

# Lending Club Case Study

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# Introduction

- The Lending Club case study explores how real business problems are addressed using Exploratory Data Analysis (EDA).
- This case study focuses on understanding risk analytics in the banking and financial services sector.
- By analyzing past loan applicant data, the aim is to minimize the risk of financial loss by identifying patterns that indicate whether a person is likely to default on a loan.
- This analysis helps in making informed decisions on loan approvals, thereby reducing potential credit losses.

# Business Understanding

- You work for a consumer finance company which specialises in lending various types of loans to urban customers. When the company receives a loan application, the company has to make a decision for loan approval based on the applicant's profile.
- Two types of risks are associated with the bank's decision:
  - If the applicant is likely to repay the loan, then not approving the loan results in a loss of business to the company.
  - If the applicant is not likely to repay the loan, i.e. he/she is likely to default, then approving the loan may lead to a financial loss for the company.
- The data given below contains information about past loan applicants and whether they 'defaulted' or not. The aim is to identify patterns which indicate if a person is likely to default, which may be used for taking actions such as denying the loan, reducing the amount of loan, lending (to risky applicants) at a higher interest rate, etc.
- In this case study, you will use EDA to understand how consumer attributes and loan attributes influence the tendency of default.

# Business Objectives

- This company is the largest online loan marketplace, facilitating personal loans, business loans, and financing of medical procedures. Borrowers can easily access lower interest rate loans through a fast online interface.
- Like most other lending companies, lending loans to 'risky' applicants is the largest source of financial loss (called credit loss). Credit loss is the amount of money lost by the lender when the borrower refuses to pay or runs away with the money owed. In other words, borrowers who default cause the largest amount of loss to the lenders. In this case, the customers labelled as 'charged-off' are the 'defaulters'.
- If one is able to identify these risky loan applicants, then such loans can be reduced thereby cutting down the amount of credit loss. Identification of such applicants using EDA is the aim of this case study.
- In other words, the company wants to understand the driving factors (or driver variables) behind loan default, i.e. the variables which are strong indicators of default. The company can utilise this knowledge for its portfolio and risk assessment.

# Loan Decision Scenarios

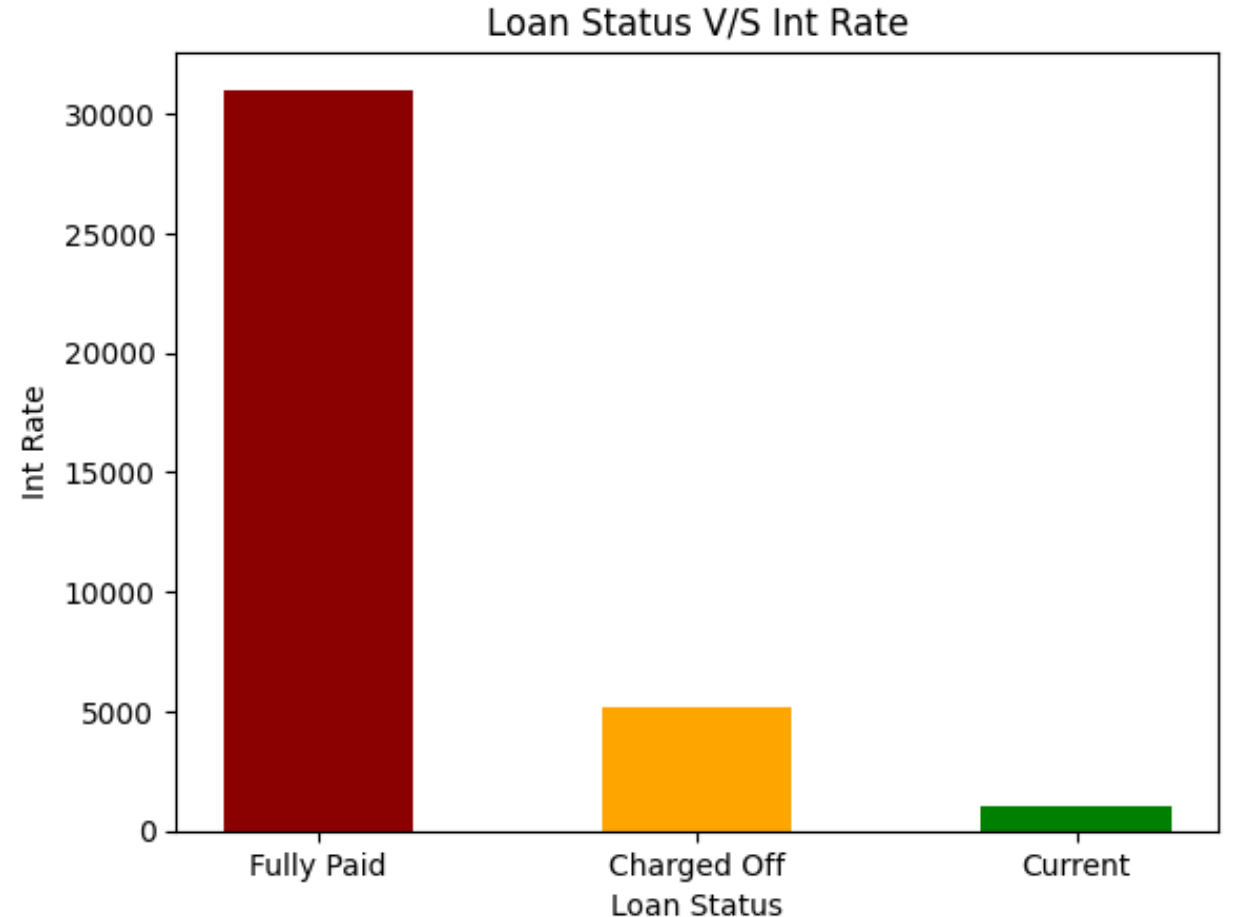
When a person applies for a loan, there are two types of decisions that could be taken by the company.

- 1. Loan accepted: If the company approves the loan, there are 3 possible scenarios described below:
  - Fully paid: Applicant has fully paid the loan (the principal and the interest rate).
  - Current: Applicant is in the process of paying the instalments, i.e. the tenure of the loan is not yet completed. These candidates are not labelled as 'defaulted'.
  - Charged-off: Applicant has not paid the instalments in due time for a long period of time, i.e. he/she has defaulted on the loan.
- 2. Loan rejected: The company had rejected the loan (because the candidate does not meet their requirements etc.). Since the loan was rejected, there is no transactional history of those applicants with the company and so this data is not available with the company.

# EDA Insights

## Interest Rate

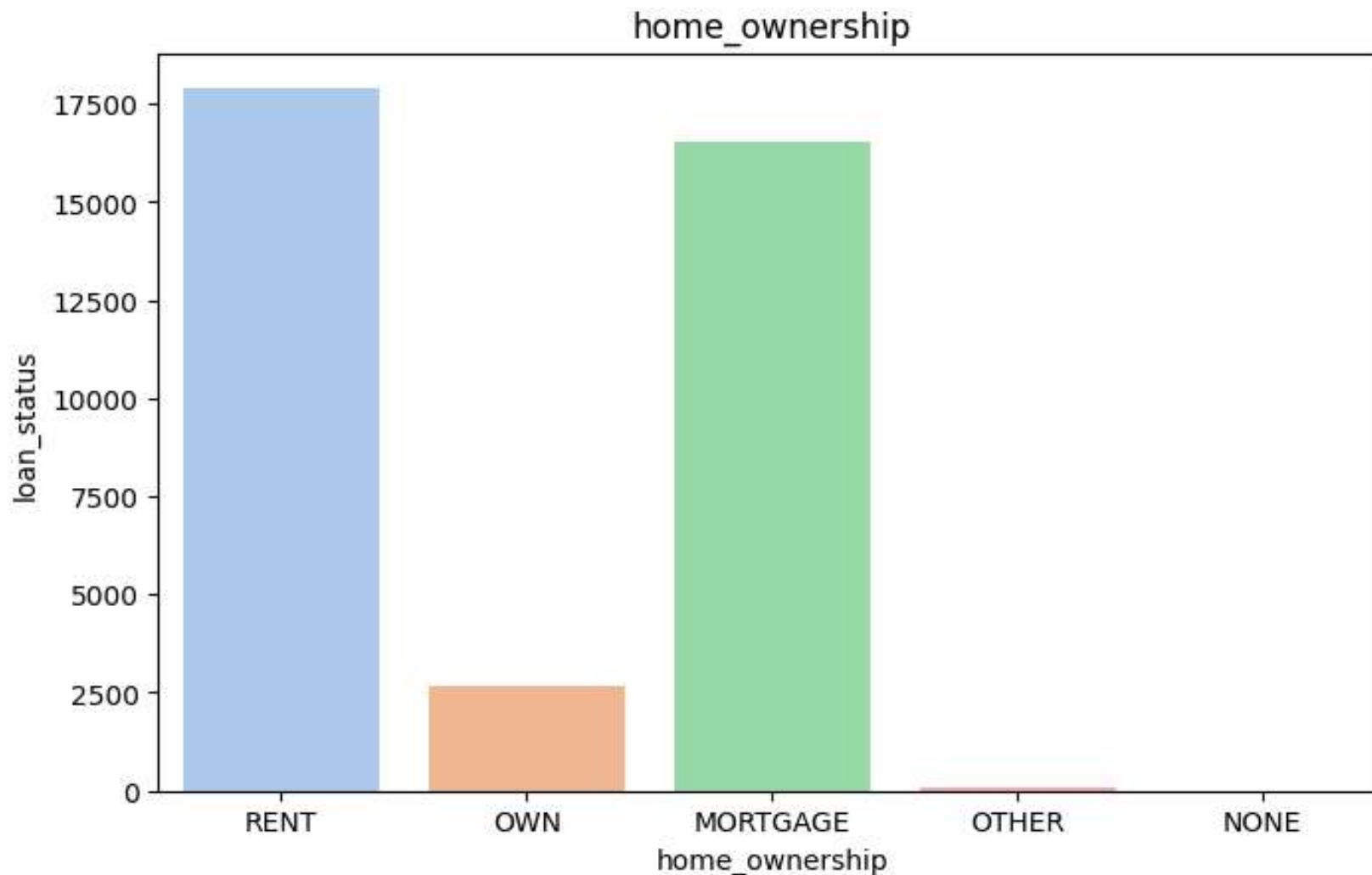
- The interest rate is a crucial variable influencing default rates.  
Applicants with higher interest rates are more likely to default, possibly due to higher monthly payment burdens.



## Home Ownership Status:

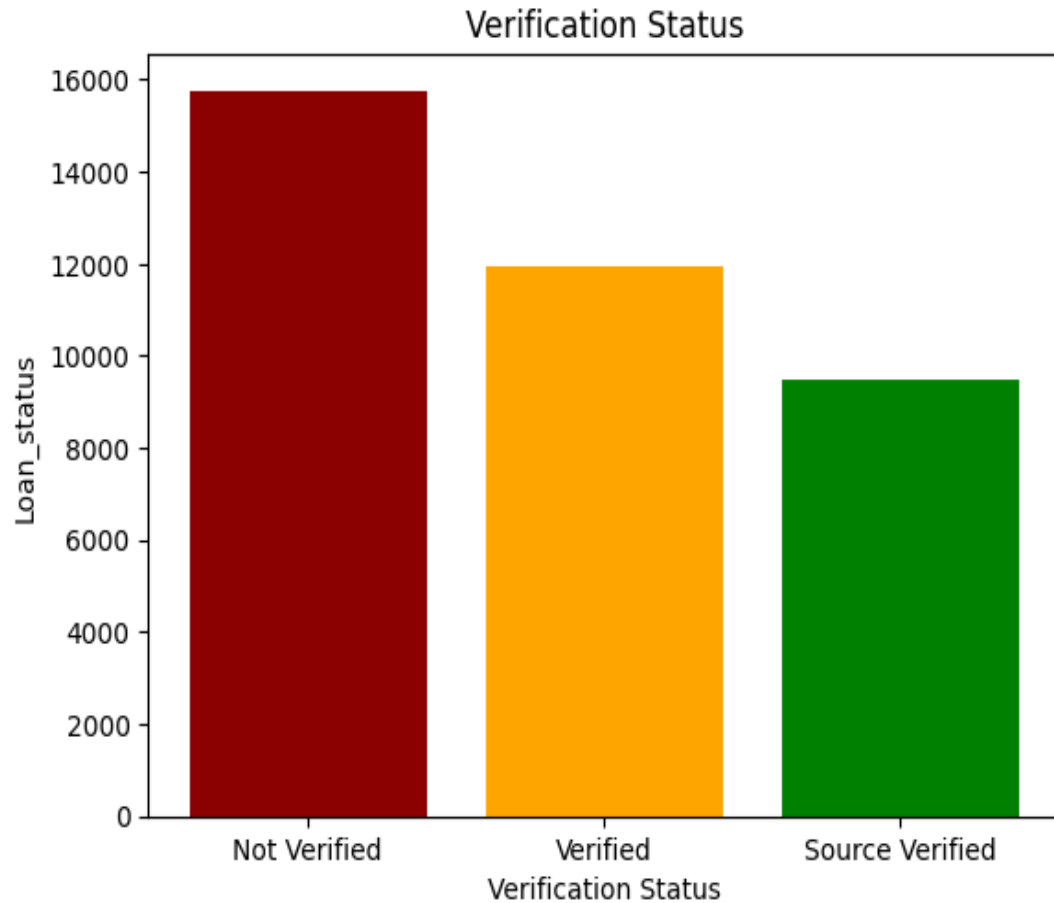
Whether the applicant owns a home can influence default rates.

Homeowners might be considered less risky compared to renters, as owning a home can indicate financial stability.

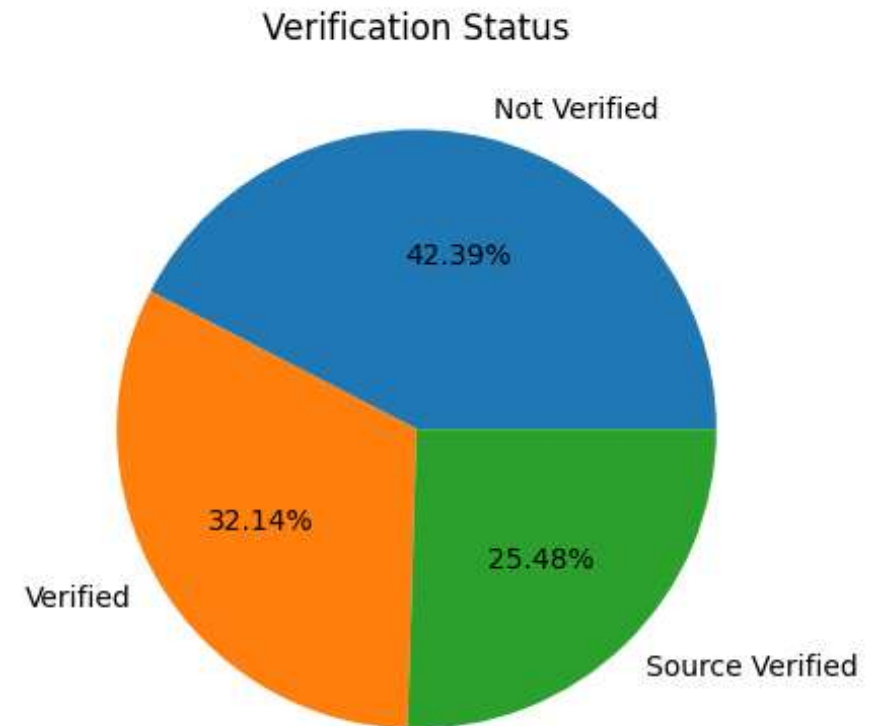




By this graph most of the constomers are not verfied who took the loans from company

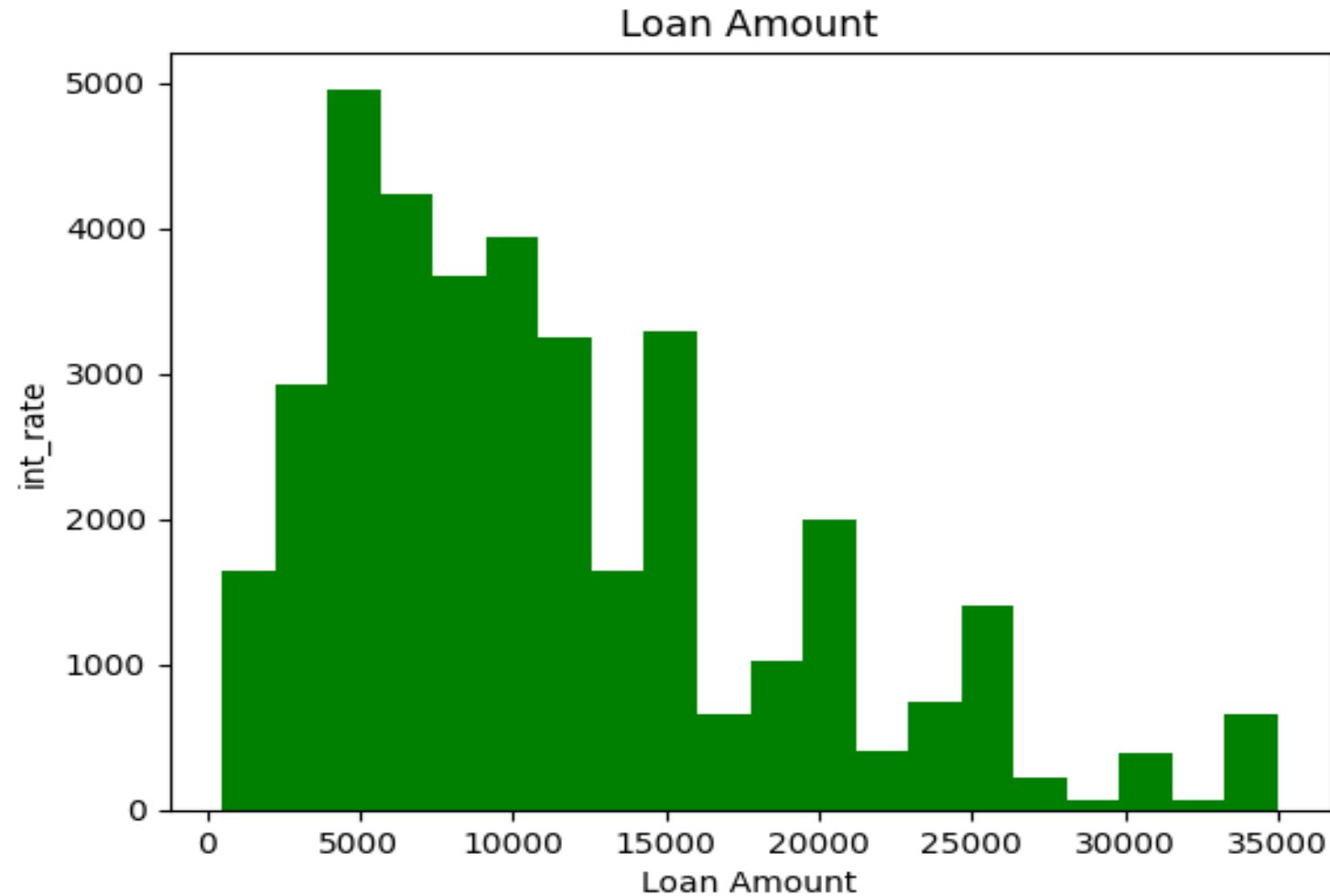


Bar Chart



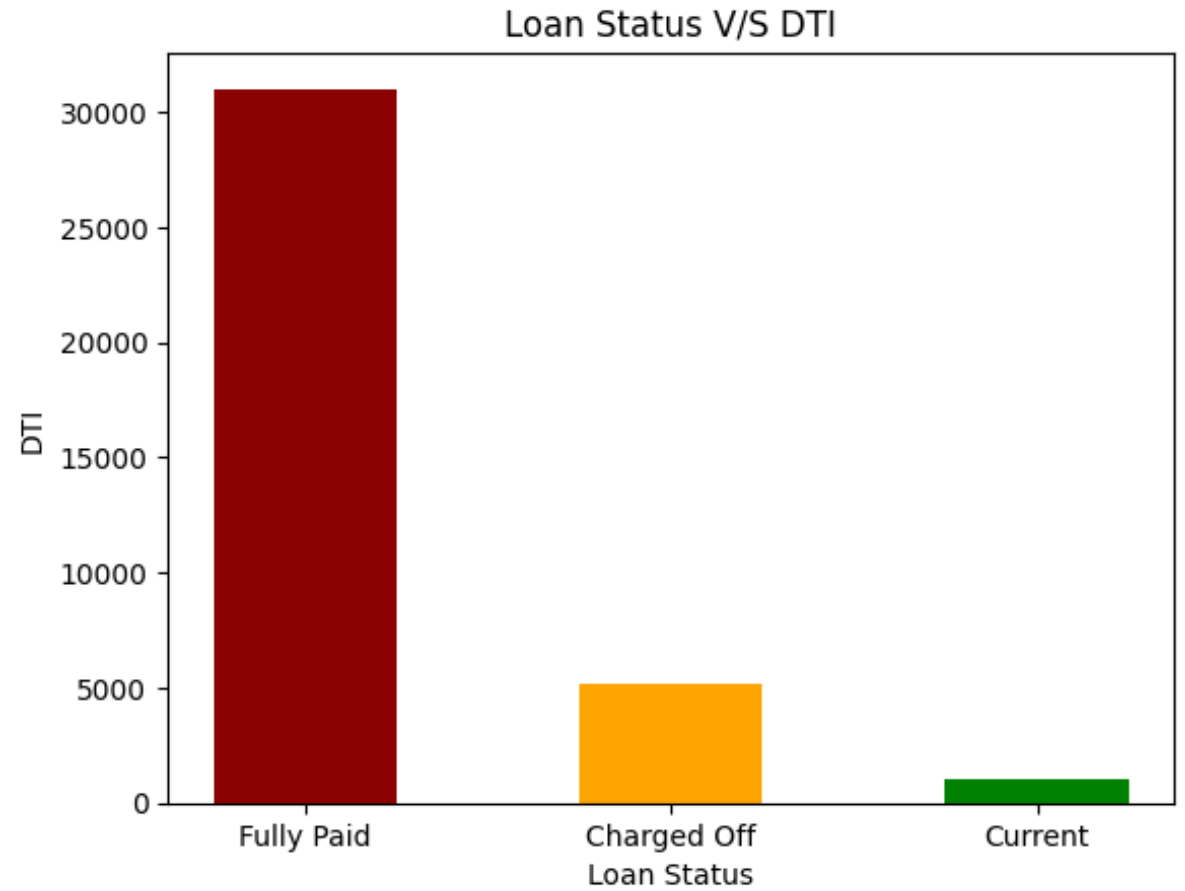
Pie Chart

By this the company can analyze the highest loan amount is approved of the customer.



# Debt-to-Income Ratio

The debt-to-income ratio measures an applicant's monthly debt payments relative to their monthly income. Higher ratios indicate a greater likelihood of default, as high debt burdens can strain financial resources.



# Conclusion

- In conclusion, the Lending Club case study provides valuable insights into the factors that influence loan default risk.
- **Loan Amount:** Higher loan amounts are associated with increased default rates.
- **Interest Rate:** Higher interest rates significantly contribute to the likelihood of default due to increased repayment burdens.
- **Debt-to-Income Ratio:** Higher debt-to-income ratios are linked to higher default rates, suggesting that existing debt levels play a critical role.
- **Employment Length:** Longer employment histories tend to reduce the risk of default, reflecting income stability.
- **Purpose of Loan:** The reason for taking a loan can impact default risk, with certain purposes showing higher default rates.