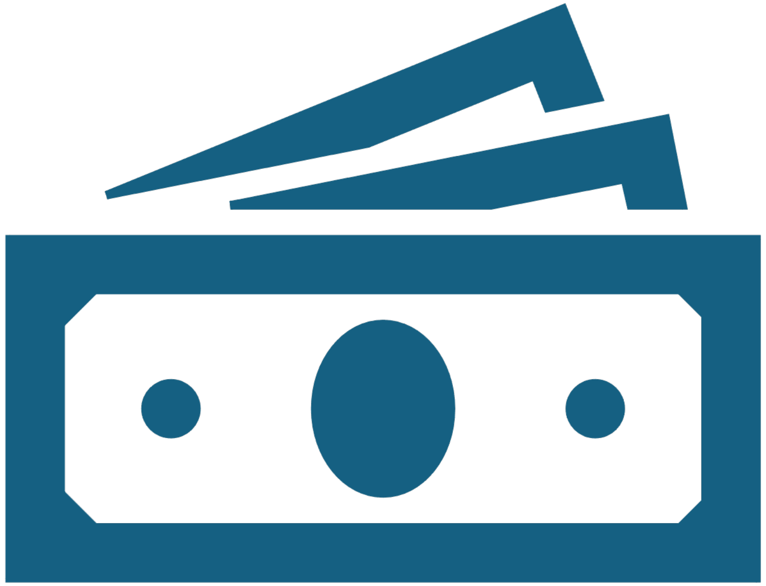

Lending Club Case Study

Submitted By :

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Objective:

The primary objective is to leverage data analysis to mitigate the financial risks associated with lending to customers, aiming to minimize potential losses.

The overarching objective is to curtail credit loss by employing exploratory data analysis (EDA) techniques to identify key factors influencing loan defaults.

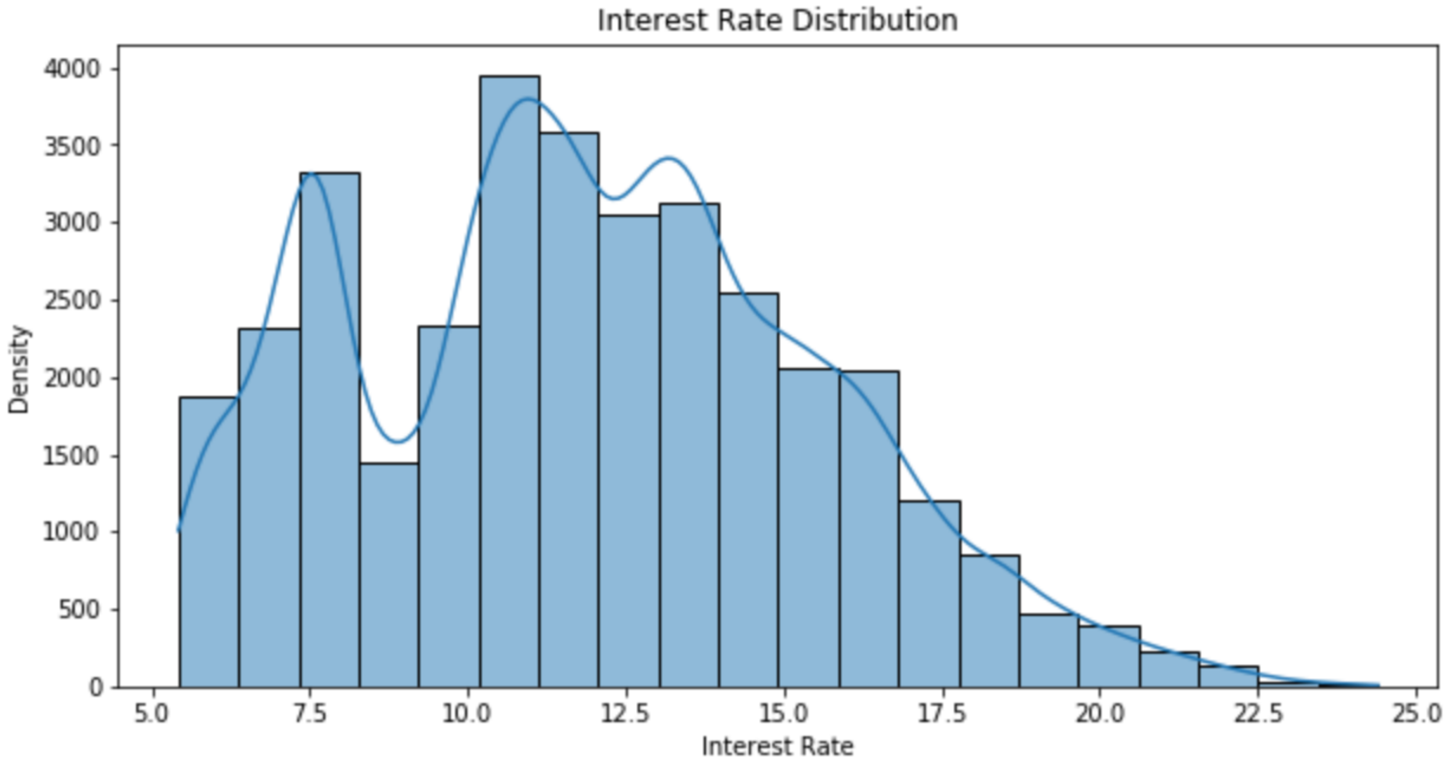
Context of the Problem:

The company under consideration stands as the largest online loan marketplace, facilitating a spectrum of loans, including personal, business, and medical procedure financing. Through an efficient online platform, borrowers gain access to loans at lower interest rates. Like other lending institutions, providing loans to applicants with a higher risk profile poses the most significant source of financial loss, known as credit loss. Credit loss represents the monetary value lost by the lender when borrowers fail to repay, leading to a financial setback. In this scenario, customers categorized as 'charged-off' are identified as defaulters, contributing to the credit loss.

Risks Associated with the Problem:

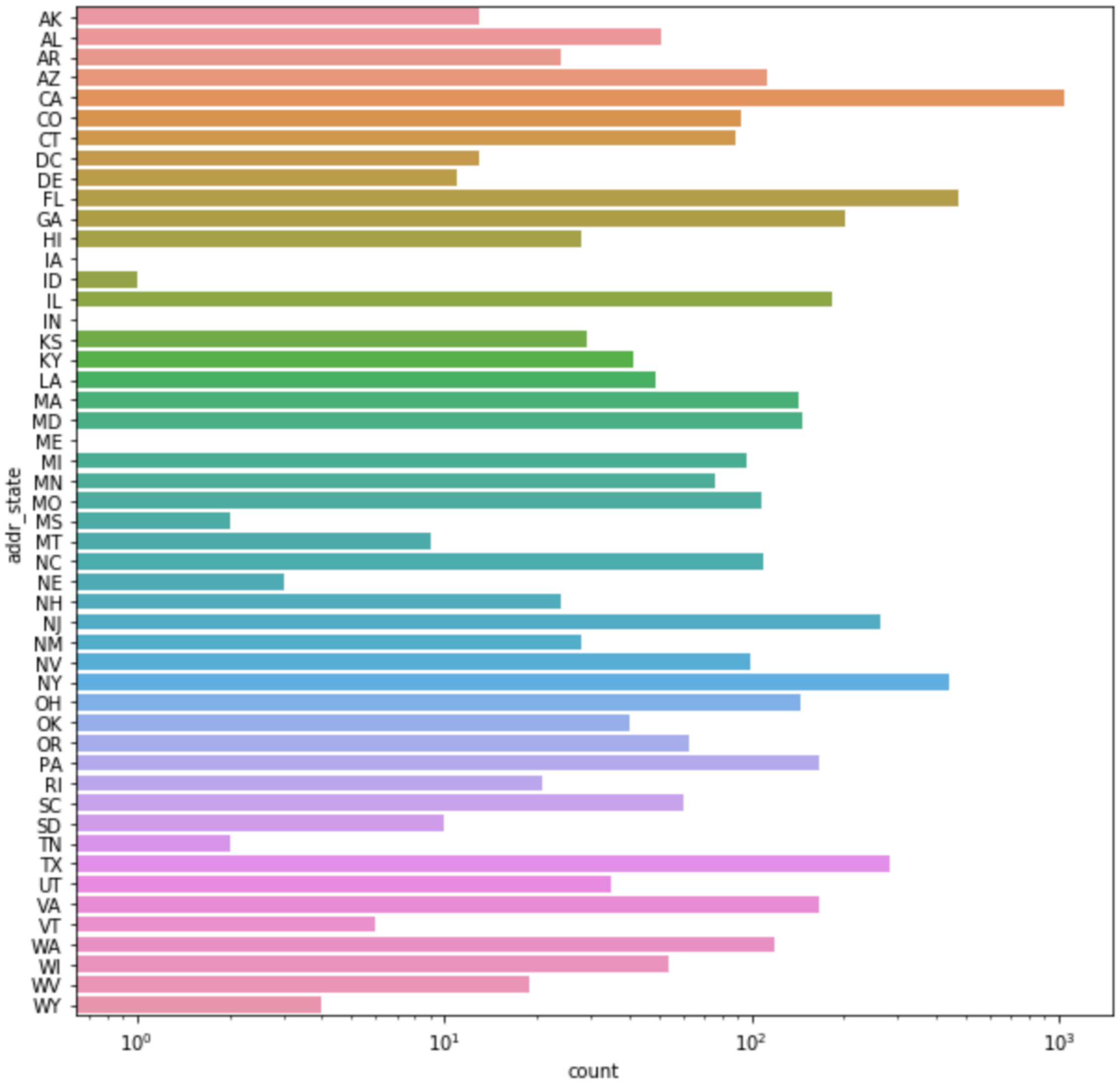
- Approving loans for applicants likely to repay is crucial; rejecting such loans leads to a loss of business (non-default scenarios).
- On the other hand, approving loans for applicants unlikely to repay poses a significant financial risk, resulting in potential losses (default scenarios).

Univariate Analysis – Interest Rate



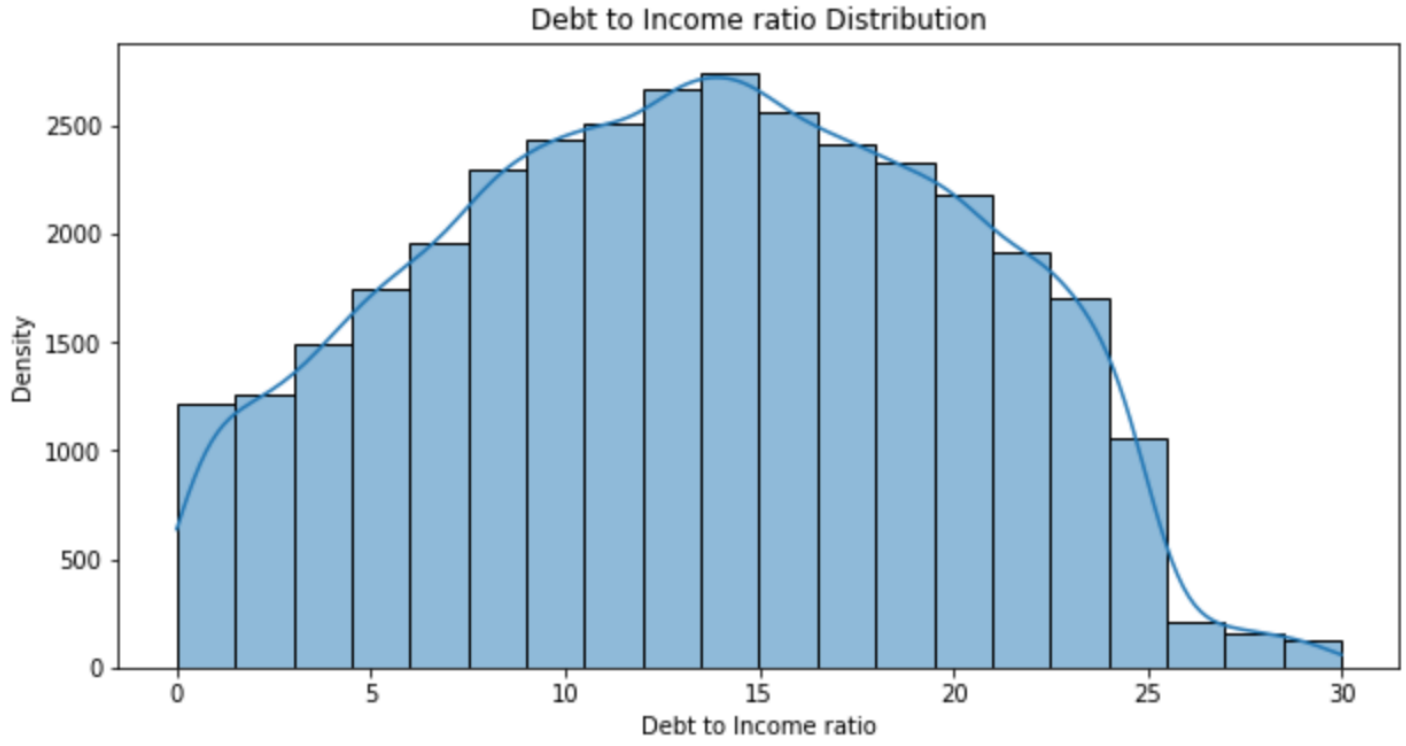
INSIGHT: Most people borrow at an interest rate in the ranges of around 7.5 to 8 percent and around 11 to 12 percent

Univariate Analysis: Address State



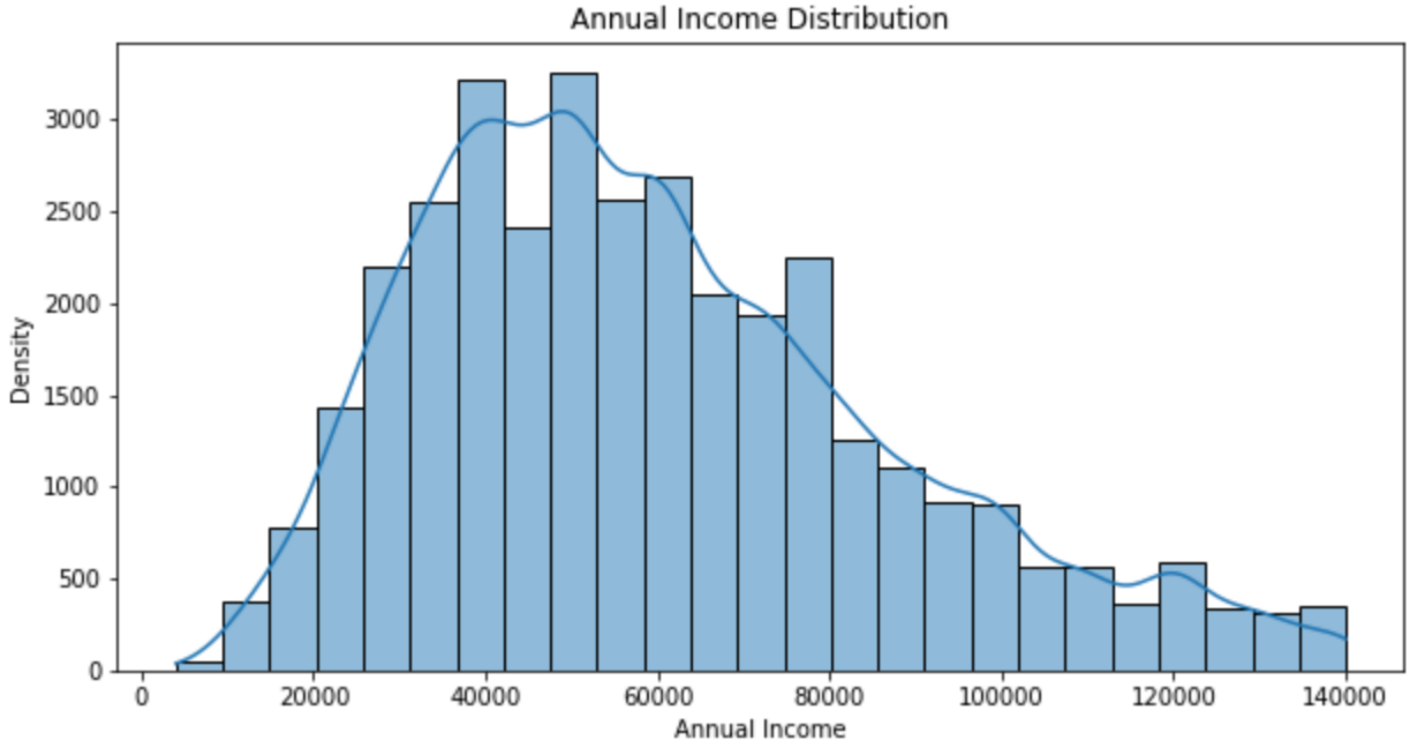
INSIGHT : California, Florida, New York, New Jersey, and Texas have the highest probability of default.

Univariate Analysis – DTI



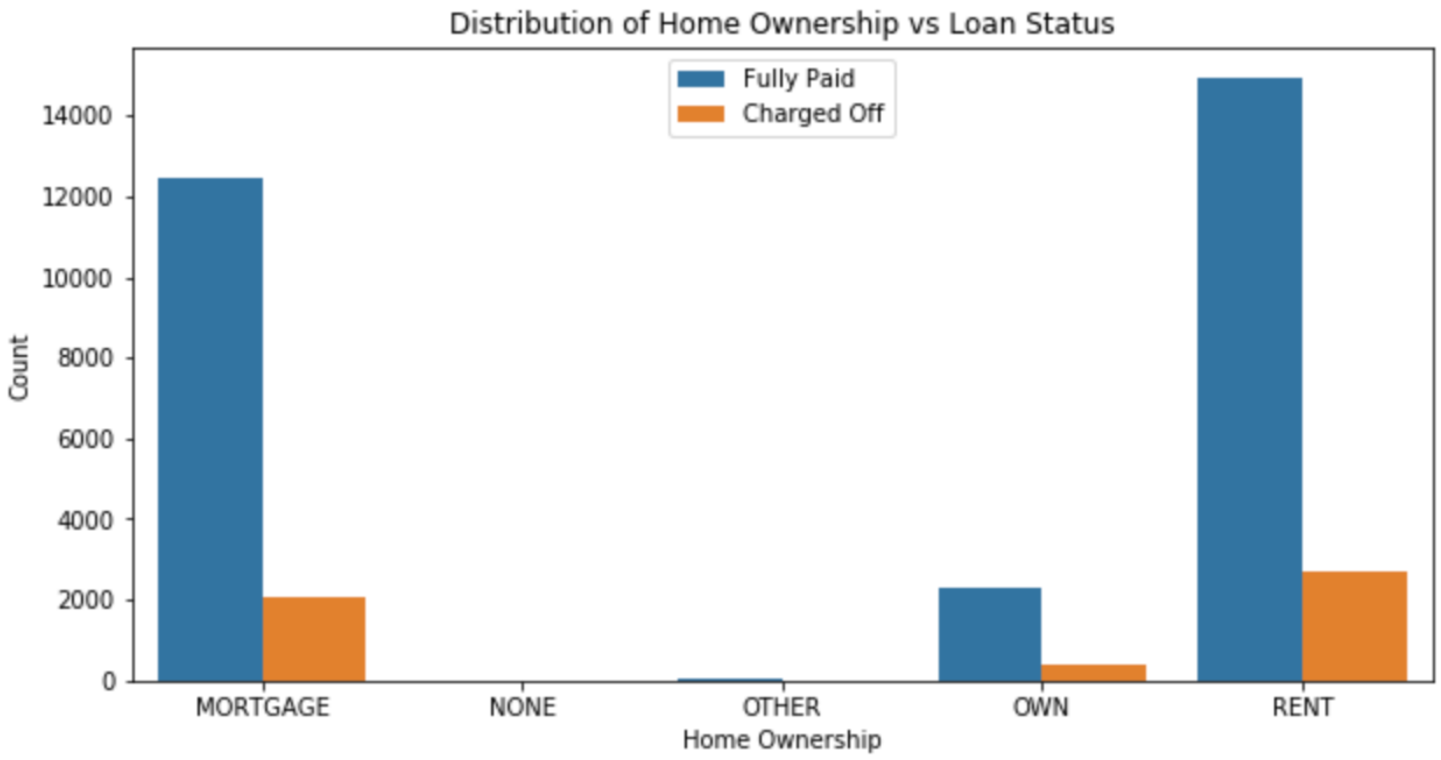
INSIGHT: Most people have a high debt to income ratio, and that ratio peaks around the value of 15 and falls down

Univariate Analysis – Annual Income



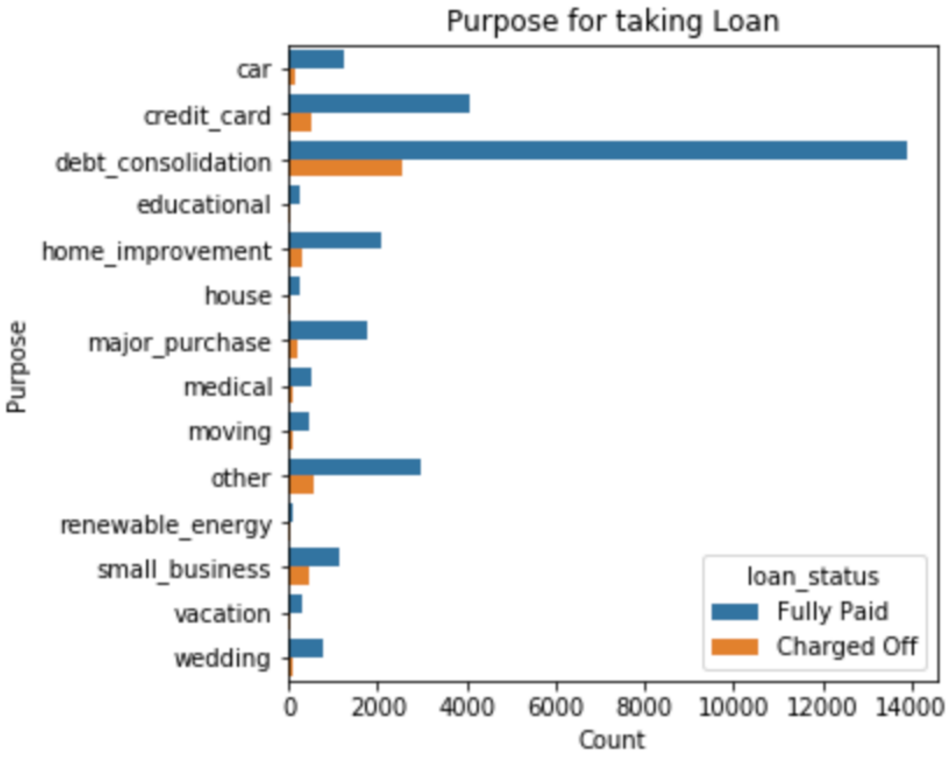
INSIGHT: Most people who borrow have an annual income in the range of 30,000 to 70,000

Univariate Analysis – Home Ownership



INSIGHT : The Default rate is lower for the borrowers who have their own property than for people who are on mortgage or rent.

Univariate Analysis – Purpose of Loan



INSIGHT: Most people are taking loan for Debt Consolidation, and that means they are taking new loans to pay out other existing loans.

Univariate Analysis Insights

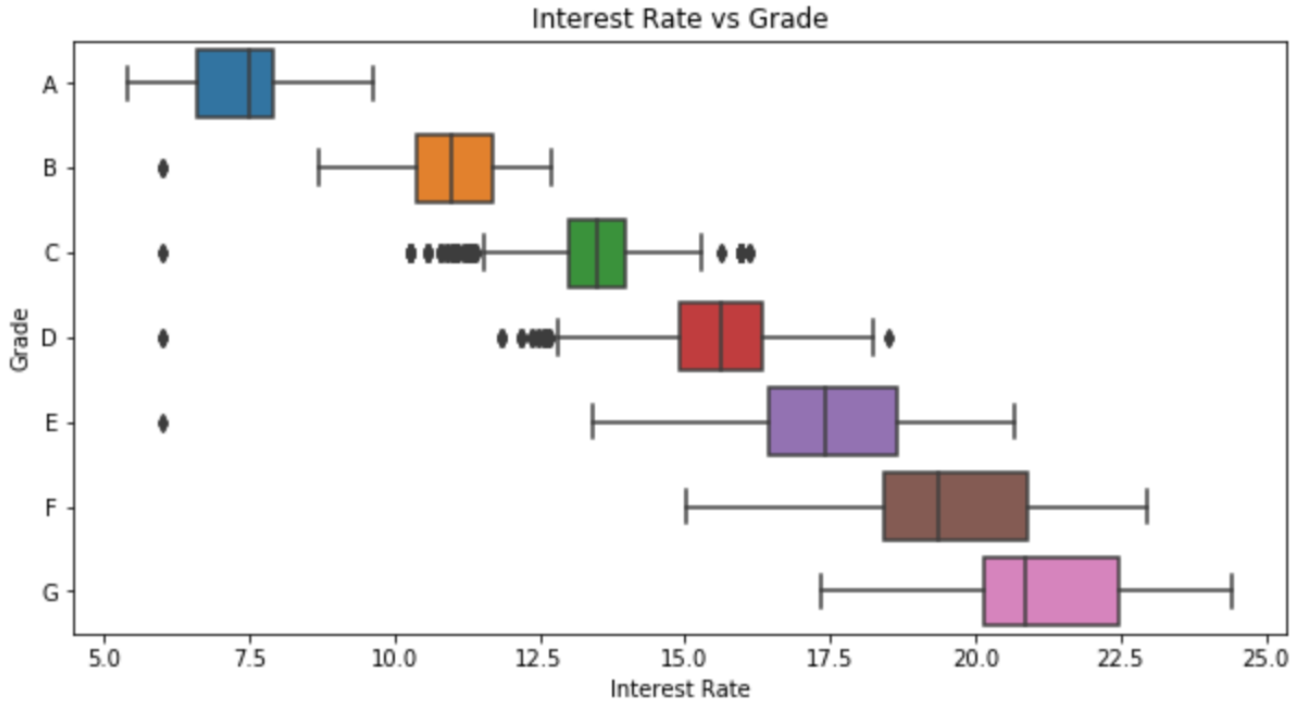
Key Findings:

Borrower Location	• Concentrated in large urban areas like California, New York, Texas, Florida.
Loan Term Distribution	• Majority of loans have a 36-month term. • Interest rate peaks around 5-10 and 10-15.
Loan Grade Distribution	• Predominance of 'A' and 'B' grade loans.
Employment Length	• Majority of borrowers have more than 10 years of work experience.
Home Ownership and Verification	• Majority don't own a property but are on mortgage or rent. • 50% of borrowers are verified or source verified.

Univariate Analysis Insights

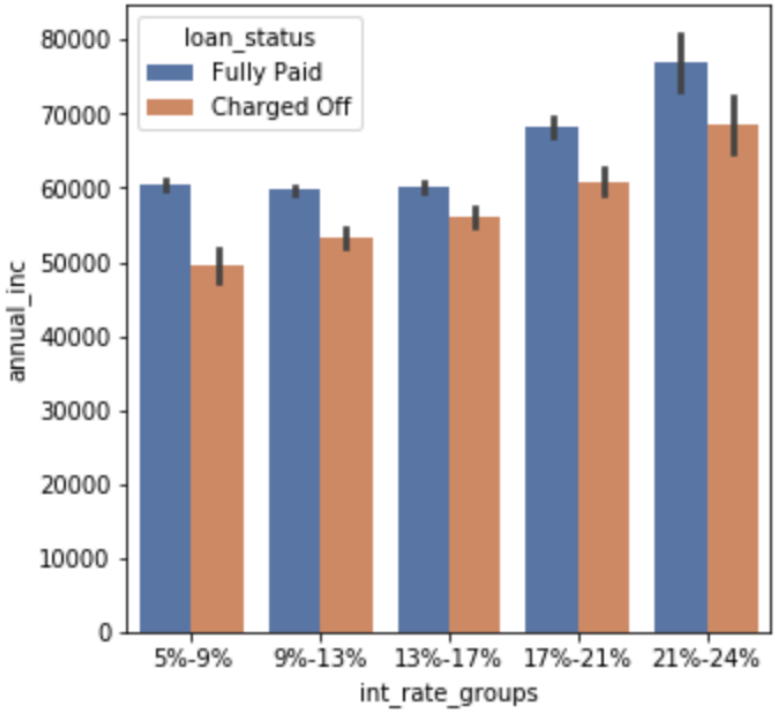
Loan Purpose Distribution	• Debt consolidation is the most common purpose.
Debt-to-Income Ratio (DTI)	• Majority with DTI ratio of 10-15.
Public Recorded Bankruptcy	• Most borrowers have no record of public recorded bankruptcy.
Loan Issuance by Quarter	• More loans given in the last quarter of the year.
Loan Approval Rate Over Time	• Exponential increase in loan approval rates.
Loan Status Distribution	• 7 times fewer defaults than fully paid loans.

Bivariate Analysis – Interest Rate vs Grade



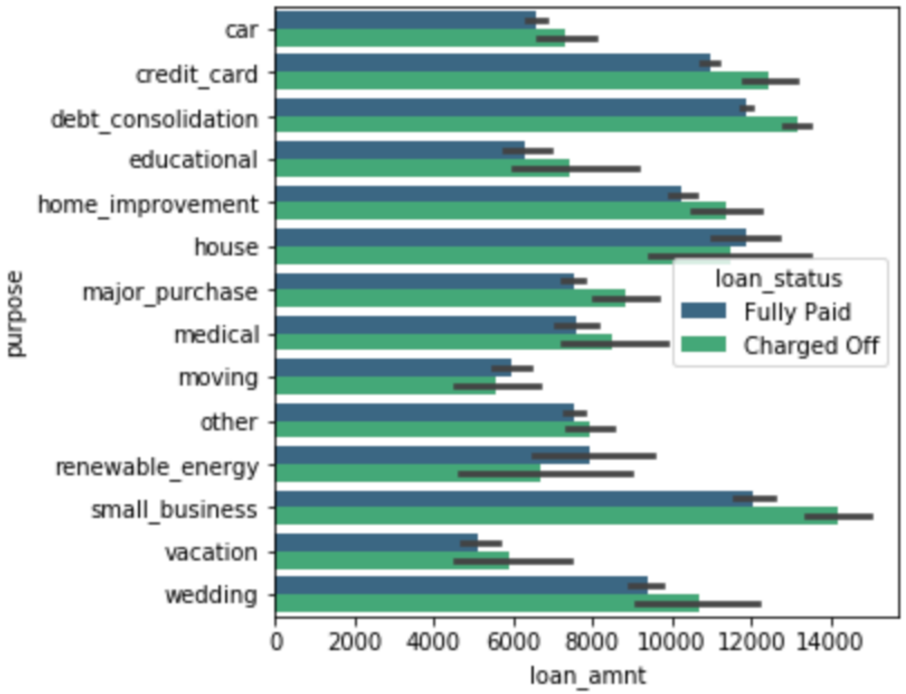
INSIGHT : The Grade represent risk factor, so we can say interst rate increases with the risk factor. Grade A is a low risk grade and Grade G is a high risk Grade. So, grade G loans have a higher mean Interest Rate

Bivariate Analysis – Loan Status with respect to Interest Rate and Annual Income



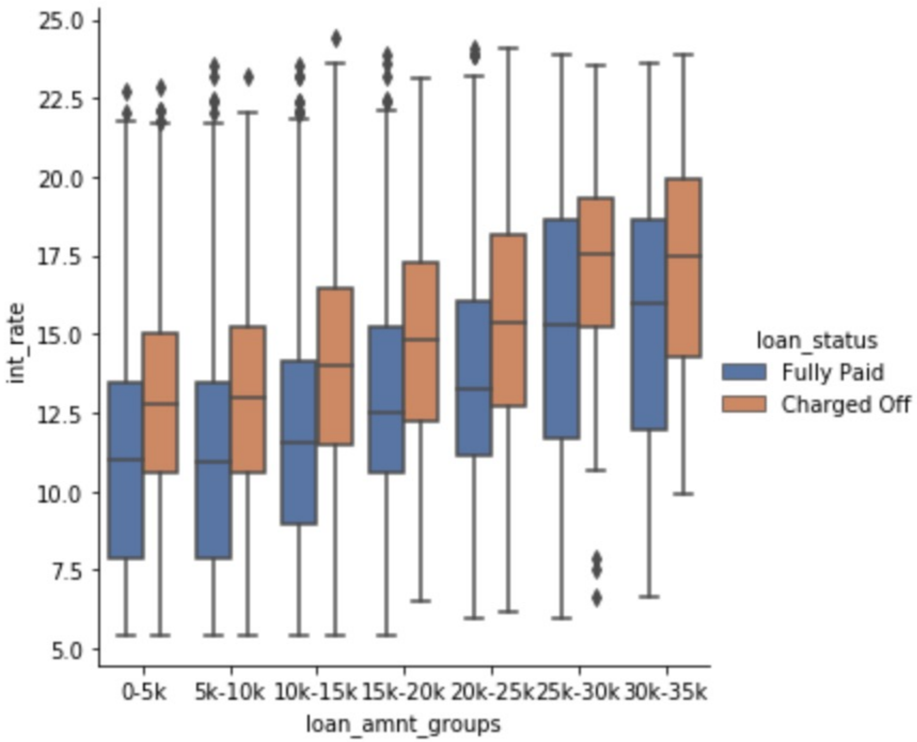
INSIGHT : People who borrow at 21 to 24 percent interest rate have the highest probability of default.

Bivariate Analysis – Loan Amount vs Purpose



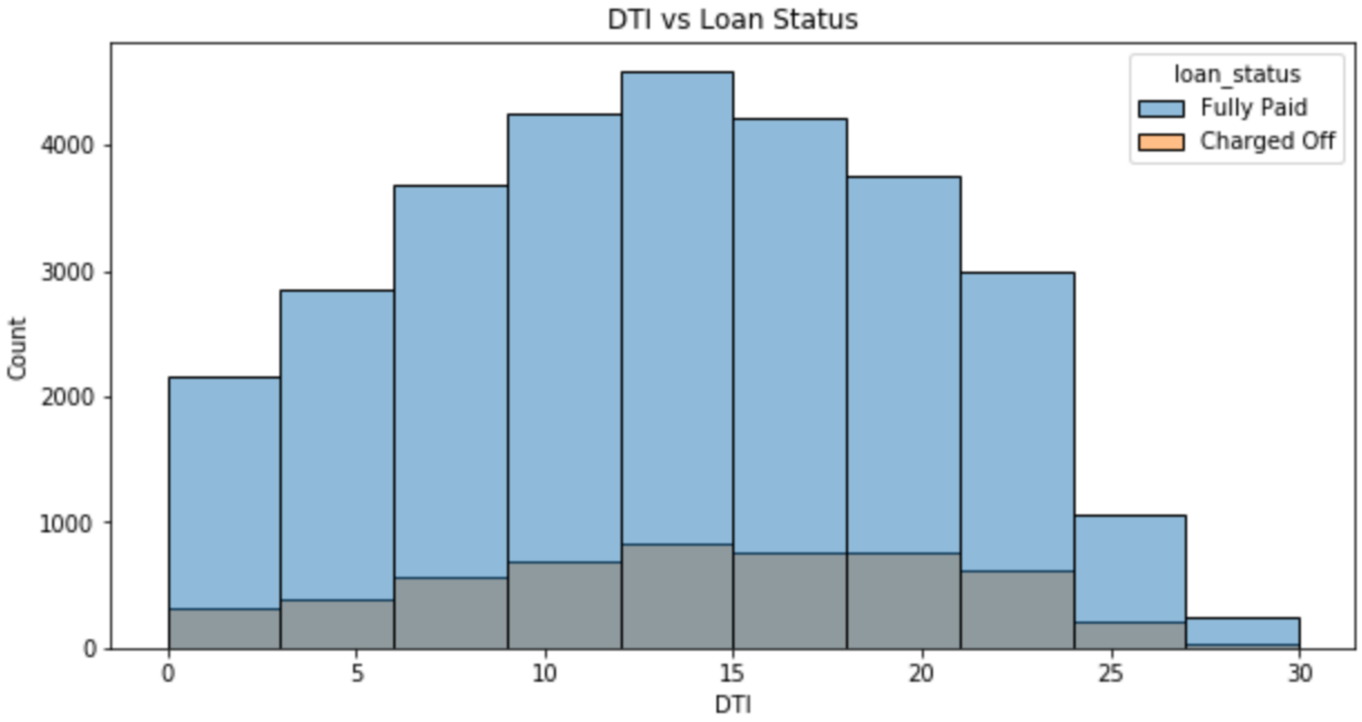
INSIGHT : Most people are borrowing to either to repay the existing loans or to start small businesses. So, Highest possibility of default is in the Small Business Loans, and the second highest possibility of default is in loans with purpose of Debt Consolidation.

Bivariate Analysis – Loan Amount vs Interest Rate



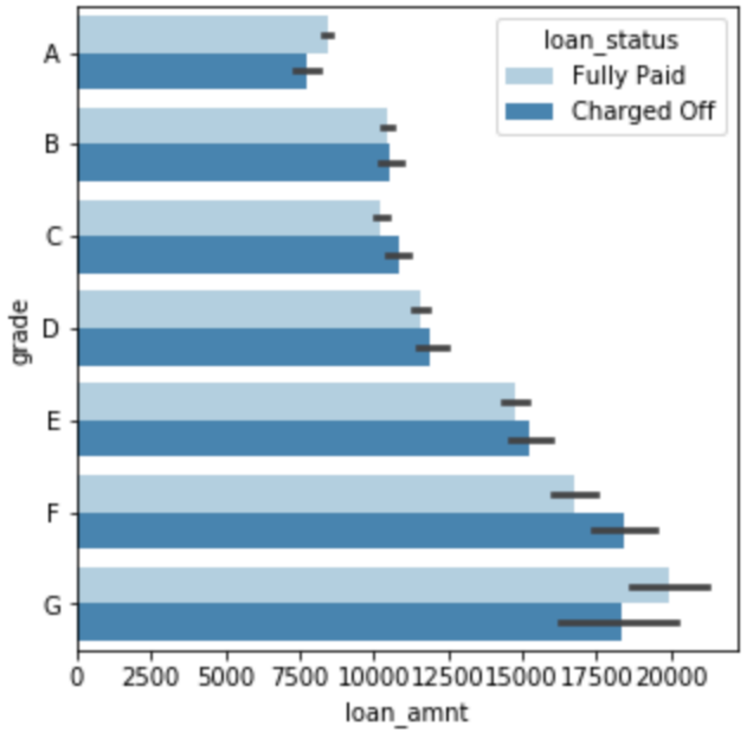
INSIGHT : Loans over 17.5 percent interest rate have the highest probability of default. Also, loans below the amount of 10,000 and with an interest rate of below 12.5 percent have the least probability of default.

Bivariate Analysis – DTI vs Loan Status



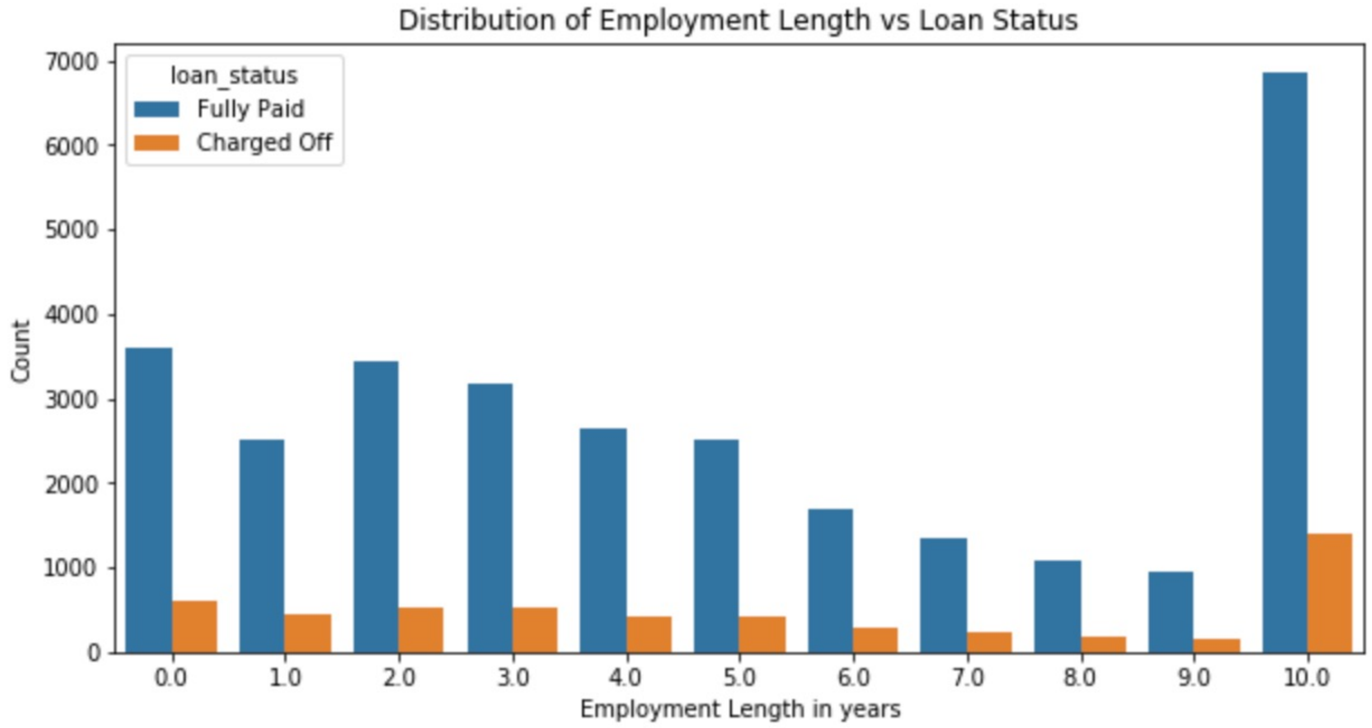
INSIGHT: The Loan Status varies with DTI ratio, we can see that the loans in DTI ratio 10-15 have highest number of defaulted loans. Also we can see that higher dti has higher chance of defaulting.

Bivariate Analysis – Grade vs Loan Amount



INSIGHT : 'F' grade loans have the highest Probability of Default followed by the 'G' Grade loans. Also, 'G' grade loans have the highest possibility of being Fully Paid.

Bivariate Analysis – Employment Length vs Loan Status



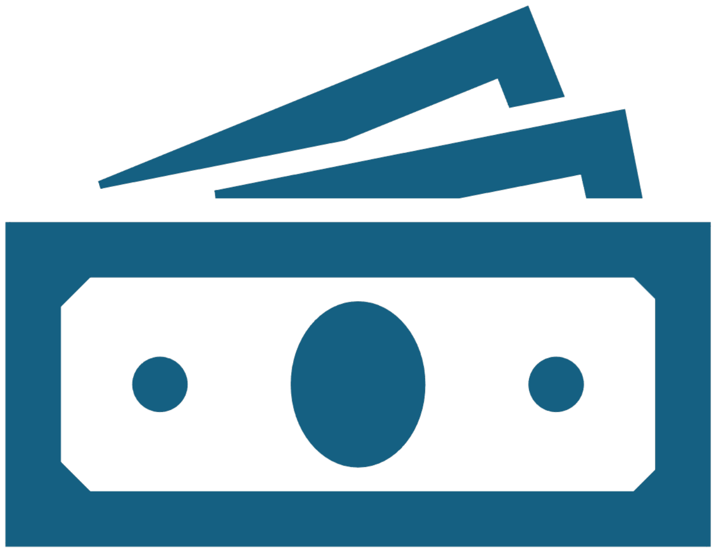
INSIGHT : People with an employement tenure of over 10 years are highly likely to take loans and repay them off quickly. Also, they have a higher chance of default.

Bivariate Analysis Insights

Relationship Analysis and Key Findings:	
Loan Purpose and Status	• Debt consolidation has the highest number of both fully paid and defaulted loans.
Loan Term and Grade	• 36-month term mostly consists of 'A' and 'B' grade loans. • 60-month term consists of 'B', 'C', and 'D' grade loans.
DTI Ratio and Loan Status	• Higher DTI (10-15) has a higher number of defaulted loans.
Home Ownership and Default	• Property owners have lower default rates compared to those on mortgage or rent.
Income Level and Default	• Borrowers with less than $50,000 annual income are more likely to default.

Bivariate Analysis Insights

Loan Status Over Time	• Fully paid loans increase exponentially over time.
Interest Rate and Default Amount	• Default loan amount increases with interest rate.
Employment Length and Default	• Employees with 10+ years of experience are likely to default.
Grade and Risk	• Higher-grade loans have lower DTI ratios, indicating lower default rates.
Public Recorded Bankruptcy	• Borrowers with no record of bankruptcy are a safer choice for loan issuance.



Key Driving Factors Behind Loan Default

- ❑ **Debt-to-Income Ratio (DTI)**
- ❑ **Loan Purpose - Debt Consolidation**
- ❑ **Loan Term**
- ❑ **Interest Rate**
- ❑ **Annual Income**
- ❑ **Loan Grade**
- ❑ **Verification Status**
- ❑ **Home Ownership**
- ❑ **Employment Length**
- ❑ **Loan Amount**