Lending Club Case Study - Risk and Profitability Analysis

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INTRODUCTION

Problem statement: Lending Club aims to reduce loan defaults and maximize profitability by identifying high-risk and profitable customers.

Business Goal: Improve loan portfolio quality by analyzing historical loan data.

Objective: Use exploratory data analysis (EDA) to discover patterns in customer behavior.

Dataset Overview

Dataset:

- **Source:** Historical Lending Club loan dataset.
- **Key Features:** Loan amount, interest rate, loan grade, loan status, annual income, loan term, etc.

Initial Observations:

- The dataset contains missing values and mixed data types.
- Wide variation in loan amounts, interest rates, and customer profiles

Data Cleaning and Preparation

Steps in Data Cleaning:

- Handled missing values using imputation or removal.
- Removed irrelevant columns to streamline the analysis.
- Standardized formats and datatypes for consistency (e.g., loan terms, categorical data)

Impact:

- Ensured data quality and consistency for meaningful analysis.

Univariate Analysis

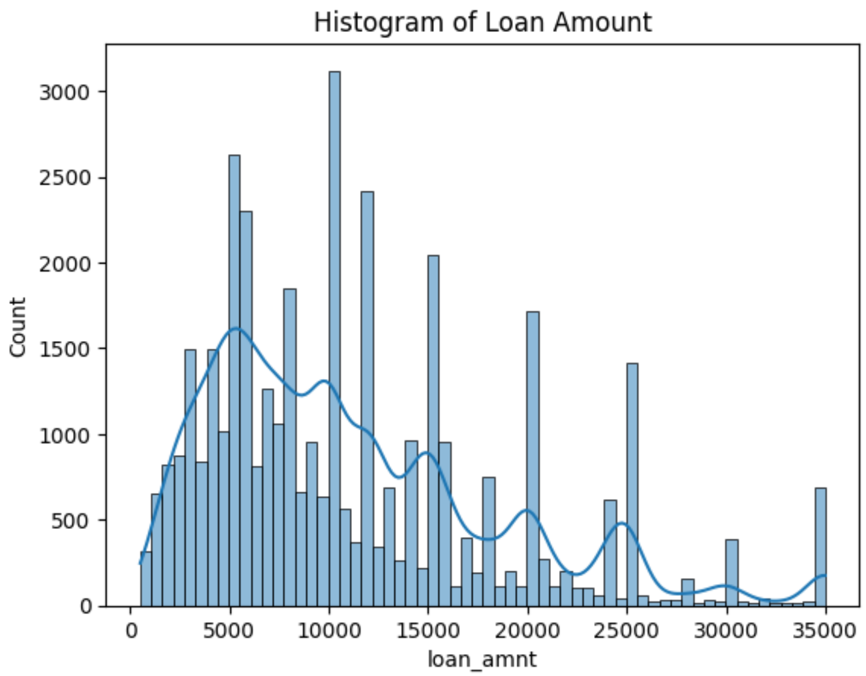
Key Insights:

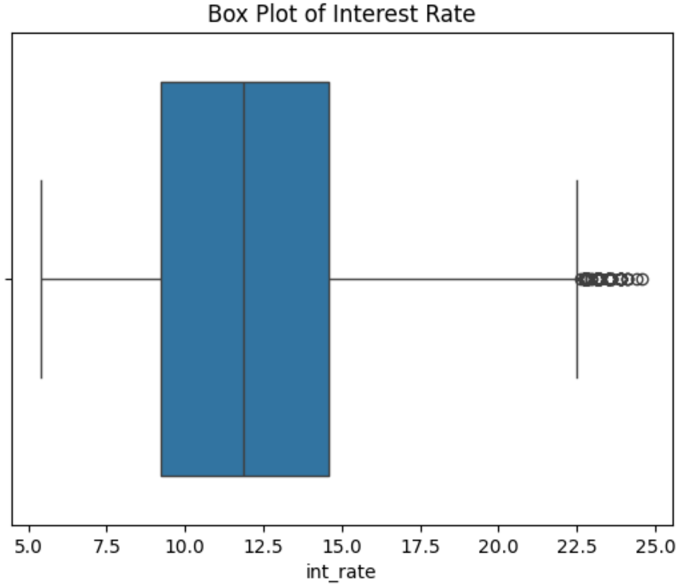
- **Loan Amount:** Most of the loans range between 10,000 and 15,000.
- The distribution is right skewed.
- The median is around 12%,the IQR is approximately in between 9%-15%

Business Insight:

- There are more loans with lower amounts and as loan amount increases the number of loans decreases.
- The box plot is slightly skewed to the right, longer tail on higher end of interest rates.

Visuals: Histogram of loan amounts and box plot of interest rate.

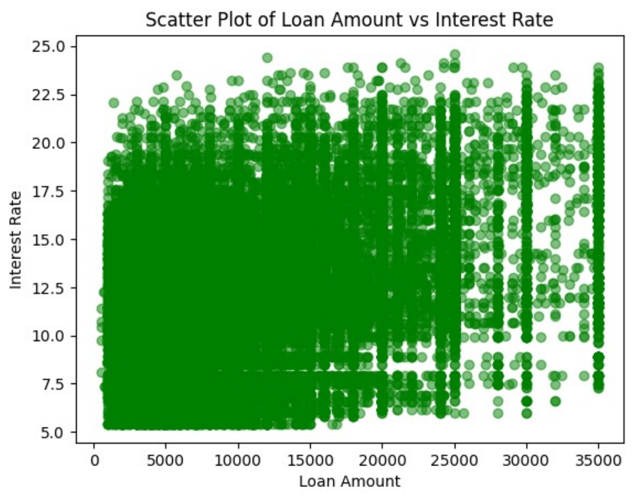


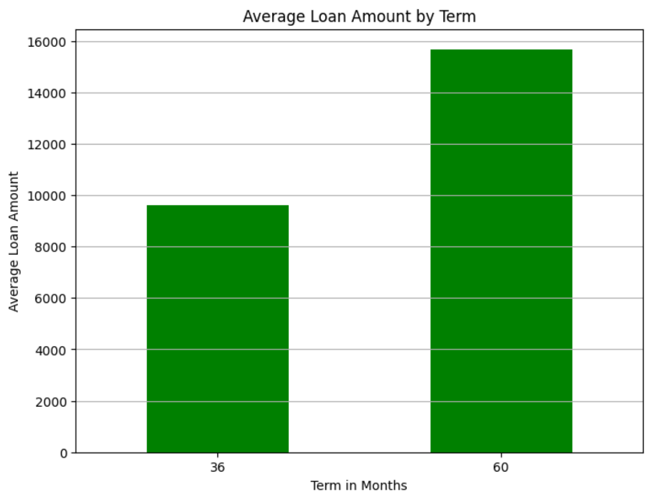


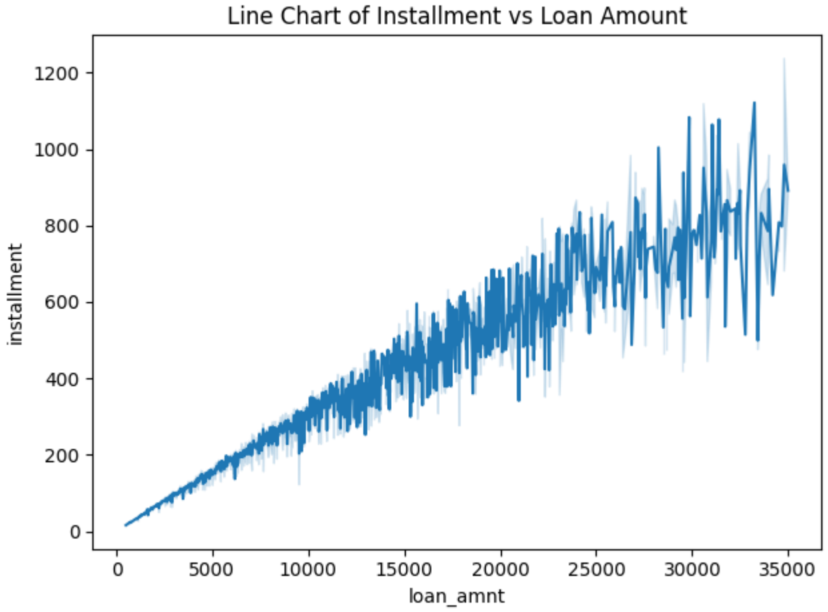
Bivariate Analysis

Key Relationships:

- The interests are spread across the range of 5%-25% ,but significant portion of loans have interests between 10% and 20%.
- For average loan amount of 8000 to 10000 the repayment term opted was 36 months
- For average loan amount of 14000 to 16000 the repayment term opted was 60 months.
- The line chart shows positive correlation between loan amount and installment.







Business Insight:

- Interest rate is not solely dependent on loan amount.
- The chart effectively shows that installment amounts increase with loan amounts in linear fashion way.

Visuals: Scatter plot of loan amount vs. interest rate, bar chart of average loan amount vs. term in months,
Line chart of installment vs loan amount.

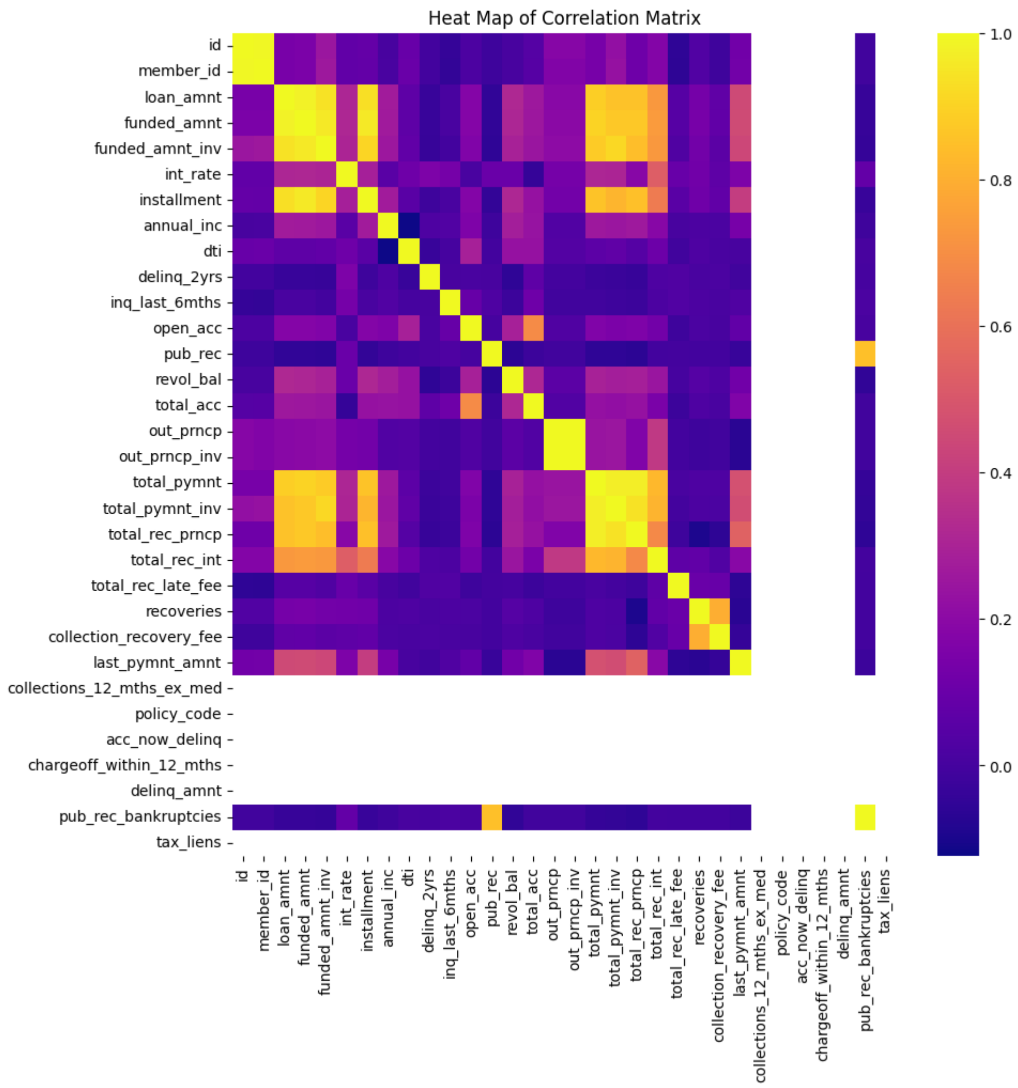
Multivariate Analysis

Insights from Correlations:

- Loan-related variables such as loan_amnt, total_pymnt, and funded_amnt show high correlation, indicating redundancy.
- This suggests they capture similar information on loan disbursement and repayment.

Business Insight:

- The high correlation between loan amount and repayment metrics indicates efficient loan disbursement and repayment tracking.
- Streamlining these processes can enhance risk assessment and improve operational decision-making.

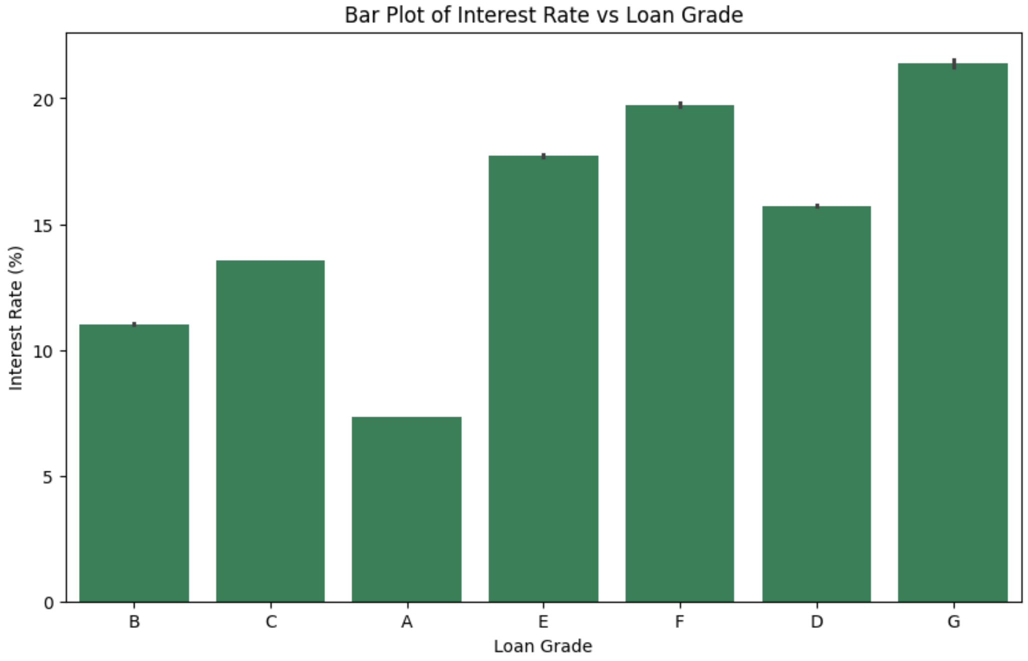


Visuals: Correlation heatmap of key variables.

Profitability Analysis

Most Profitable Customer Segments:

- Customers with moderate loan amounts, and shorter terms (36 months) offer better profit potential.
- Debt-to-income ratio is lower in profitable segments, meaning customers are less financially stretched.
- Analysis of customer segment based on loan grade shows grade G is highly profitable when compared to others.



Business Insight:

- Focus marketing and loan offers on profitable customer segments while applying caution to higher-risk profiles.

Visuals: Bar chart comparing profitability across customer segments.

Conclusion and Recommendations

Key Findings:

- **Risky Customers:** Larger loans, longer terms, higher DTI.
- **Profitable Customers:** Shorter terms, moderate loan amounts, lower DTI.

Recommendations:

- **Target Segmentation:** Focus lending efforts on lower-risk, more profitable customers.
- **Interest Rate Adjustment:** Increase rates for high-risk profiles to offset potential defaults.
- **Future Steps:** Use predictive modeling to automate risk and profitability predictions for new applicants.

Business Impact:

- Reducing default rates while maintaining a profitable loan portfolio.