Lending Club Case Study

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*A consumer finance company that provides a variety of loans to urban customers faces two significant risks when approving loan applications: "business loss" (from rejecting loans that could have been repaid) and "credit loss" (from approving loans that default). The company's challenge is to balance these risks while making lending decisions. The aim of this analysis is to reduce "credit loss", which occurs when a borrower defaults, leading to a financial loss for the company. The primary goal of this case study is to identify the key factors driving loan defaults using *Exploratory Data Analysis (EDA). By understanding these driving factors, the company can build a risk assessment strategy to identify and minimize the approval of loans to **risky applicants—those likely to "default". The analysis will focus on distinguishing between borrowers who have "fully repaid" their loans, those whose loans are still *current, and the "charged-off" borrowers (defaulters). By identifying the key indicators of default, the company can significantly reduce "credit loss" and improve its "loan approval" strategy, leading to better portfolio management and risk mitigation.*

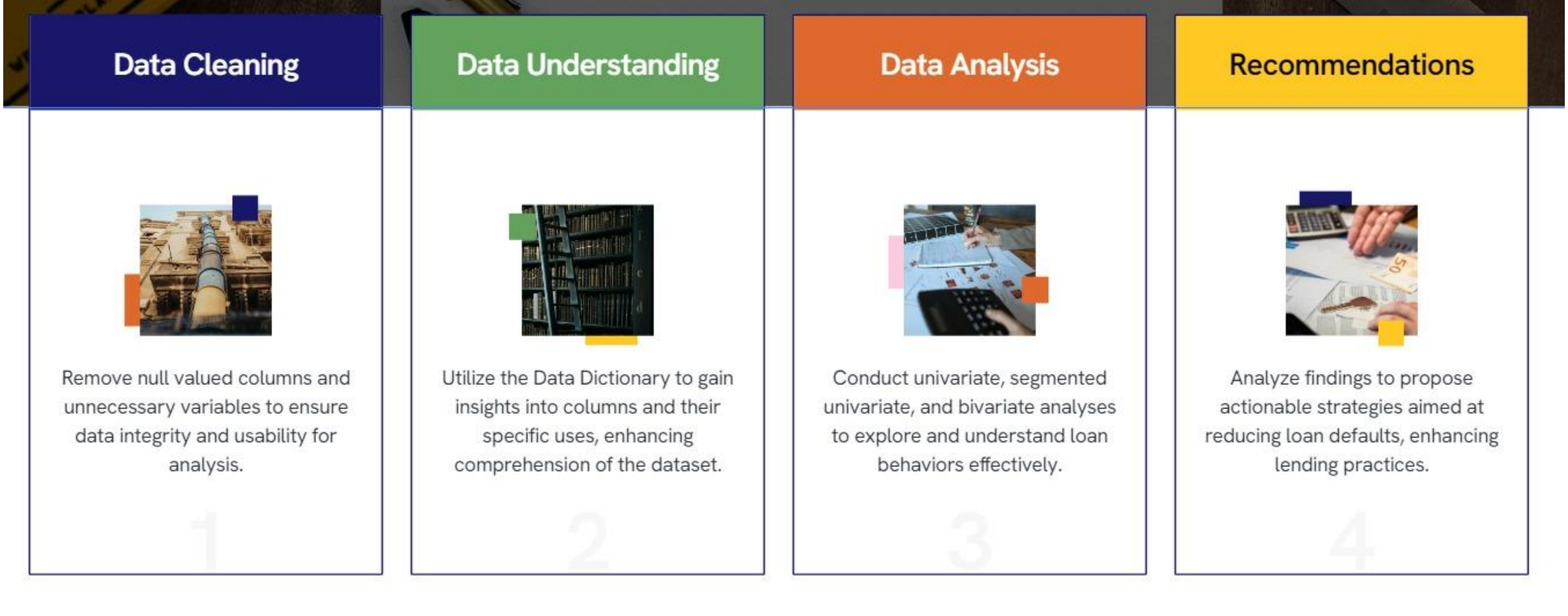
PROBLEM STATEMENT

Use EDA to discover variables that influence loan defaults.

Identify "high-risk applicants" and develop strategies to minimize "credit loss".

Ensure that future loan approvals strike a balance between maximizing business opportunities and minimizing financial risk due to defaults

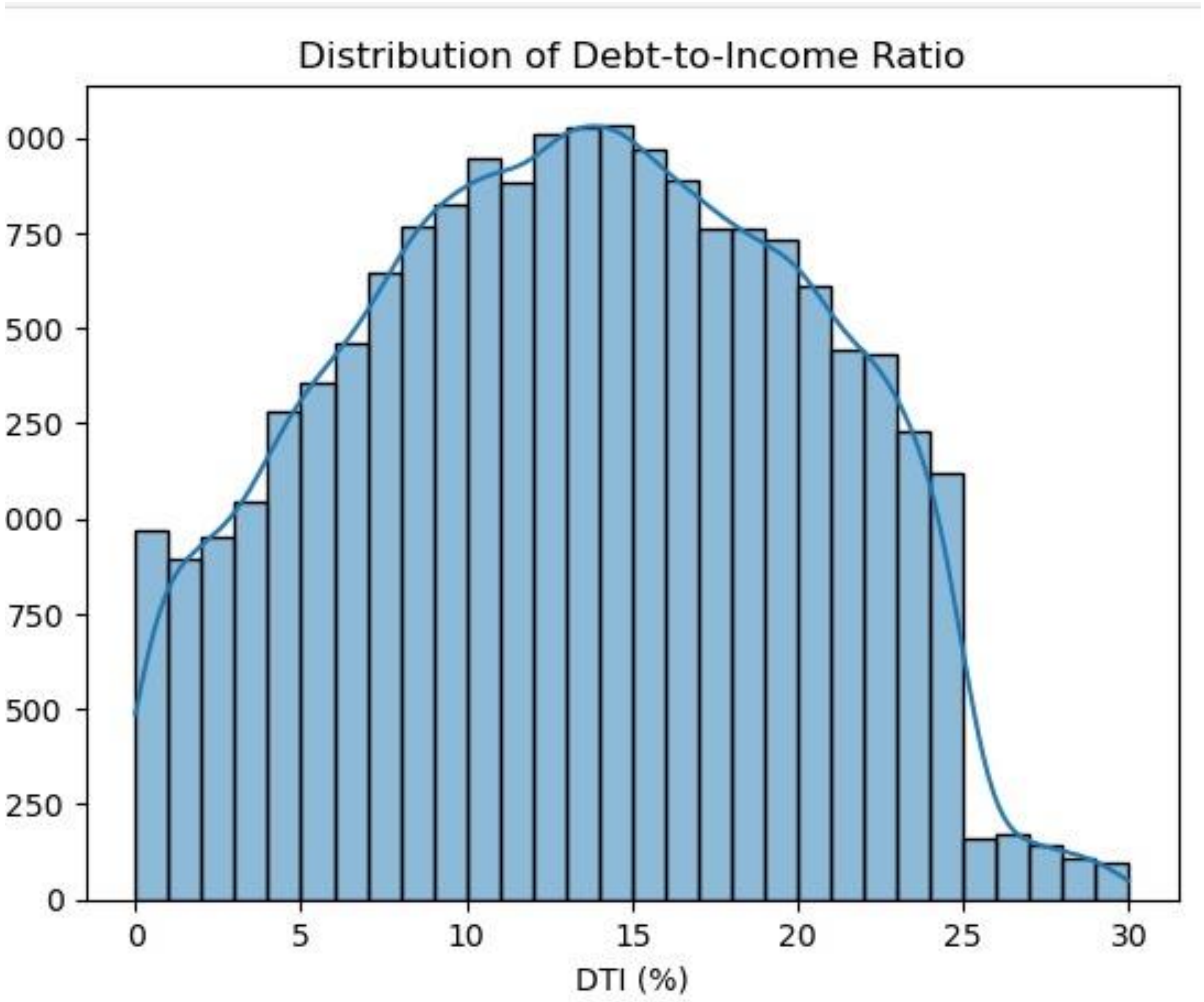
OBJECTIVES



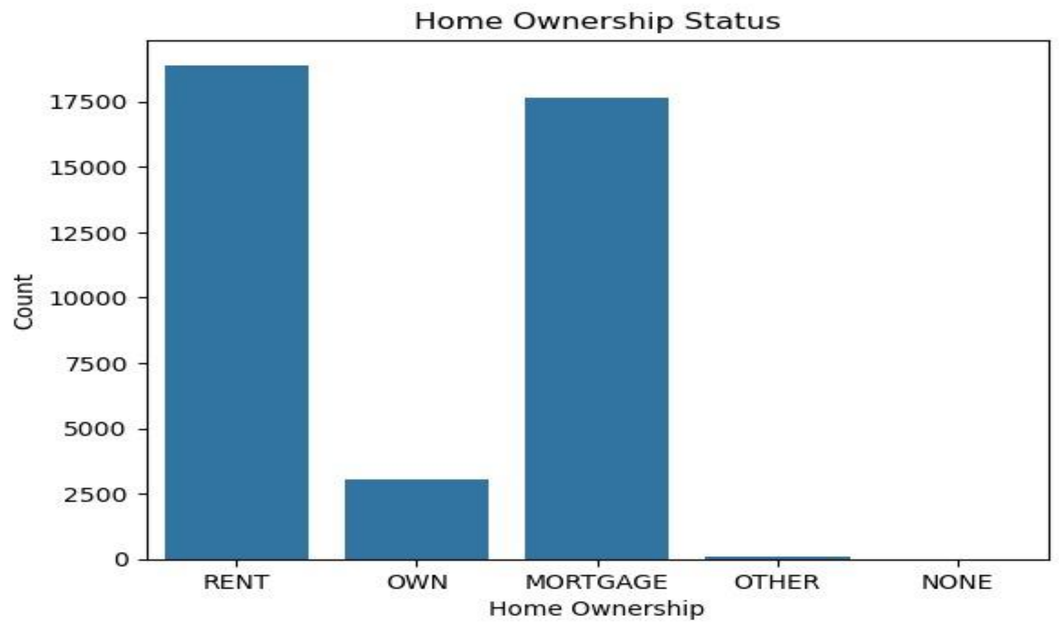
Problem Solving Methodology

Analysis

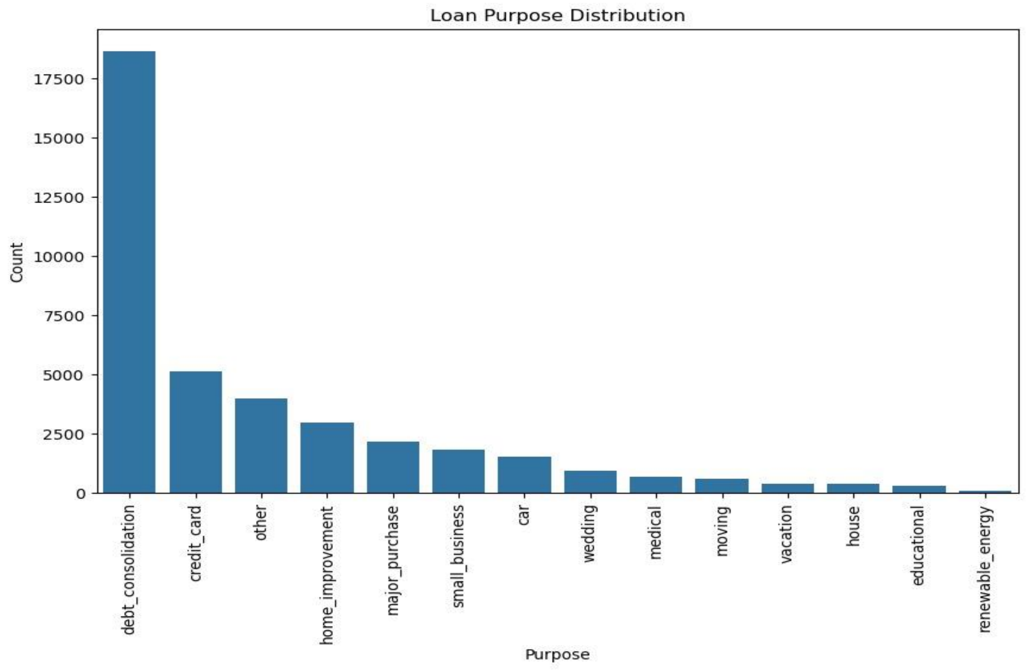
The distribution of debt-to-income ratios suggests that the majority of borrowers have manageable debt levels, with a smaller proportion having higher debt burdens



The distribution of home ownership status suggests that a majority of the borrowers are renters, followed by homeowners and mortgage holders. The categories "OTHER" and "NONE" are relatively infrequent.

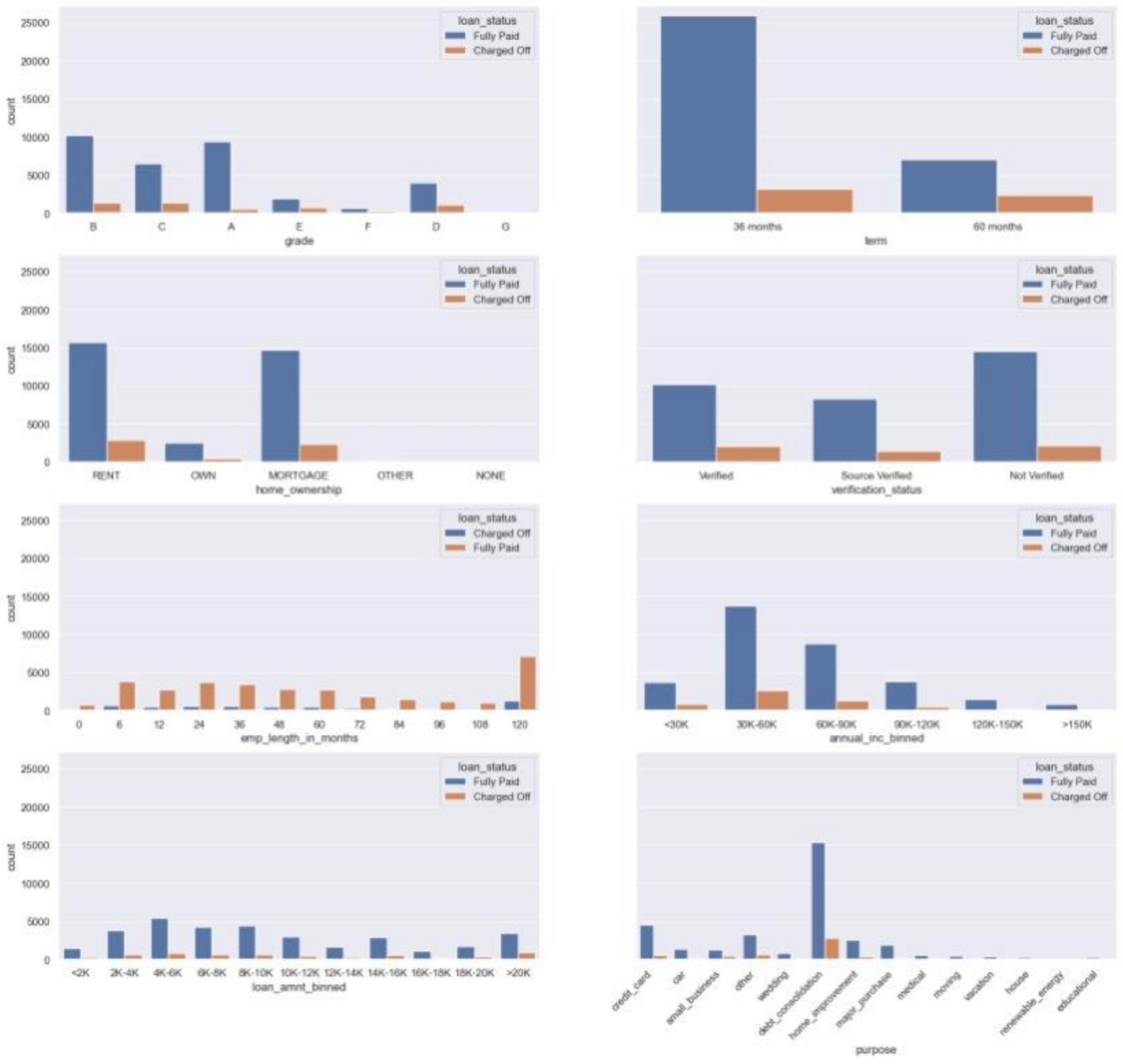


The distribution of loan purposes suggests that debt consolidation is the most common reason for borrowers to take out loans. Other popular purposes include credit card debt and home improvements. A variety of other purposes are also represented, indicating the diverse needs of borrowers.



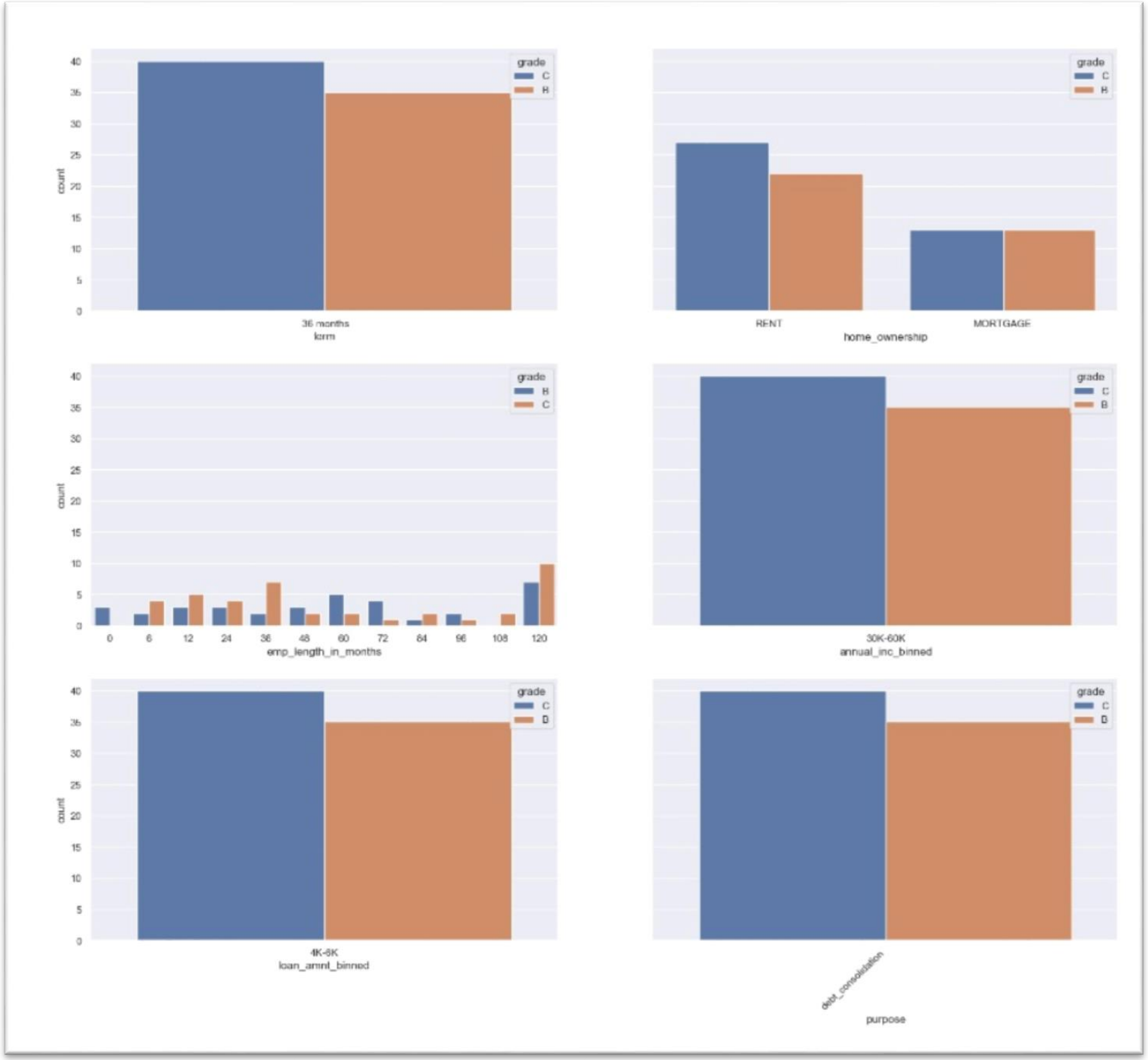
Loan Status Performance Across Categorical Variable

- Grade: Grades B, C, D have a higher proportion of Charged Off loans compared to grades A, E, F and G. This suggests that loans with lower grades are more likely to default.
- Term: 36-month loans have a slightly higher proportion of Charged Off loans compared to 60-month loans.
- Home Ownership: Borrowers with a home ownership status of RENT and MORTGAGE have a slightly higher proportion of Charged Off loans compared to those with OWN or OTHER.
- Verification Status: No clear patterns observed.
- Employee Length: Borrowers with 10+ year of employment have a slightly higher proportion of Charged Off loans. But <1 , 2, 3 and 4 also shows some irregularities.
- Annual Income: The proportion of Charged Off loans decreases as annual income increases. This indicates that borrowers with higher incomes are less likely to default. Borrowers with 30-60K annual income are more likely to default.
- Purpose: Debt consolidation loans appear to have the most defaults (charged off). Categories like credit card , small business, other and home improvement show higher risks.



Analysis of Grade Across Categorical Variables

- B and C grades shows high relation with every other categories



Analysis Of Term Across Categorical Variables

Term and Grade:

- Loans with a 36-month term are more frequent across all grades compared to 60-month terms.
- Grade C loans are more prevalent for 60-month terms.

Term and Homeownership:

- 60-month terms are more common among renters.
- 36-month terms are more evenly distributed across homeownership statuses.

Term and Employment Length:

- Borrowers with shorter employment lengths are more likely to opt for 36-month terms.
- Longer terms are associated with more stable employment histories.

Term and Annual Income:

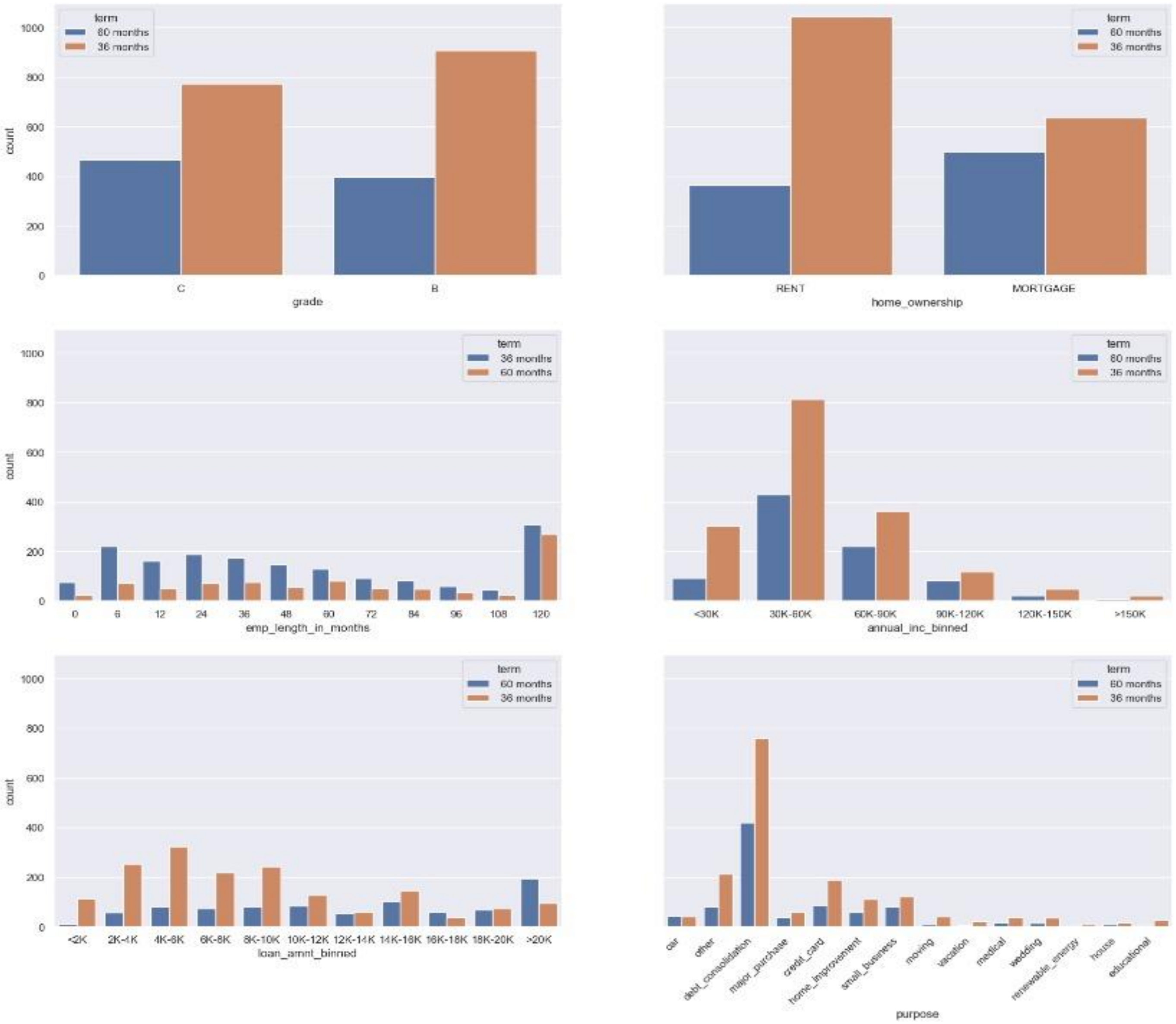
- Lower-income borrowers tend to choose 60-month terms.
- Higher-income borrowers have a more balanced distribution of term lengths

Term and Loan Amount:

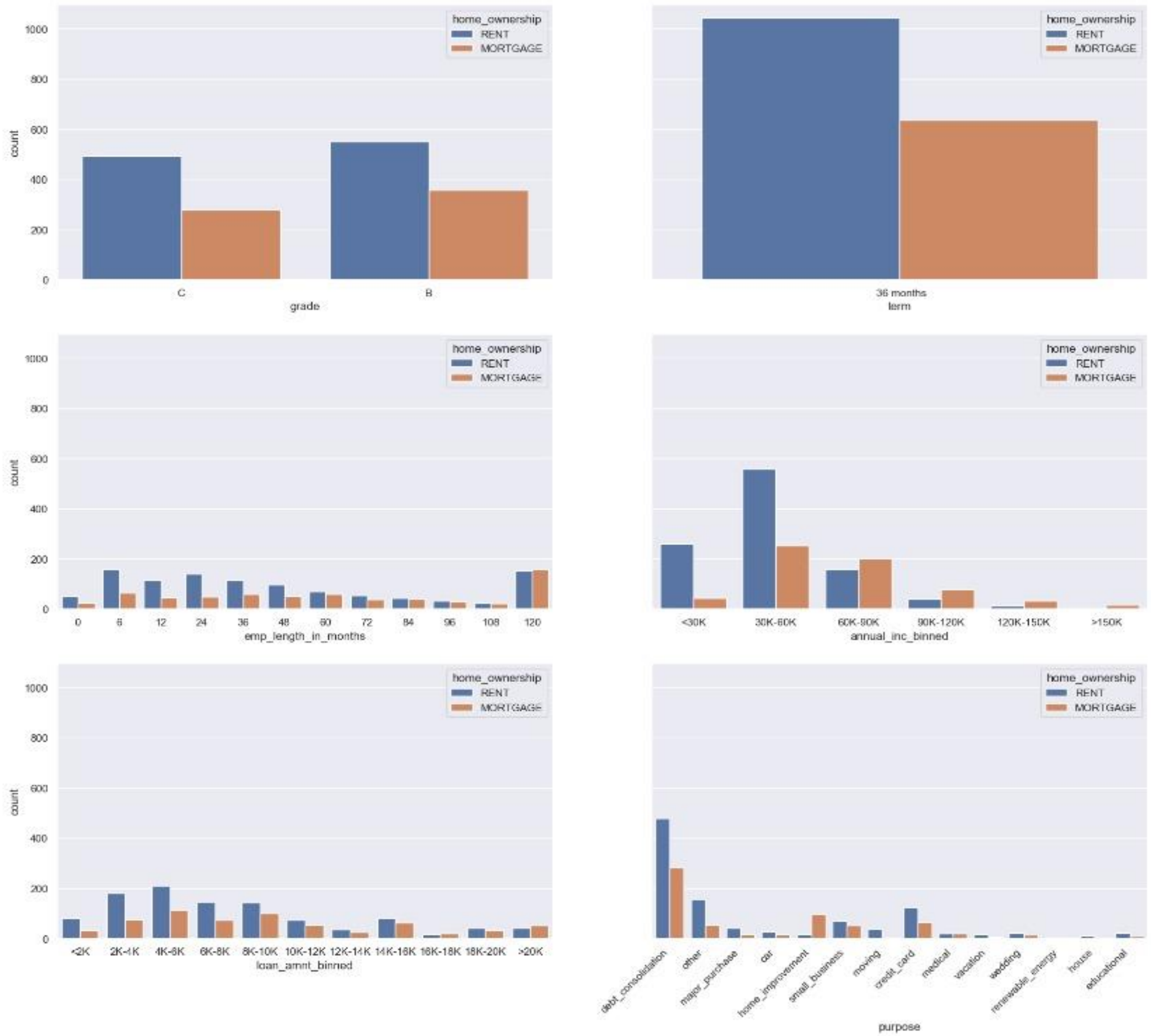
- Smaller loan amounts are more frequent with 36-month terms.
- Larger loan amounts are more associated with 60-month terms.

Term and Purpose:

- Debt consolidation and credit card loans are more common with 36-month terms.
- Other purposes, like house and wedding, are more evenly distributed across terms.



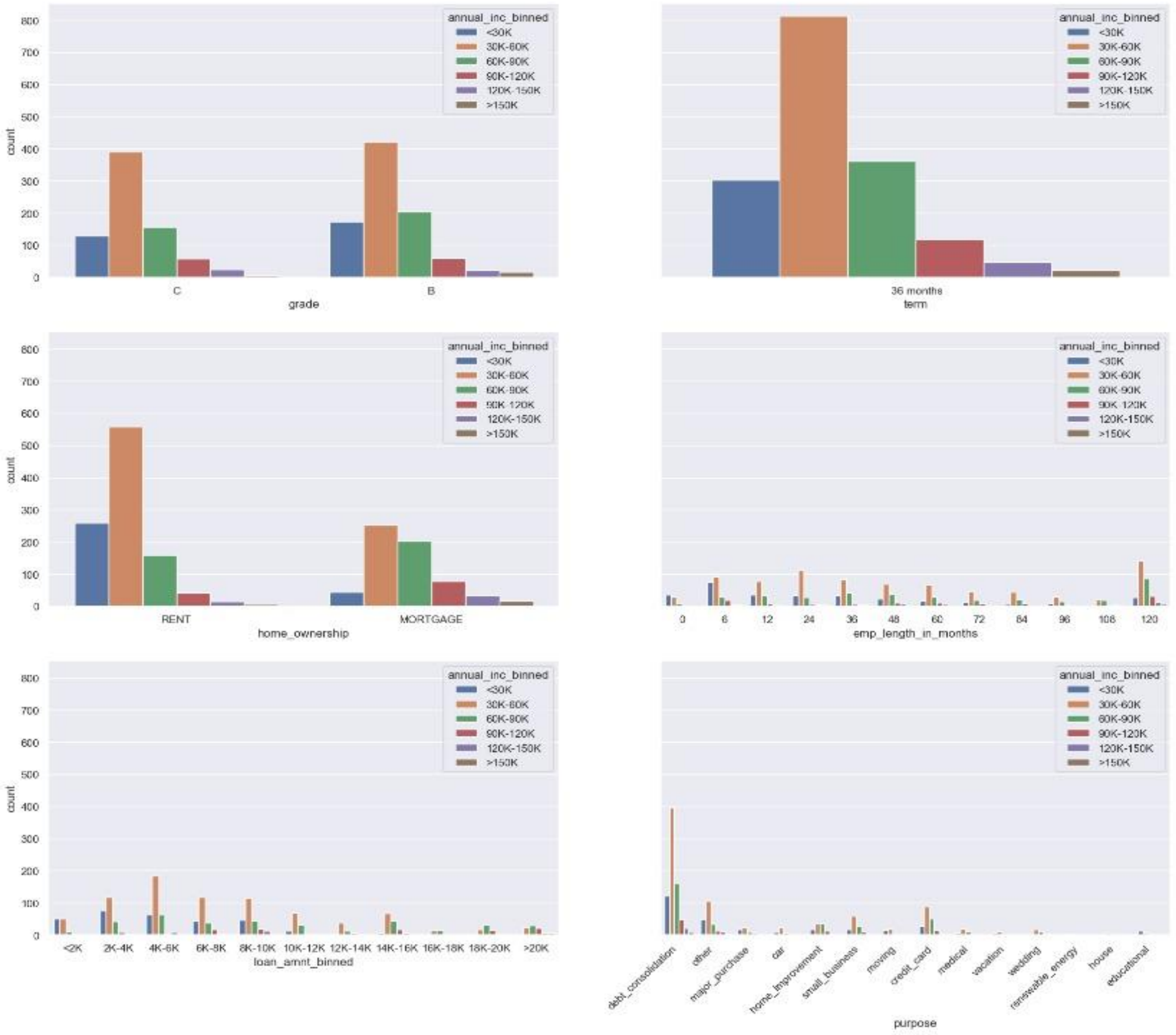
Analysis of Home Ownership Across Categorical Variables



RENT shows strong relation with every other categories except for employment length

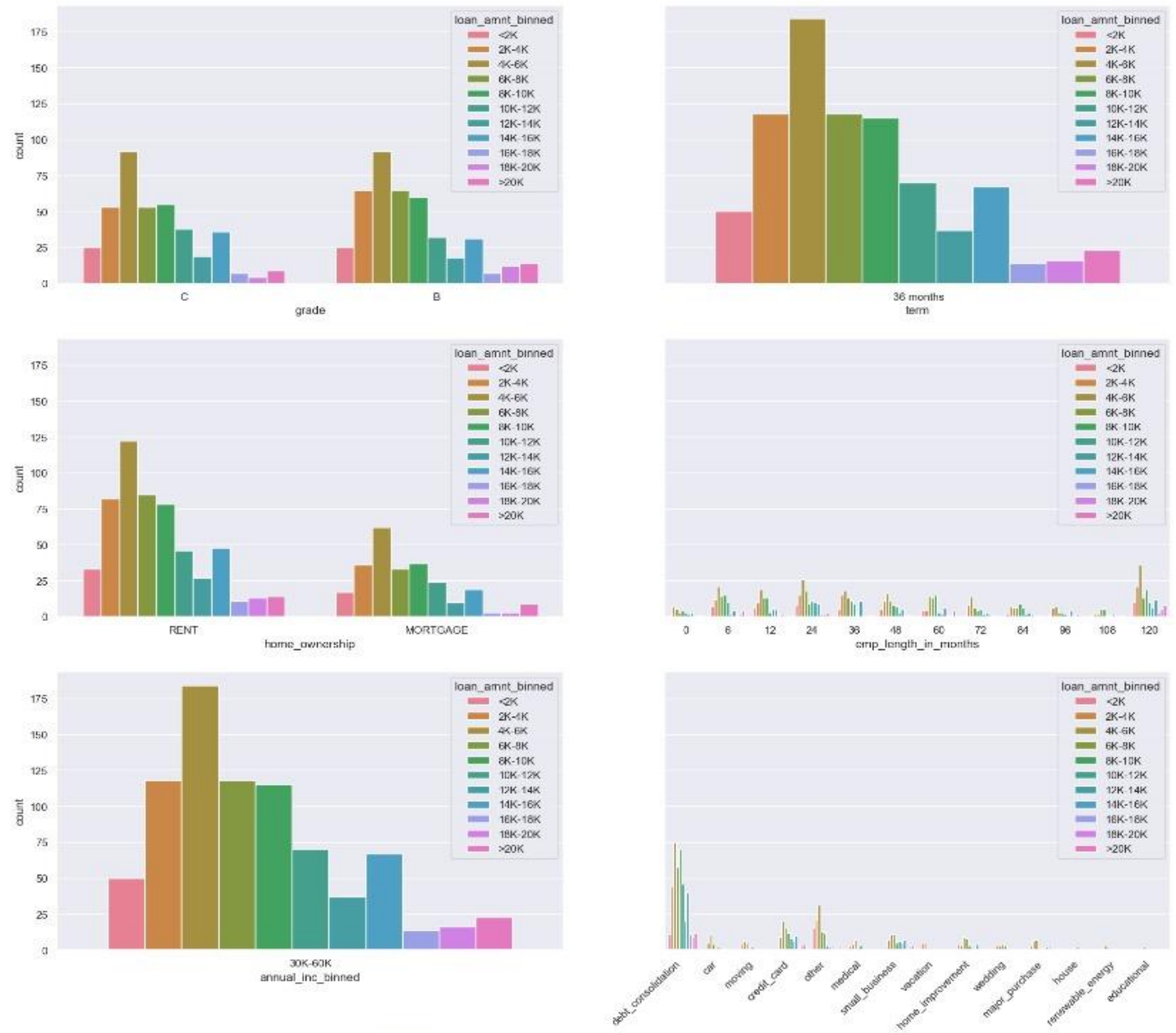
Analysis of Annual Income Across Categorical Variables

Annual income of 30K-60K shows strong relation with every other categories.



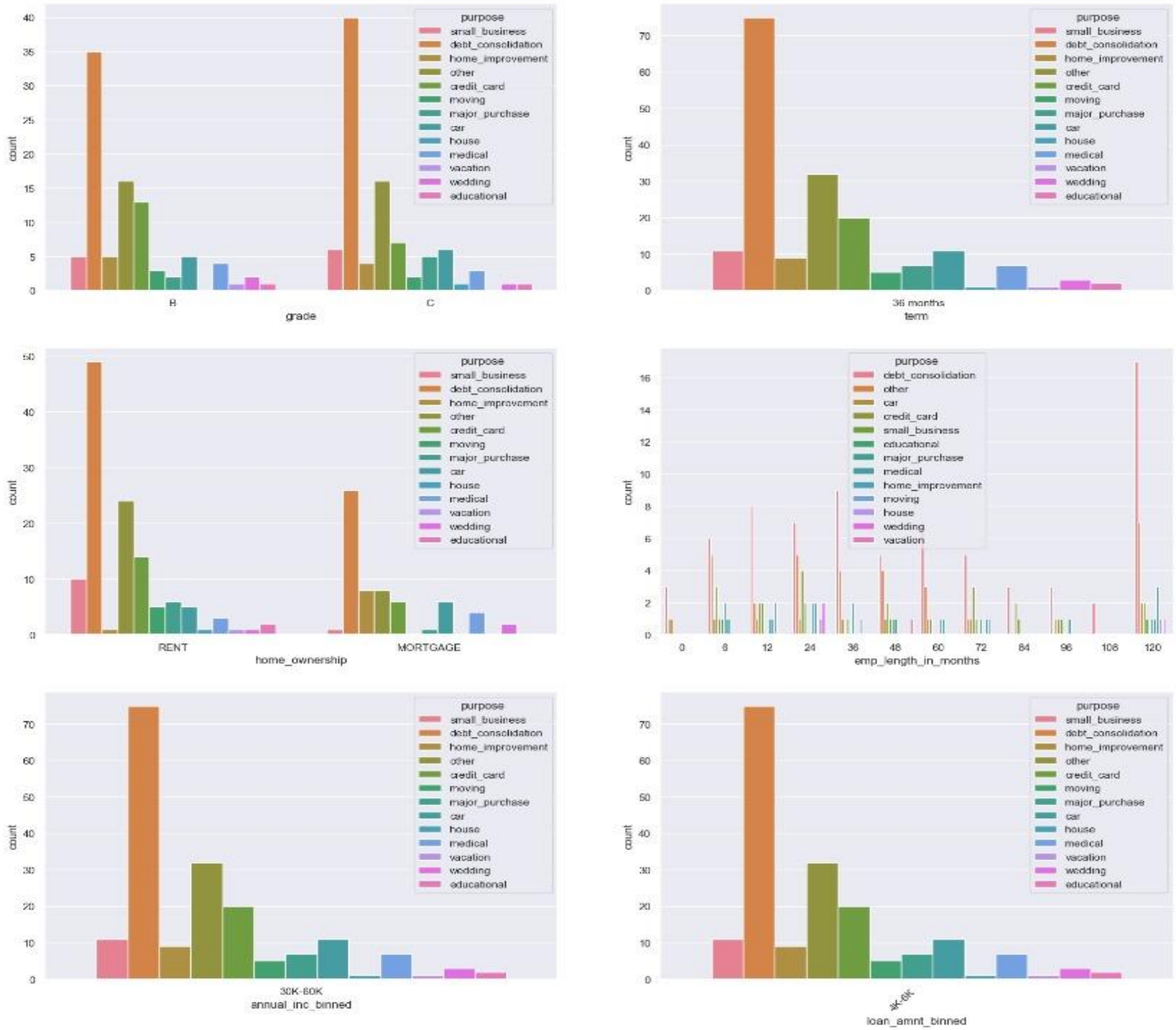
Analysis of Loan Amount Across Categorical Variables

Loan amount of 4K-6K shows strong relation with every other categories



Analysis of Purpose Across Categorical Variables

Debt consolidation shows strong relation with every other categories



- Primary factors that can be leveraged to forecast the probability of loan default and reduce credit loss.

  - Loan Grade: Borrowers with a loan grade of B or C exhibit a higher likelihood of default.

  - Loan Term: 36-month loans show a marginally higher proportion of defaults compared to 60-month loans.

  - Home Ownership: Renters are more prone to default than homeowners, making "RENT" a critical indicator.

  - Employment Length: Borrowers with over 10 years of employment tend to have a slightly higher risk of default than those with shorter employment histories.

  - Annual Income: Borrowers with an annual income between 30,000 and 60,000 are more likely to default. Additionally, the analysis indicates that the probability of default decreases as income rises, with lower-income groups showing a higher risk.

  - Loan Amount: Borrowers requesting loan amounts in the range of 4,000 to 6,000, particularly for debt consolidation, are more likely to default.

  - Loan Purpose: Debt consolidation loans and credit card refinancing have higher default rates. Other categories such as small business loans, general loans ("other"), and home improvement loans also present elevated risks.

  - Inquiries in the Last 6 Months: Borrowers with a higher number of credit inquiries within the past six months are more likely to default, indicating a relationship between recent credit activity and default risk.

CONCLUSION