LENDING CLUB CASE STUDY

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Problem Statement:

Optimizing Loan Approval for Profitability and Risk Management

As a consumer finance company specializing in urban lending, our primary objective is to enhance our loan approval process to maximize profitability and minimize financial risks. Our decisions hinge on assessing two critical risks:

•**Opportunity Loss Risk:** Not approving loans for creditworthy applicants could lead to missed revenue opportunities.

•**Default Risk:** Approving loans for applicants likely to default may result in financial losses.

To mitigate these risks effectively, we aim to develop a robust, data-driven decision-making framework. This framework will:

i. Detect applicants likely to default to prevent financial losses.

ii. Our goal is to achieve a balanced approach that optimizes our loan approval process, increases profitability, and maintains financial stability.

ABSTRACT:

- Lending Club, the largest online loan marketplace, offers a range of financing options including personal, business, and medical loans. Its streamlined online interface enables borrowers to access lower interest rates swiftly.

- This Analysis focuses on predicting loan defaults by leveraging historical applicant data. By harnessing this data, Lending Club aims to enhance risk assessment methodologies, thereby improving lending decisions and ensuring sustainable financial outcomes.

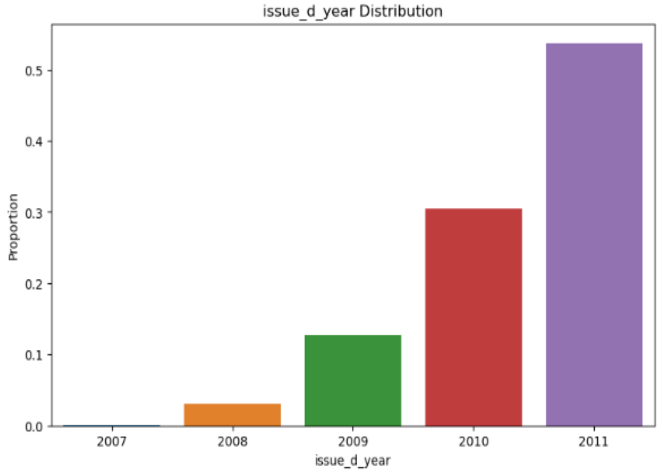
PROBLEM SOLVING METHODS IMPLEMENTATION:

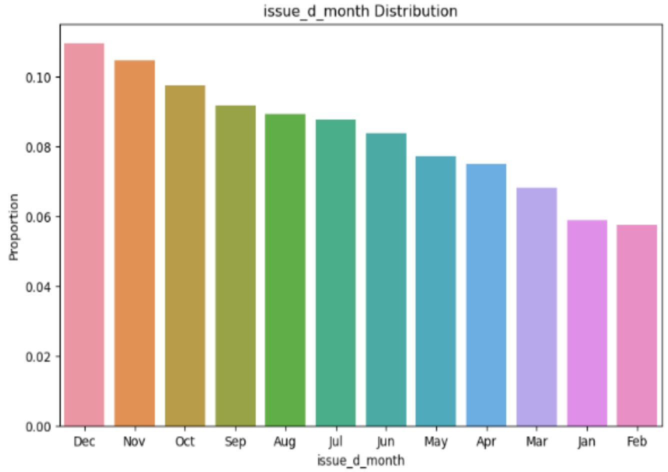
- Data Cleaning:
  - Remove columns with null values and unnecessary variables.
  - Assess null value percentages and eliminate corresponding rows for data integrity.
- Data analysis:
  - Use the Data Dictionary to understand column specifics and domain relevance.
- Univariate analysis:
  - Analyze each column independently, plotting distributions for insights.
- Segmented Univariate analysis:
  - Explore relationships between continuous and categorical data.
- Bivariate analysis:
  - Investigate variable interactions (e.g., term vs. loan status vs. loan amount).
- Recommendations:
  - Review plots to propose strategies minimizing business losses.
  - Identify predictive columns for effective loan default prediction.

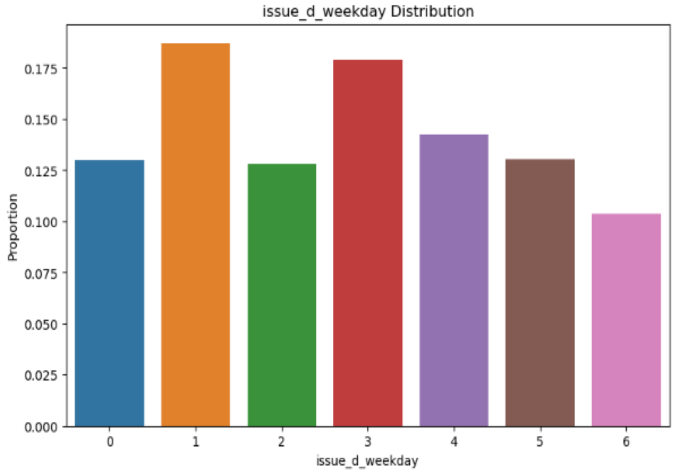
ANALYSIS:

Issue dates Analysed by Year, Month and Days.

•**Remarkable Growth**
•Lending Club shows year-over-year growth.
•Loan issuance doubles annually.
•**Exponential Trend**
•Growth accelerates from January to December.
•**Fourth Quarter Surge**
•Peak in loan issuance in the fourth quarter.
•Likely due to increased spending during vacations and holidays.

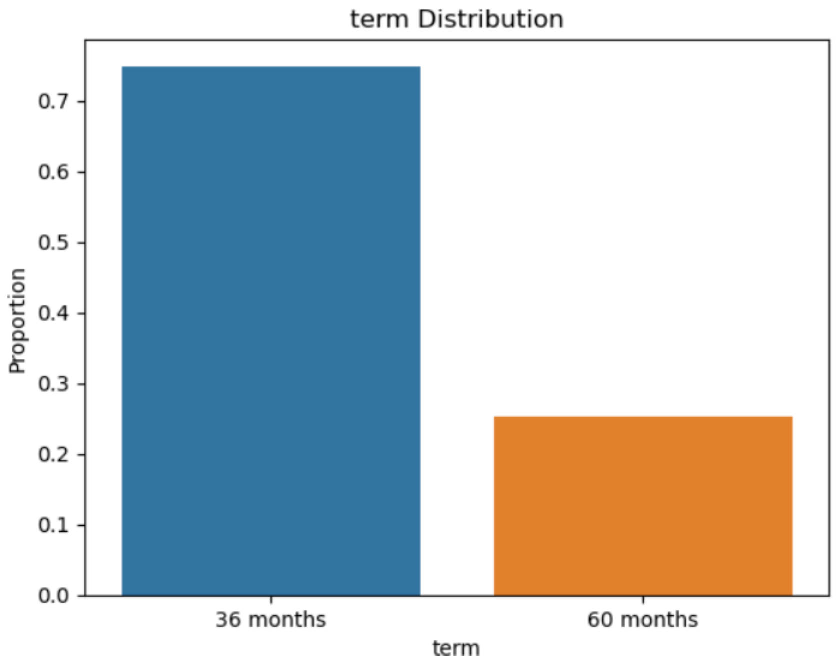


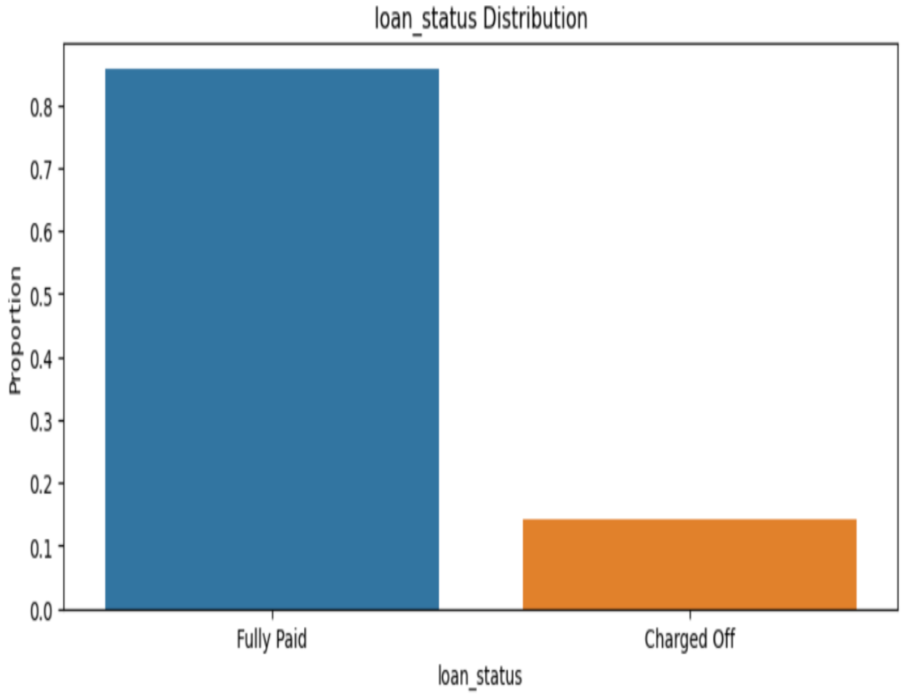




ANALYSIS:

Analysing the Term distributions and loan status.

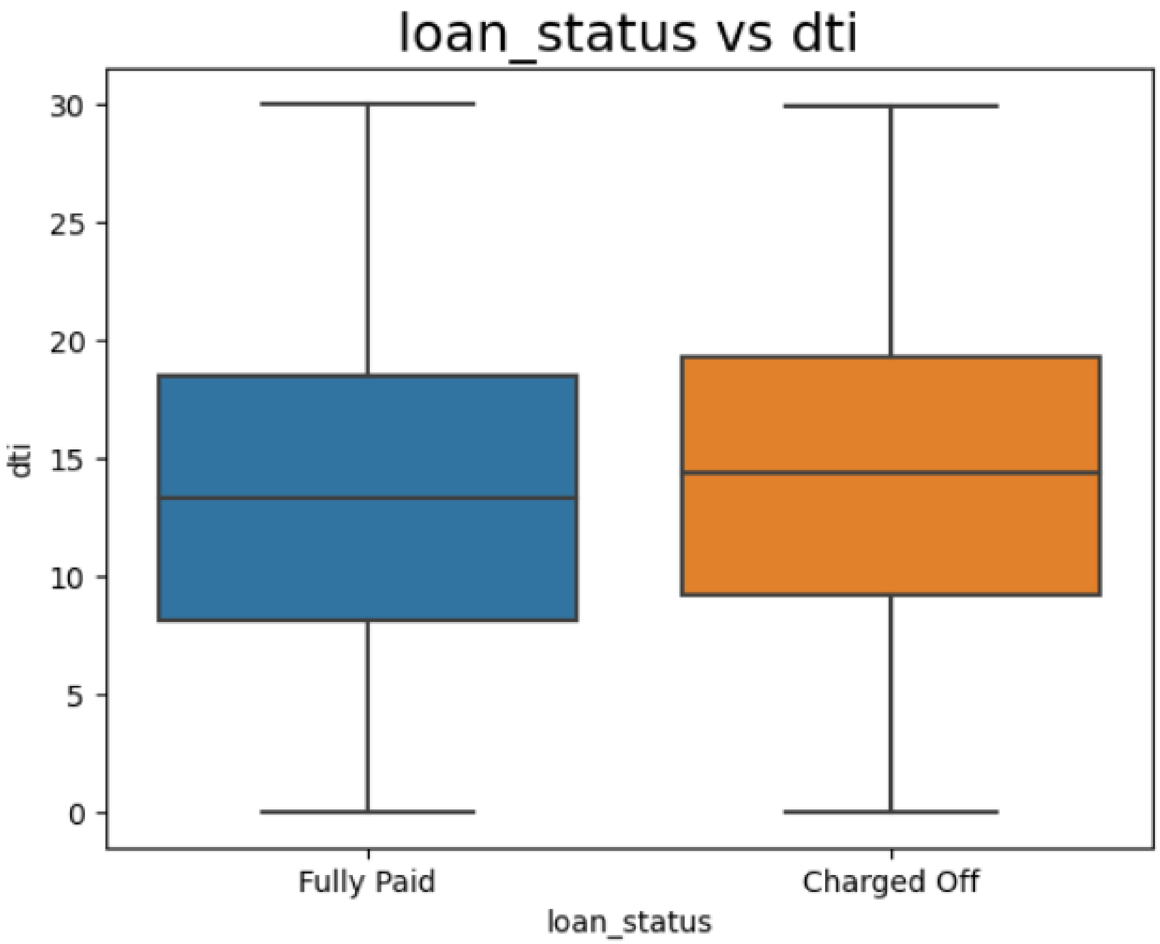




In the dataset, borrowers have exclusively opted for either a 36-month or 60-month loan term, with approximately 75% selecting the 36-month option. Among all borrowers, around 15% defaulted on their loans, while the remaining 85% successfully repaid them.

ANALYSIS:

Analysing The Loan Status V/S Interest Rates.



•Relationship Between Interest Rates and Loan Defaults

i. Probability of loan defaults increases with higher loan interest rates.
ii. Borrowers facing higher interest rates may struggle to meet repayment obligations.
iii. Elevated risk of default due to financial strain caused by higher interest rates.

•Impact of Higher Interest Rates

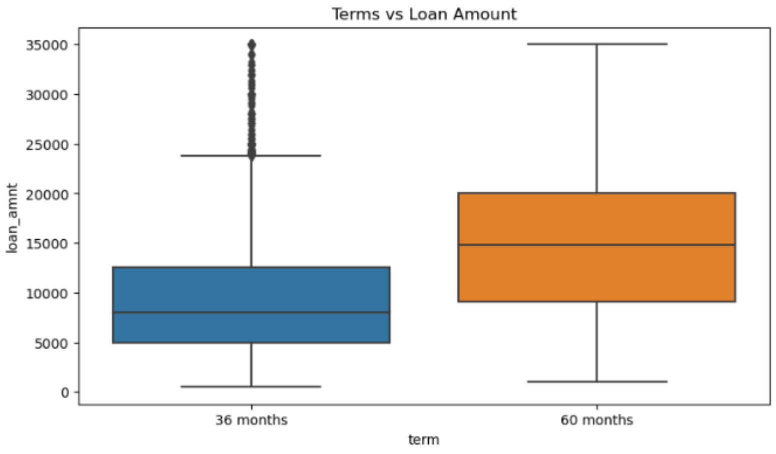
i. Higher interest rates can affect borrowers' affordability.
ii. It may stretch their financial capacity, making loan repayment challenging.

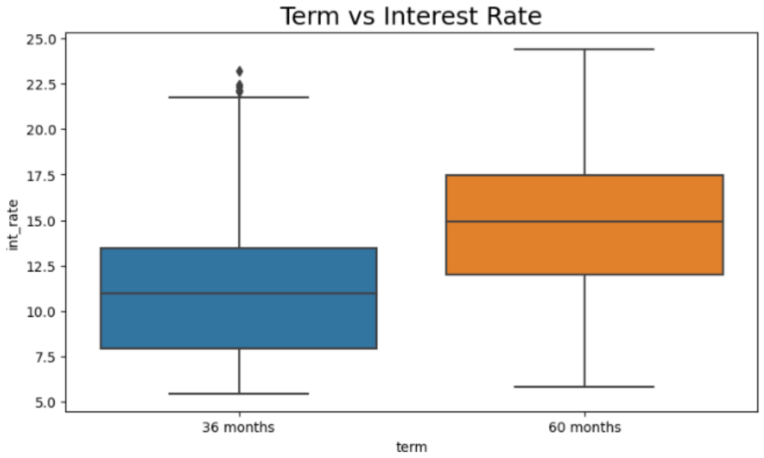
•Considerations for Financial Institutions

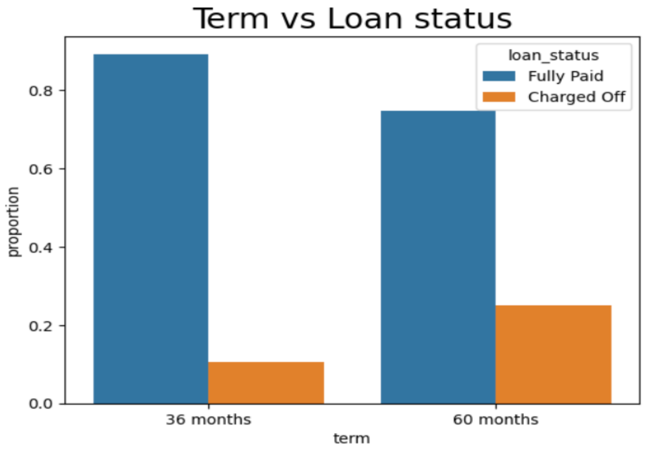
i. Balance between competitive interest rates and risk management is crucial.
ii. Effective strategies needed to mitigate default risks effectively.

ANALYSIS:

Analysing the Term v/s Loan amount, Interest rates and Loan status.



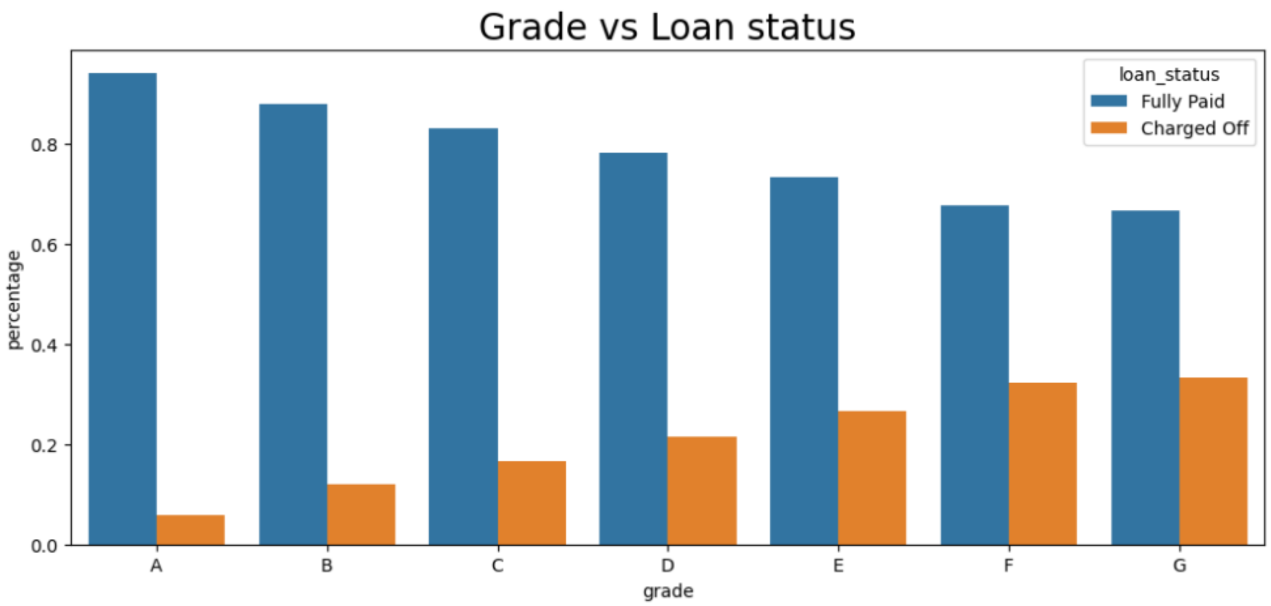


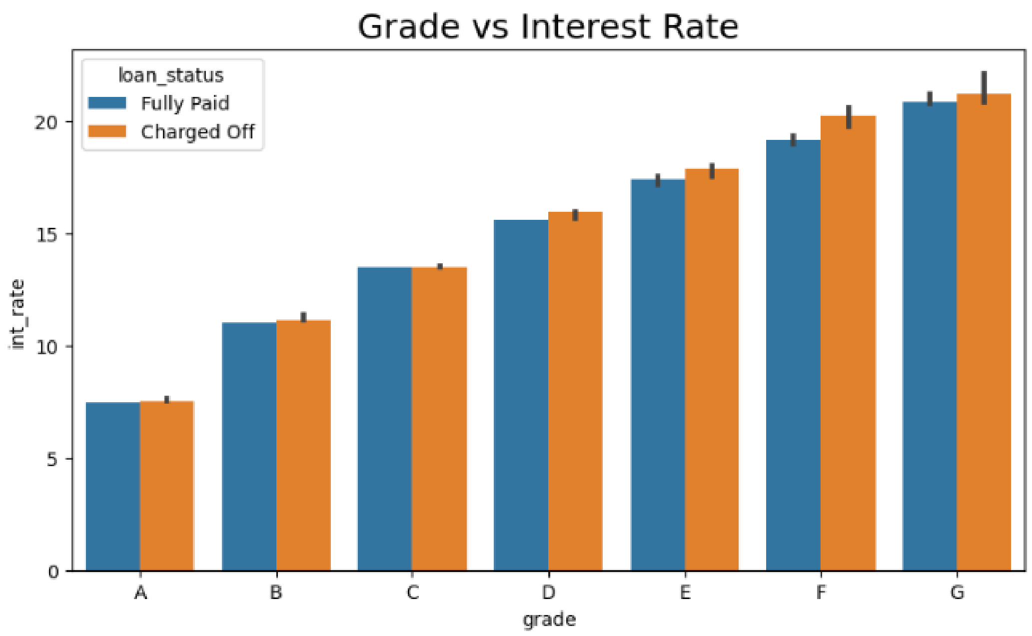


The default rate is higher for 60-month loans because borrowers typically took out larger loan amounts with higher interest rates, making it more difficult for them to repay the loans.

ANALYSIS:

Analysing the Grade v/s Loan status and Interest rate.

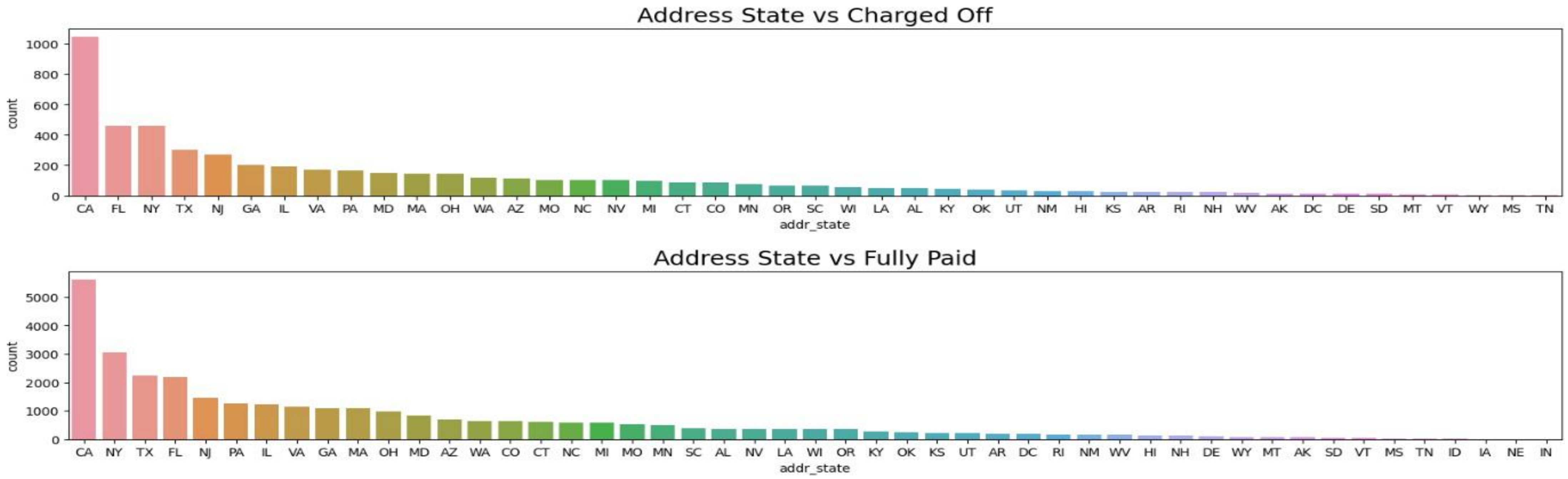




Grades are a reliable indicator of a borrower's likelihood of defaulting on a loan. Lower grades (E, F, G) have a higher probability of default compared to higher grades (A, B). Additionally, borrowers with lower grades receive loans with higher interest rates, which may contribute to the increased default risk.

ANALYSIS:

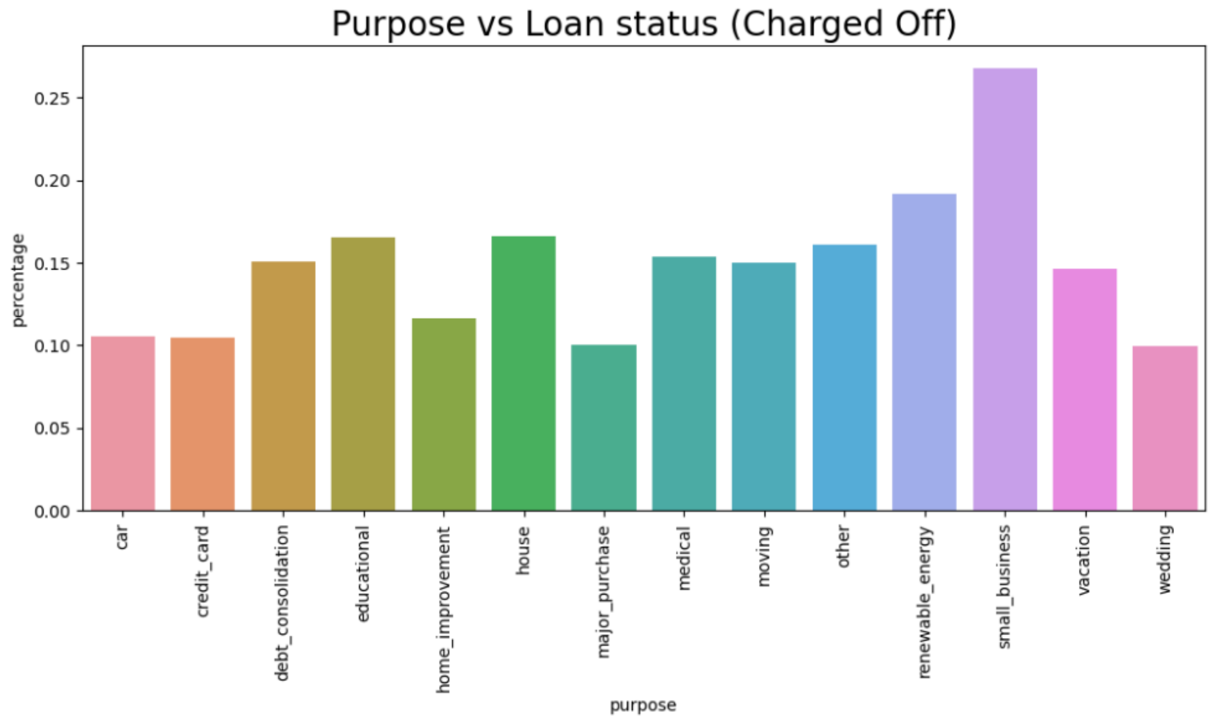
Analysing the Address states v/s Charged off and fully paid loans.



Loans given to borrowers in California, Florida, and Texas have higher default rates compared to other states.

ANALYSIS:

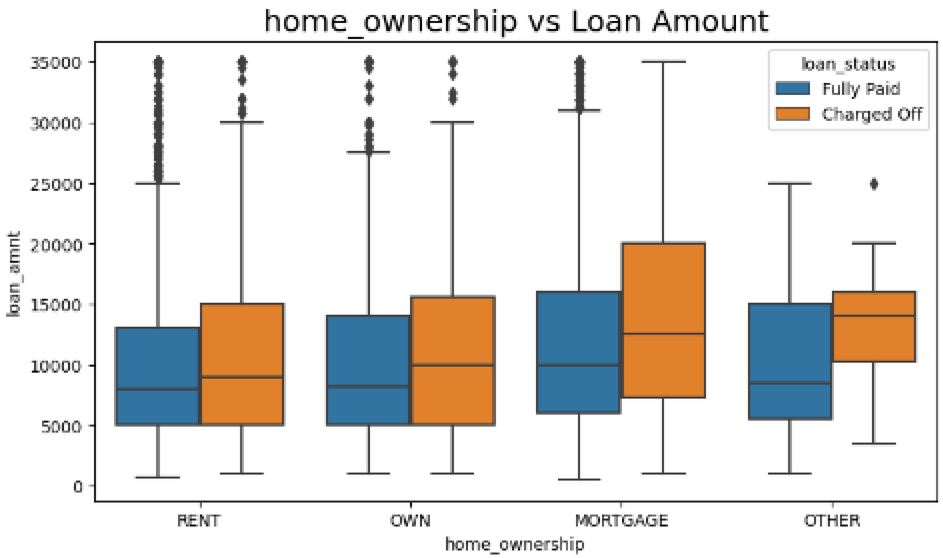
Analysing the Purpose of loan v/s Charged off loans.

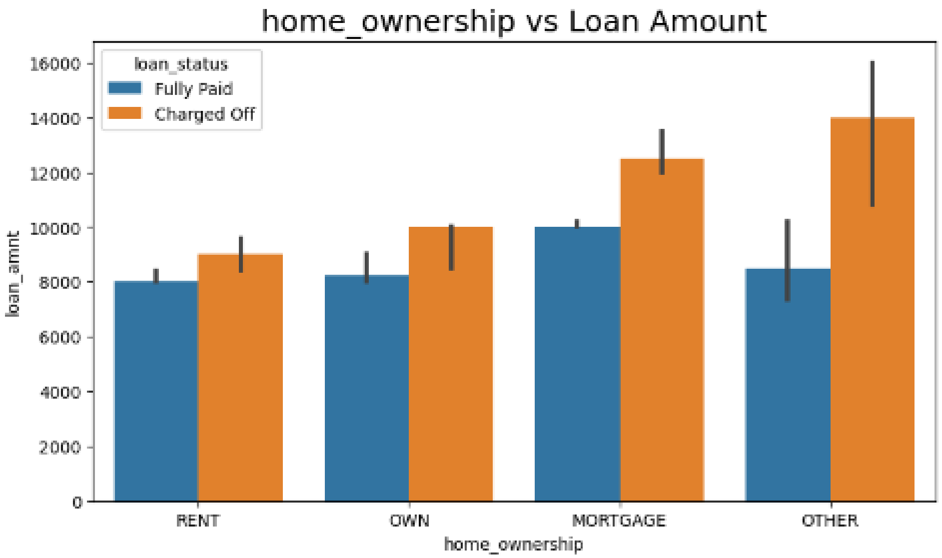


Borrowers who took out loans for small business purposes have a higher rate of default.

ANALYSIS:

Analysing Home ownerships v/s Loan status and Loan amount.

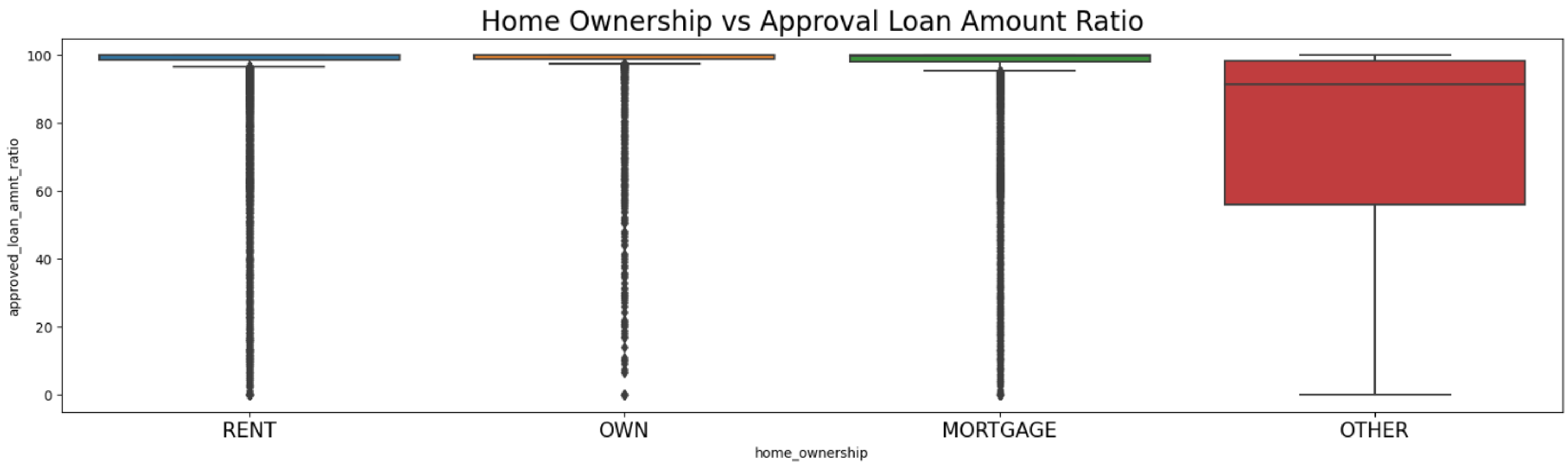




There is approximately a 20% chance of loan default in each homeownership category.
The second plot reveals that borrowers with higher loan amounts in the mortgage homeownership category have a higher default rate compared to others.

ANALYSIS:

Analysing the Home ownership v/s Approval loan amount ratio.



For borrowers in the 'Other' homeownership category, the approved loan amount funded by investors is consistently lower than the requested loan amount.

CONCLUSIONS:

1. Adjusting Interest Rates for 60-Month Loans:

- Lending Club should consider reducing interest rates for 60-month loans due to their higher default risk.

2. Enhancing Risk Assessment for Lower Grades:

- Grades serve as effective indicators for identifying potential defaulters. Lending Club should enhance scrutiny and gather additional borrower information before approving loans for lower grades (G to A).

3. Geographical Limitations for Increased Profitability:

- To optimize profitability, Lending Club should consider limiting the number of loans issued to borrowers from high-risk states like California, Florida, and New York.

4. Strategic Adjustment for Small Business Loans:

- Considering their higher default rates, Lending Club should evaluate reducing or halting the issuance of loans to small businesses.

5. Managing Loans for Mortgage Homeowners:

- Borrowers with mortgage homeownership who request loans exceeding $12,000 have shown higher default rates. Lending Club should consider stricter approval criteria or potentially halt loans in this category.

6. Screening for Public Derogatory Records:

- Applicants with a higher number of public derogatory records are more likely to declare bankruptcy. Lending Club should implement thorough checks to ensure borrowers have no such records before loan approval.