Lending Club Case Study

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Problem Statement

The aim of this case study is to find Credit worthiness trends based on the past approved loans' payment data

We have the dataset of all approved loans and those customers' transaction, demographics, employment, etc.

Based on that data, we have to determine, what is the trend when a customer defaults(charged-off), such that Lending Club can decide whether to approve/ reject loans to future customers.

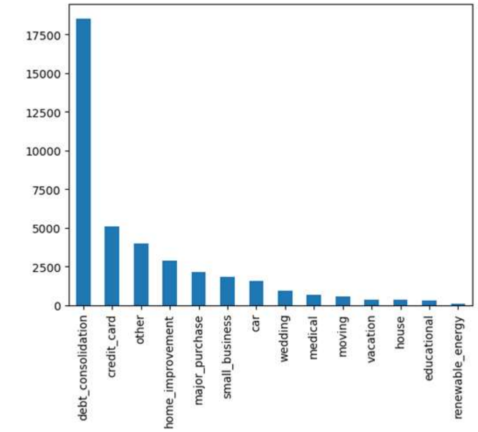
Approach

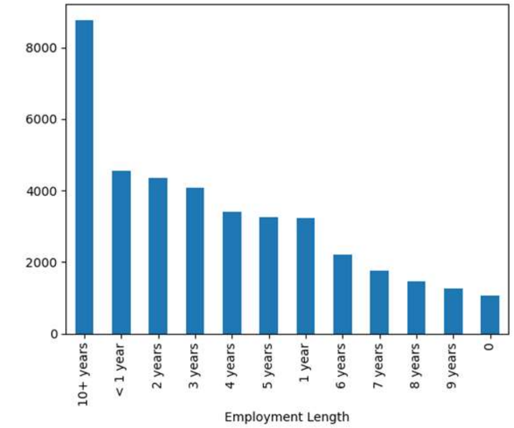
- Data Cleansing and Transformation
  - Remove unwanted columns
  - Remove Outliers
  - Remove/replace Null/ NaN values
  - Data type change (type casting)
  - Derived metrics
- Univariate Analysis
- Bivariate Analysis
- Multivariate Analysis
- Conclusion

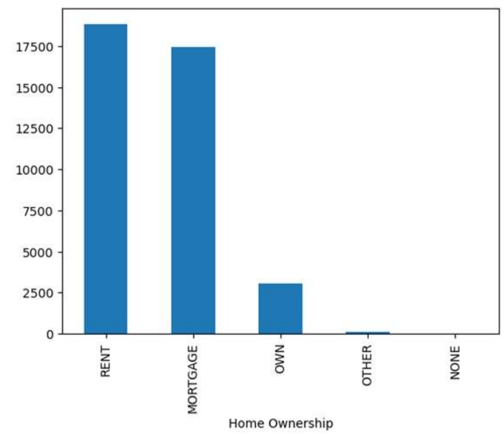
Data Cleansing

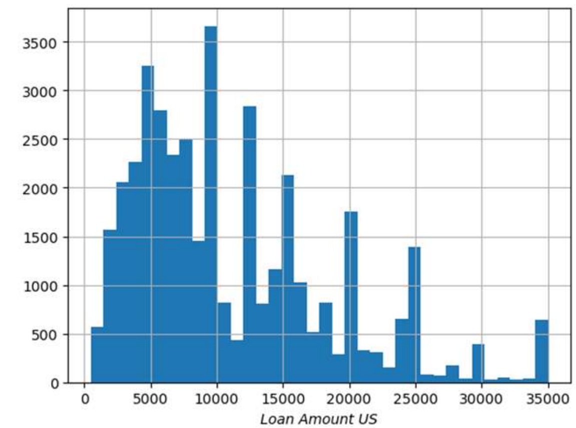
- Only kept columns that are to be used for Analysis- as the number of columns to be kept was small, so built a new data frame with selecte columns
- Removed columns with high percentage of null values
- Replaced Null values
- Removed outliers
- Changed data type of fields like term, interest rate, etc
- As we are interested in who is most likely to default, introduced a new column named default(Derived Metrics)- that would store value Defaulted for Charged off loans. All others are not defaulted
- Also, new columns added that show % of total monthly income going into loan installment. Also, loan amount as % of annual income
- Also, categorized above 2 into buckets as 2 new columns for ease of plotting.

Univariate Analysis

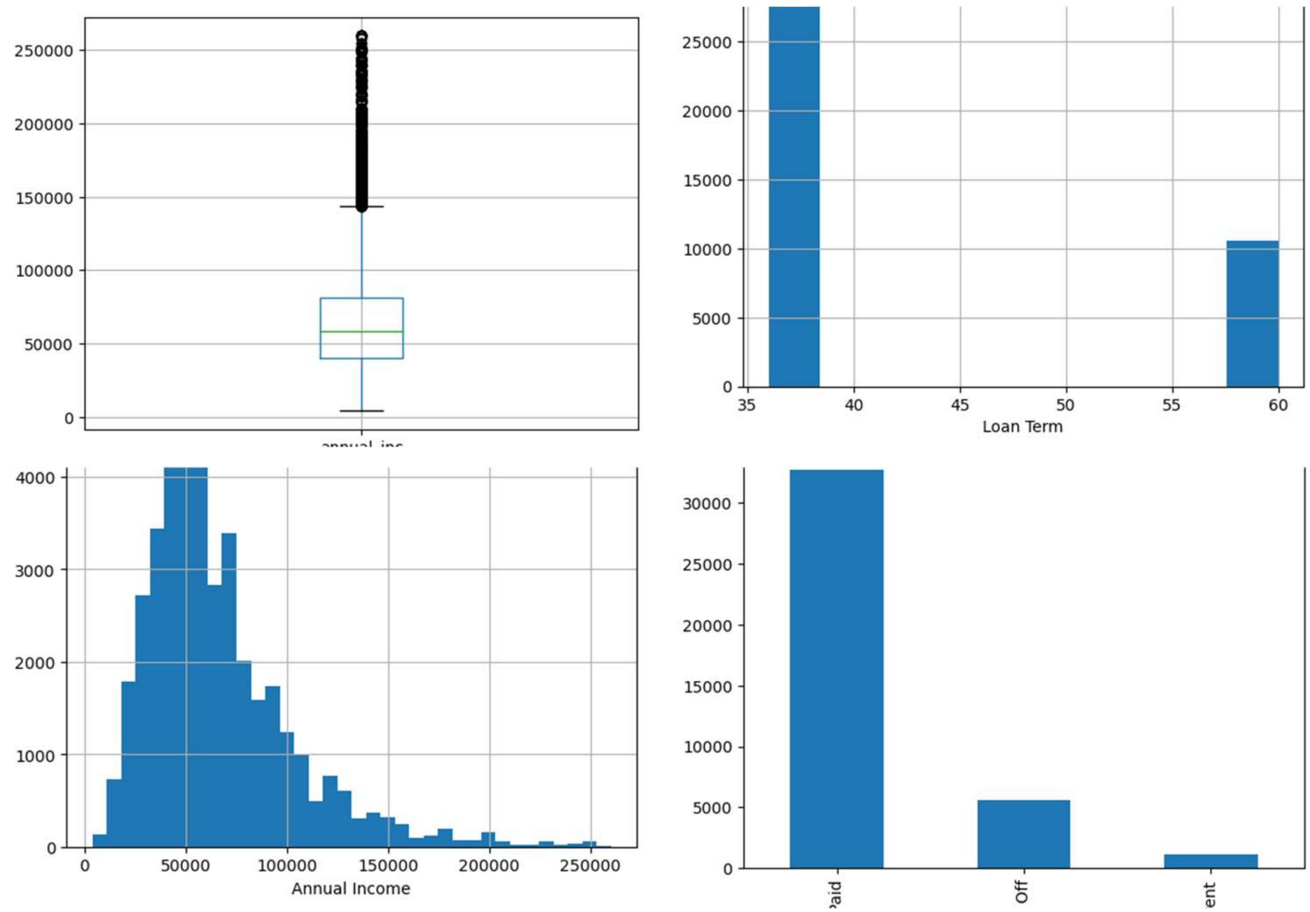








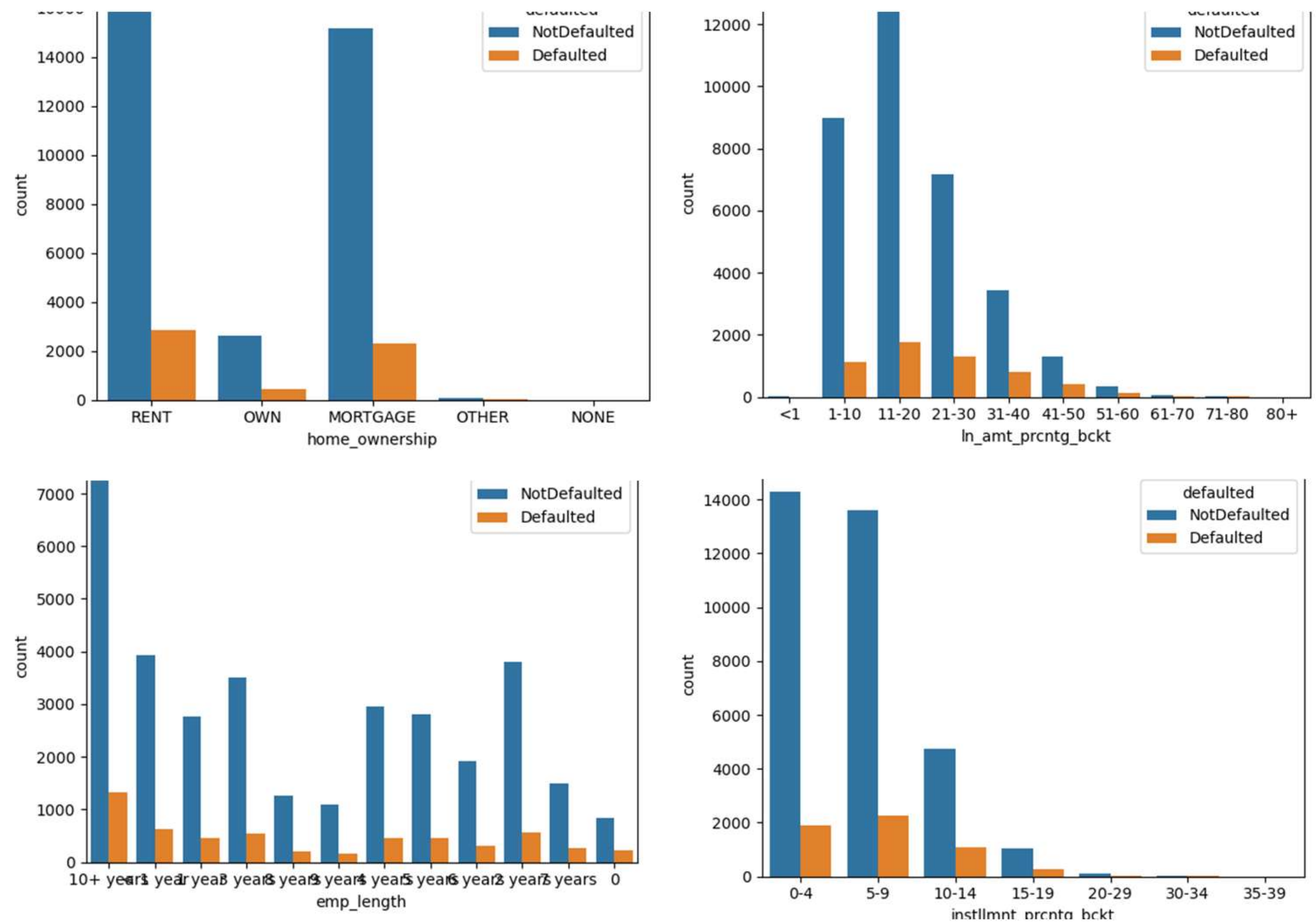
Univariate Analysis



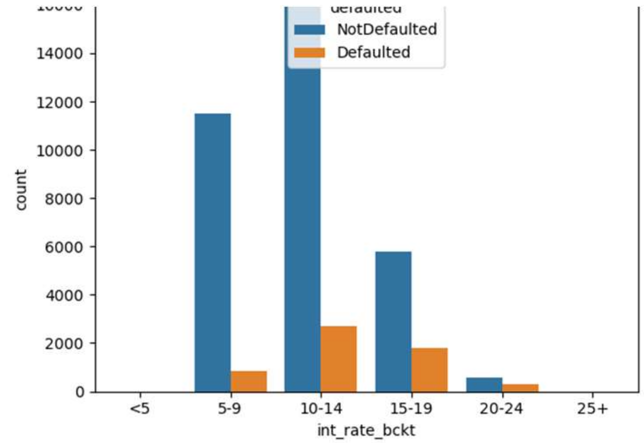
Univariate Analysis- Observations

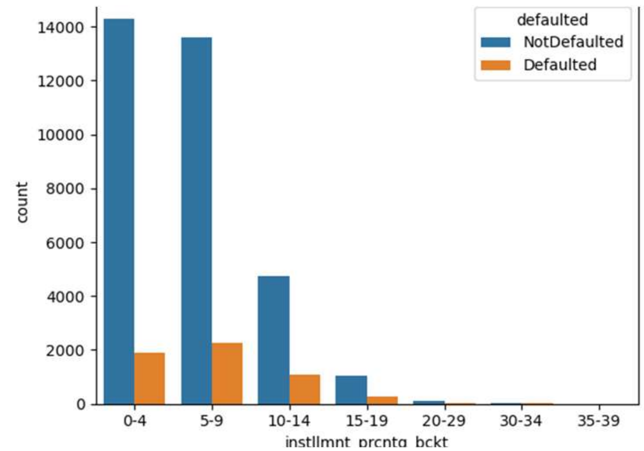
- More people with employment length 10+ year have applied for loan compared to other employment length.
- Those who have employment length of 1 year to 9 years, the number of loan applicant decreases with length of employment
- Less number of home owners applied for loan, compared to renters or those who have mortgages
- Most loan applicants applied for loan to consolidate debt
- Majority of loan applicants are not charged off
- About 50% of loan applicants have annual income between 40000 to 80000
- About 50% loan applicants have Loan amount between 5500 to 15000

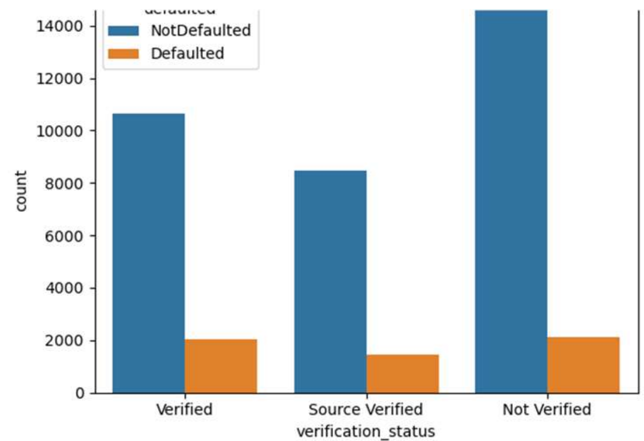
Bivariate Analysis

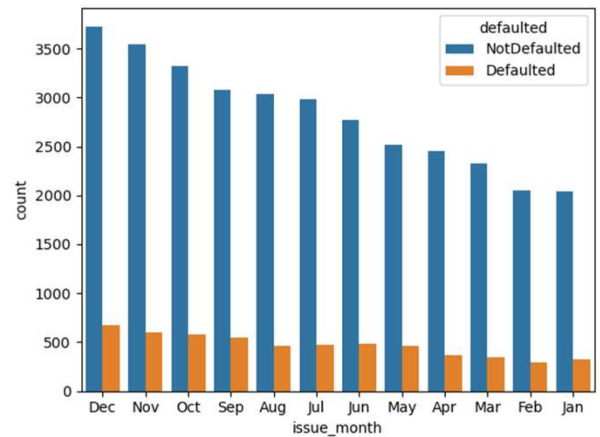


Bivariate Analysis





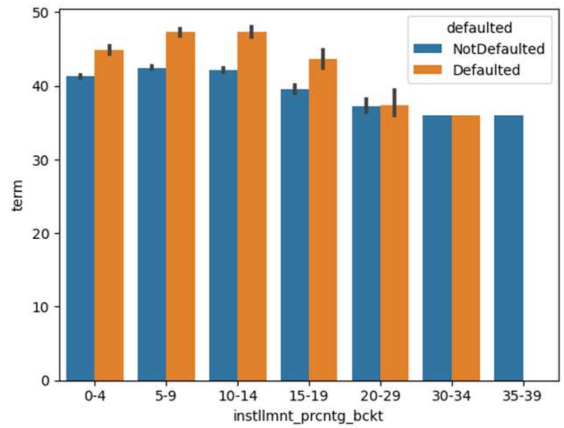


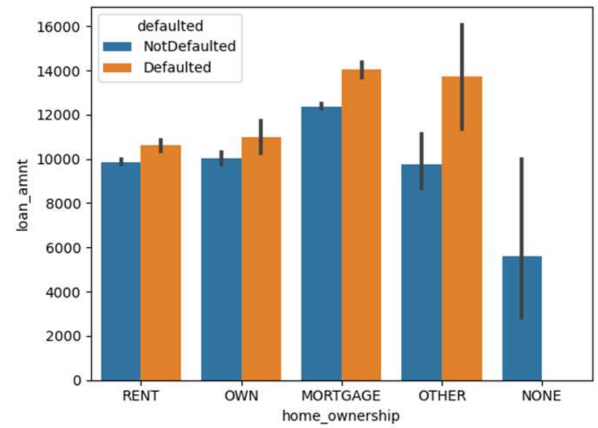


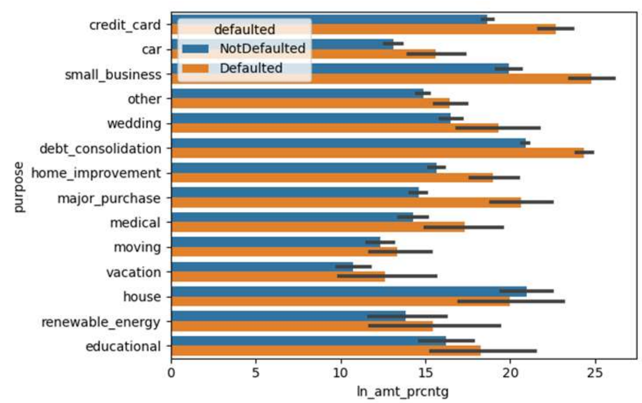
Bivariate Analysis- Observations

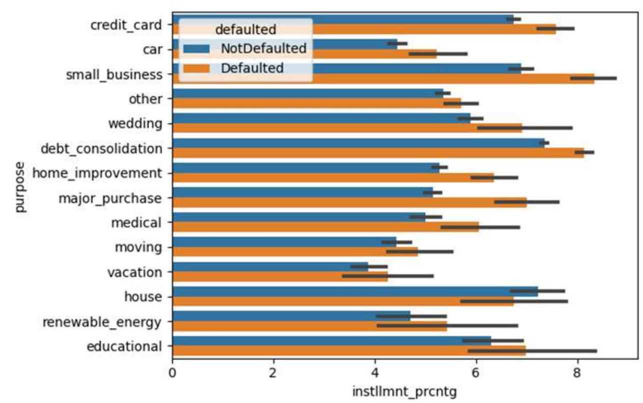
- Loan applicants who do not own a house(either rent or mortgage) are more likely to default.
- Loan applicant’s whose loan amount is between 10 to 15% of their annual income are most likely to defaule
- Loan applicant’s with more than 10 years of experience are more likely to default
- Loan applicants, who pay 5 to 10% of their monthly income as installment are most likely to default
- Higher interest rate tend to increase the default rate.
- Non verified employment status tend to default
- Loan taken toward end of year tend to default

Multivariate Analysis

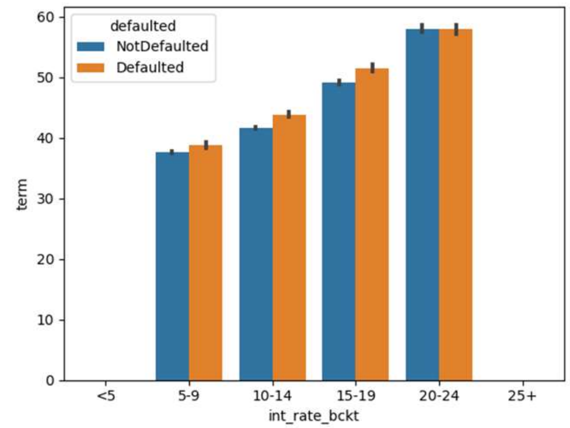


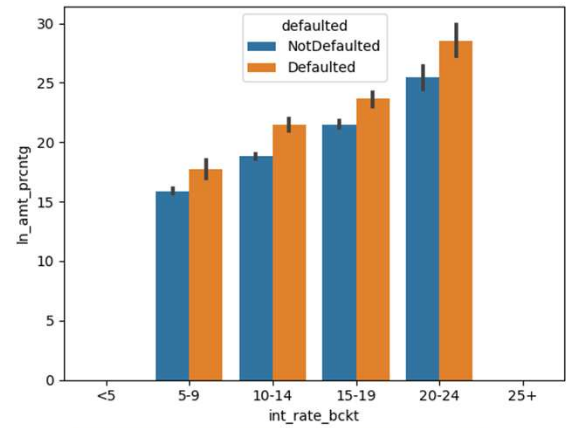


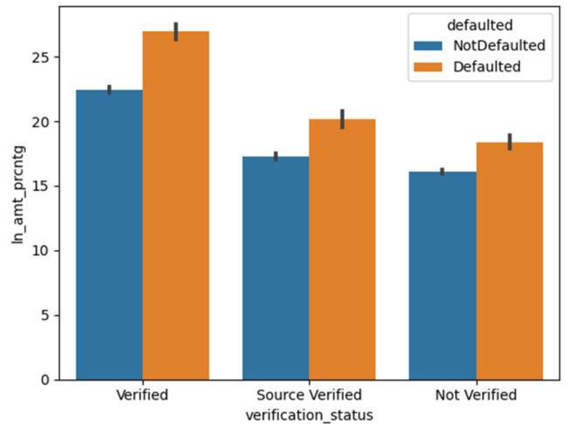


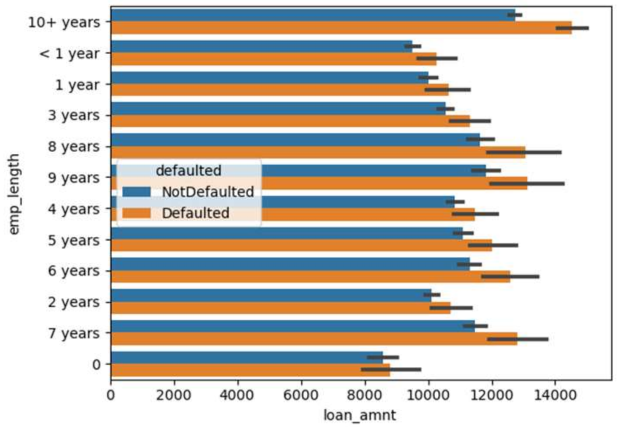


Multivariate Analysis









Multivariate Analysis- Observations

- Loan applicants who do not own a house(either rent or mortgage), and loan amount is greater than 10000, are more likely to default.
- Loan applicant's whose loan amount is between 10 to 15% of their annual income, and taken loan for small business, debt consolidation or credit card are most likely to default
- Loan applicant's with more than 10 years of experience, and loan amount more than 12000 are more likely to default
- Loan applicants, who pay 5 to 10% of their monthly income as installment, and higher term are most likely to default
- Loan applicants, who pay 5 to 10% of their monthly income as installment, and taken loan for small business, debt consolidation or credit card are most likely to default are most likely to default
- High interest rate with higher term tend to default more
- Applicants with verified employment status and more than 22% loan amount would most likely default
- Applicants who have taken more loan compared to their annual income and has high interest rate are most likely to default

Conclusion

- Loan applicants who either rent a house or mortgage, loan amount of mor than 10000 has a high chance of default
- Applicants whose loan amount is between 10 to 15% of their total annual income, and have taken loan for small business are most likely to default. This is followed by applicants who take loan for debt consolidation and credit cards.
- Applicants taking loan for small business , debt consolidation and credit cards, and have 5 to 10% of their monthly income as their monthly installment are more likely to default .
- Applicants applying for loans in later part of the year has high default rate.
- Applicants with higher interest rates are more likely to default.
- Home owners are less likely to default- so they are not a risk to the lender
- Loan applicants who pay less interest rate are less likely to default
- Applicants applying for loan for vacation, renewable energy, car are less likely to default