Lending Club Case Study

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Introduction

In the lending industry, effectively managing loan risk is essential to reducing potential financial losses. This analysis focuses on how data can help mitigate the risk of loan defaults by identifying key patterns and risk factors.

Business Problem

The company is a leading online loan marketplace offering a range of loans, including personal, business, and medical financing.

The risk lies in approving loans for high-risk applicants, which can lead to financial losses when they default. The challenge is to minimize these losses by identifying risky borrowers while still approving loans for qualified applicants.

Objective

The main objective is to reduce credit losses by using Exploratory Data Analysis (EDA) to uncover factors that contribute to loan defaults.

By analyzing historical data, we aim to identify patterns that can predict the likelihood of default and enable smarter lending decisions.

Key Risks

The company must balance two risks:

- Rejecting Low-Risk Applicants: Misclassifying good borrowers as defaulters can result in lost business opportunities.
- Approving High-Risk Applicants: Granting loans to borrowers who are likely to default can lead to significant financial losses.

Data and Analysis Approach

The dataset contains historical loan data, with each row representing an individual loan and applicant.

The goal is to analyze this data to identify trends that help reduce loan defaults while ensuring viable applicants are approved.

Analysis Process

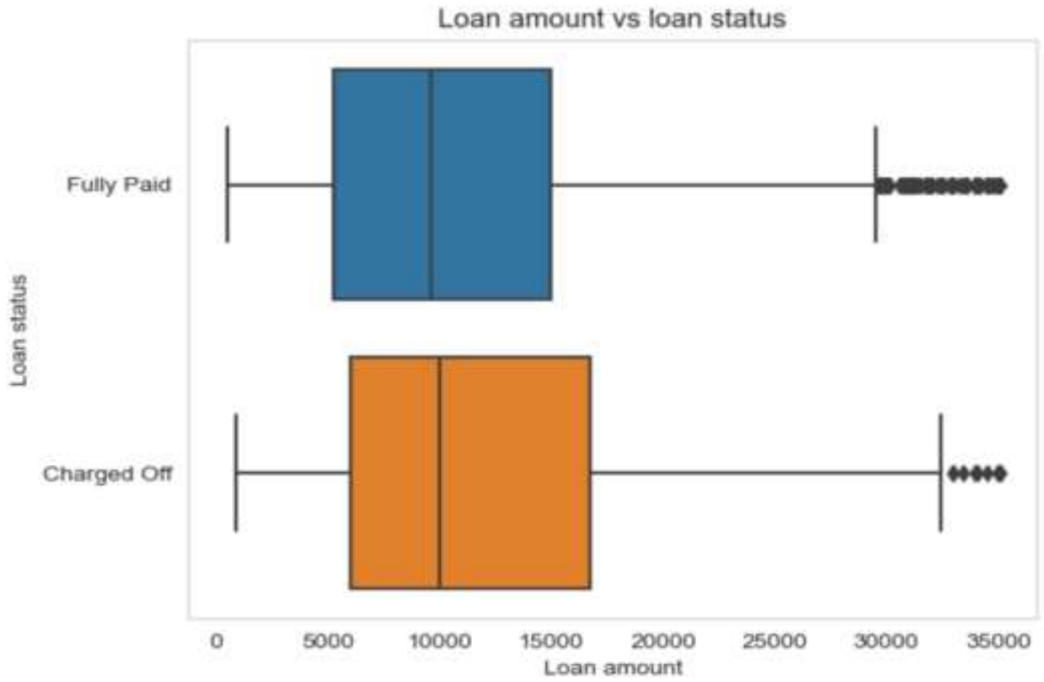
1. Data Exploration : Familiarize with the dataset, its structure, and key variables.

2. Data Preprocessing : Clean and transform the data to prepare it for analysis, including handling missing values, outliers, and inconsistencies.

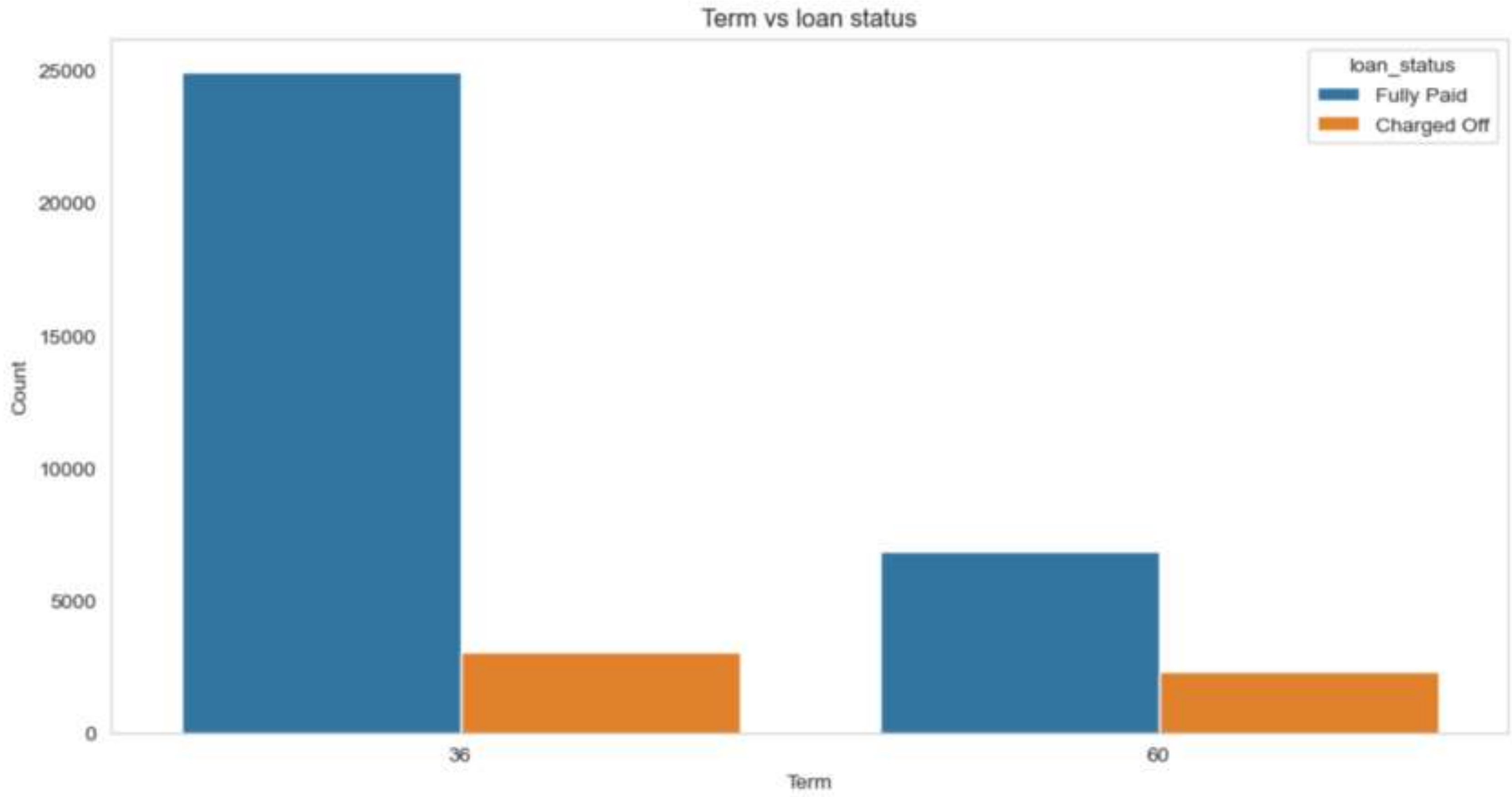
3. Data Visualization and Insights : Use charts and graphs to explore relationships between variables and uncover patterns or trends related to loan defaults.

4. Findings and Recommendations : Summarize key insights and provide actionable recommendations based on the analysis.

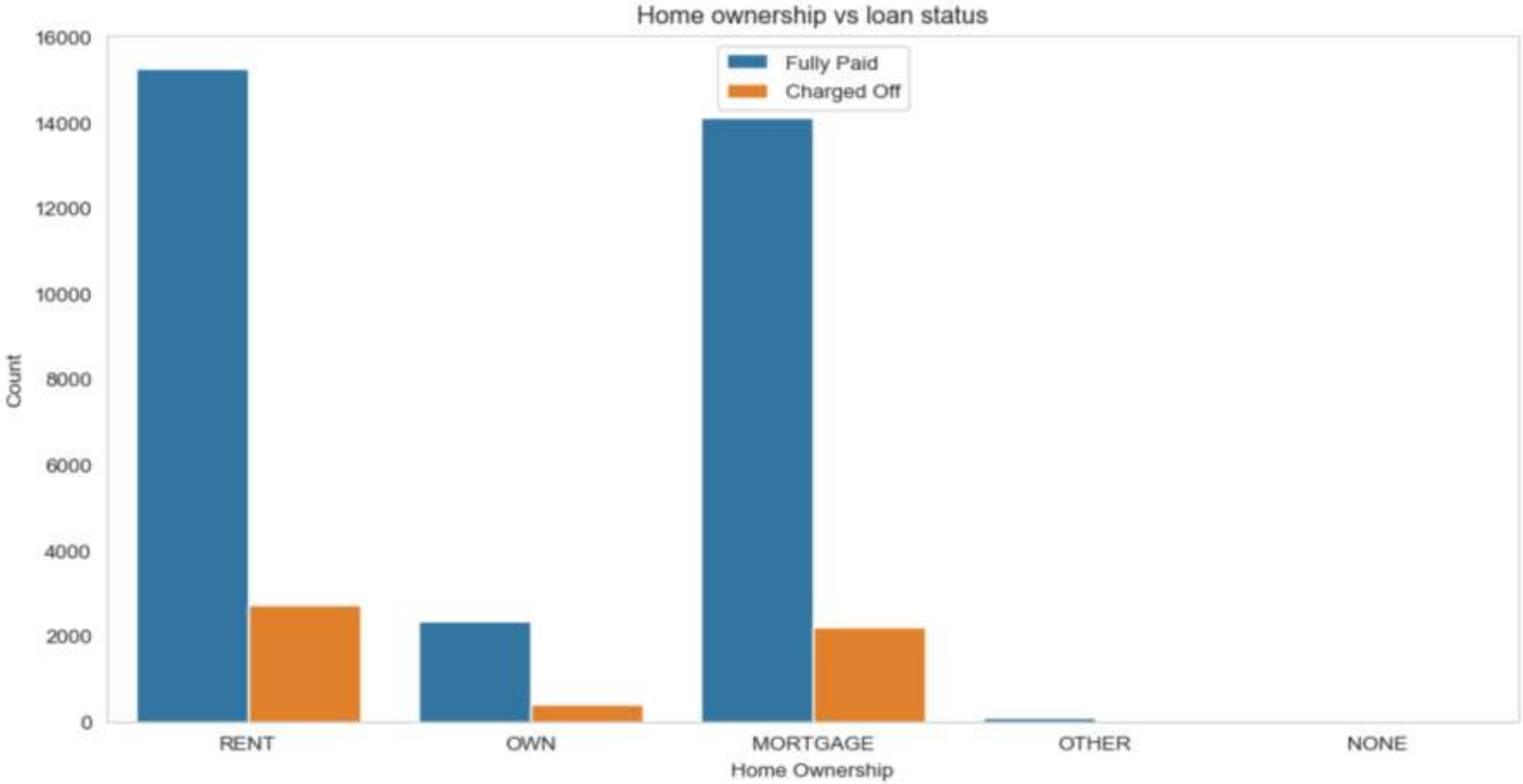
Visualization and insights of loan status



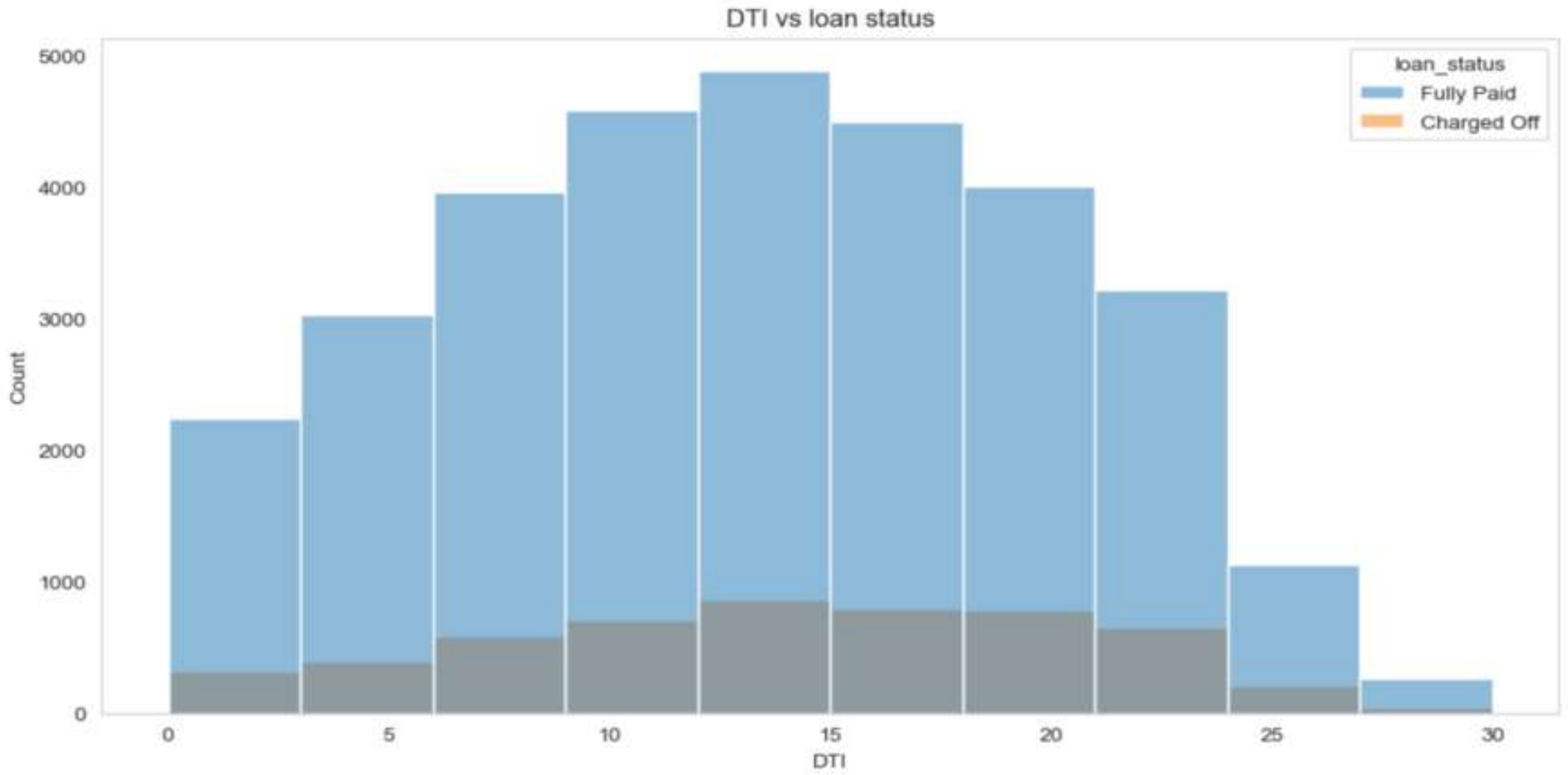
Inference : The 50th and 25th percentile are identical for both categories; however, the 75th percentile is significantly higher for defaulted loans. This suggests that larger loan amounts are more likely to result in defaults.



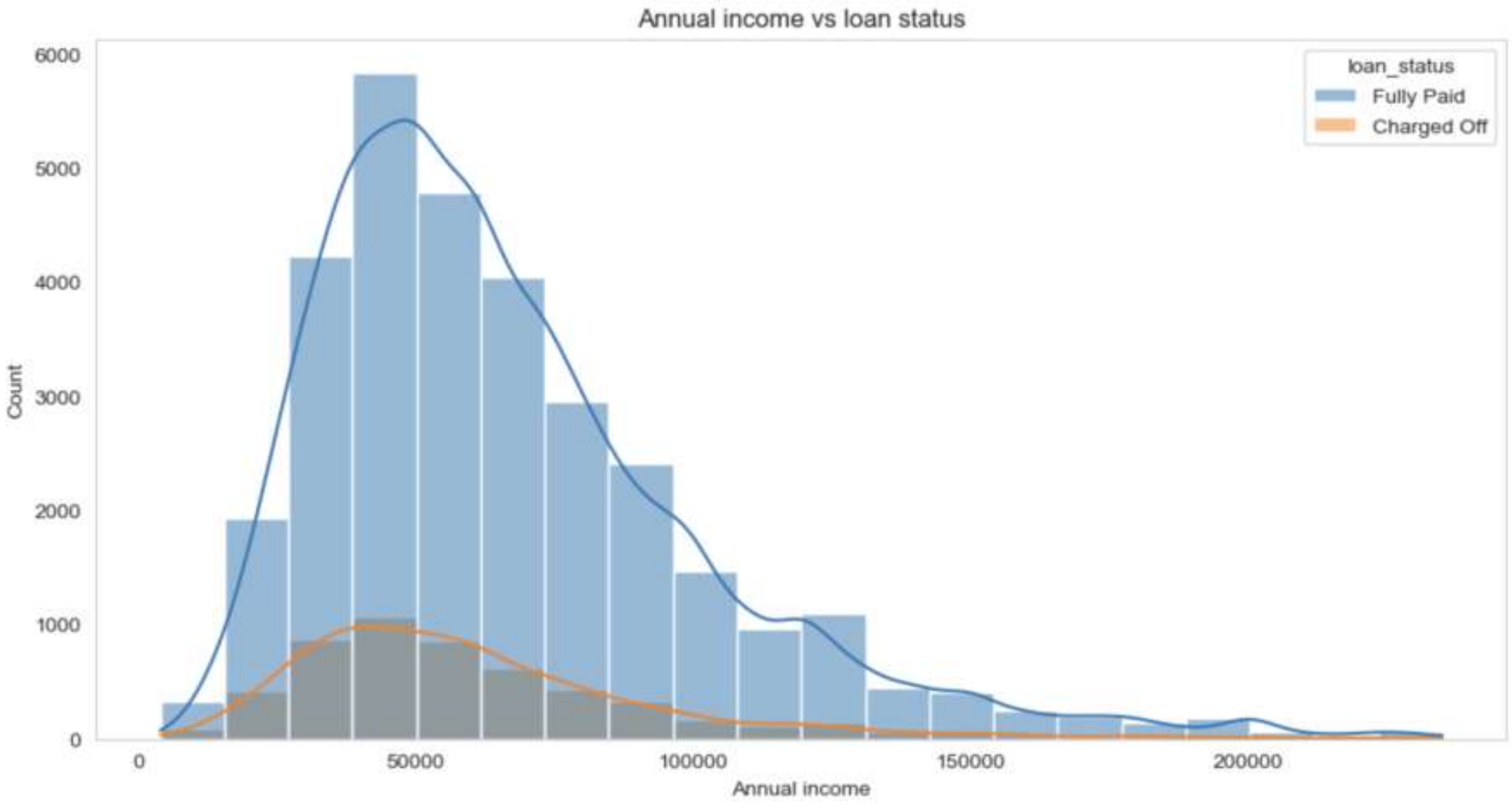
Inference : Loans with a 60-month term have a higher likelihood of defaulting compared to those with a 36-month term, whereas the 36-month term loans have a greater probability of being fully paid.



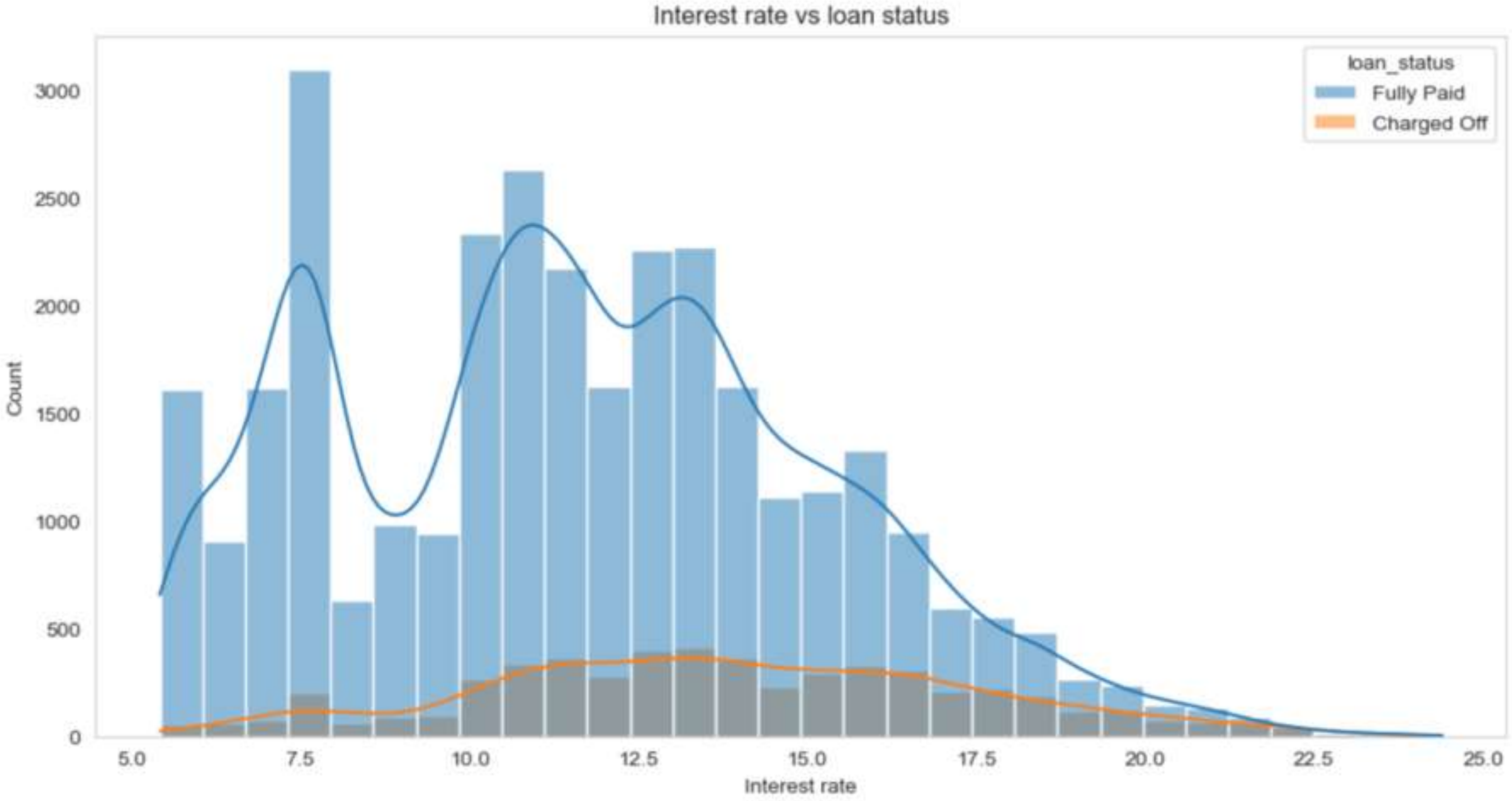
Inference : Borrowers who own their property have a lower rate of defaulted loans compared to those who are on a mortgage or renting.



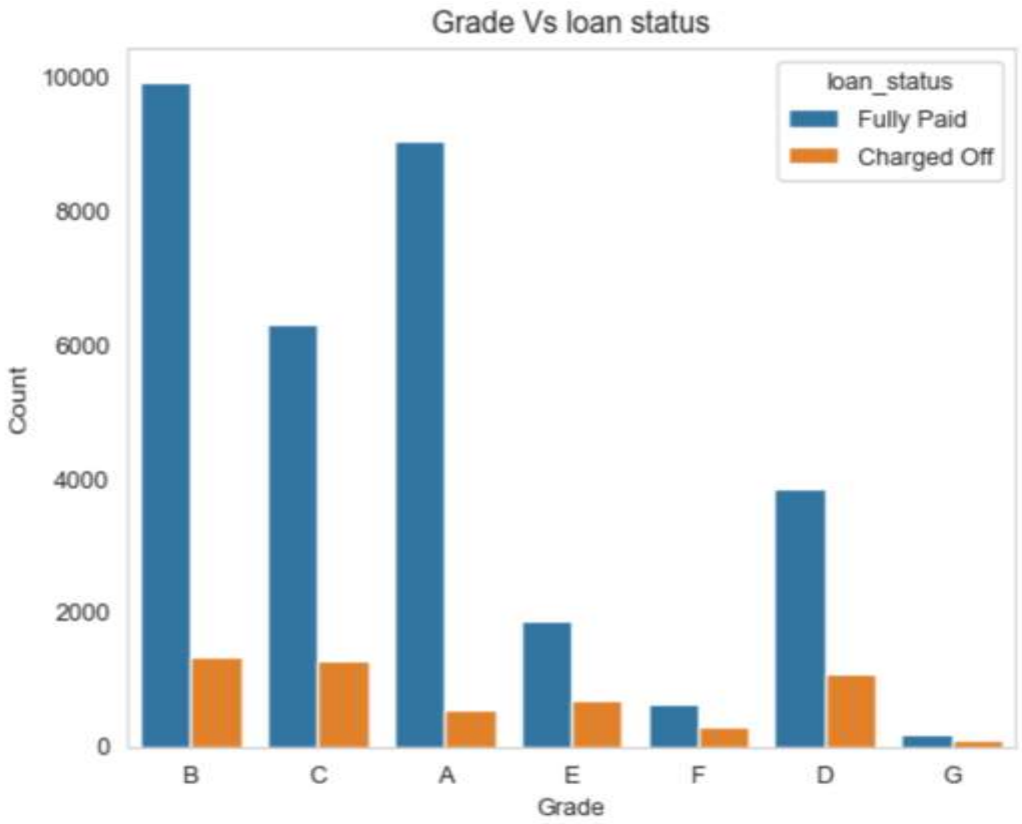
Inference : The loan status varies with the DTI ratio. Loans with a DTI ratio of 10-15 show a higher number of defaults, but as the DTI ratio increases further, the likelihood of defaulting becomes even greater.



Inference : Borrowers with an annual income of less than 50,000 are more likely to default, while those with higher annual incomes are less likely to default.



Inference : The amount of defaulted loans tends to rise as the interest rate increases, but a decline is observed after the interest rate surpasses 17%.



Inference : The ratio of 'charged off' loans to 'fully paid' loans is much lower in case of high quality grades like 'A','B','C'. The chances of default increases with low quality grades like 'E', 'F', 'G'

Findings

- The relationship between loan status and DTI ratio indicates that loans within the 10-15 DTI range have a higher incidence of defaults.

- Borrowers who own their homes exhibit a lower rate of default.

- Borrowers with annual incomes below 50,000 are more prone to default.

- The amount of defaulted loans tends to rise with interest rates, showing a decline after reaching an interest rate of 17%.

- Most borrowers lack a history of public recorded bankruptcies, making them safer candidates for loan approvals.

- The loan grade acts as a risk indicator, suggesting that interest rates escalate with increasing risk levels.

Recommendations

Key Predictive Factors for Default Risk:

- DTI Ratio
- Verification Status
- Loan Grades
- Annual Income
- Public Record Bankruptcies

Additional Considerations for Default Risks

- Borrowers exhibiting a very high Debt-to-Income ratio.

- Borrowers with recorded histories of bankruptcy.

- Borrowers with lower grades, such as E, F, and G, which indicate higher risk levels.

- Borrowers with annual incomes between 50,000 and 100,000.

- Borrowers not residing in major urban centers such as California, New York, Texas, and Florida because major borrowers belongs to urban centers.

- Borrowers with over 10 years of work experience.

Thank You