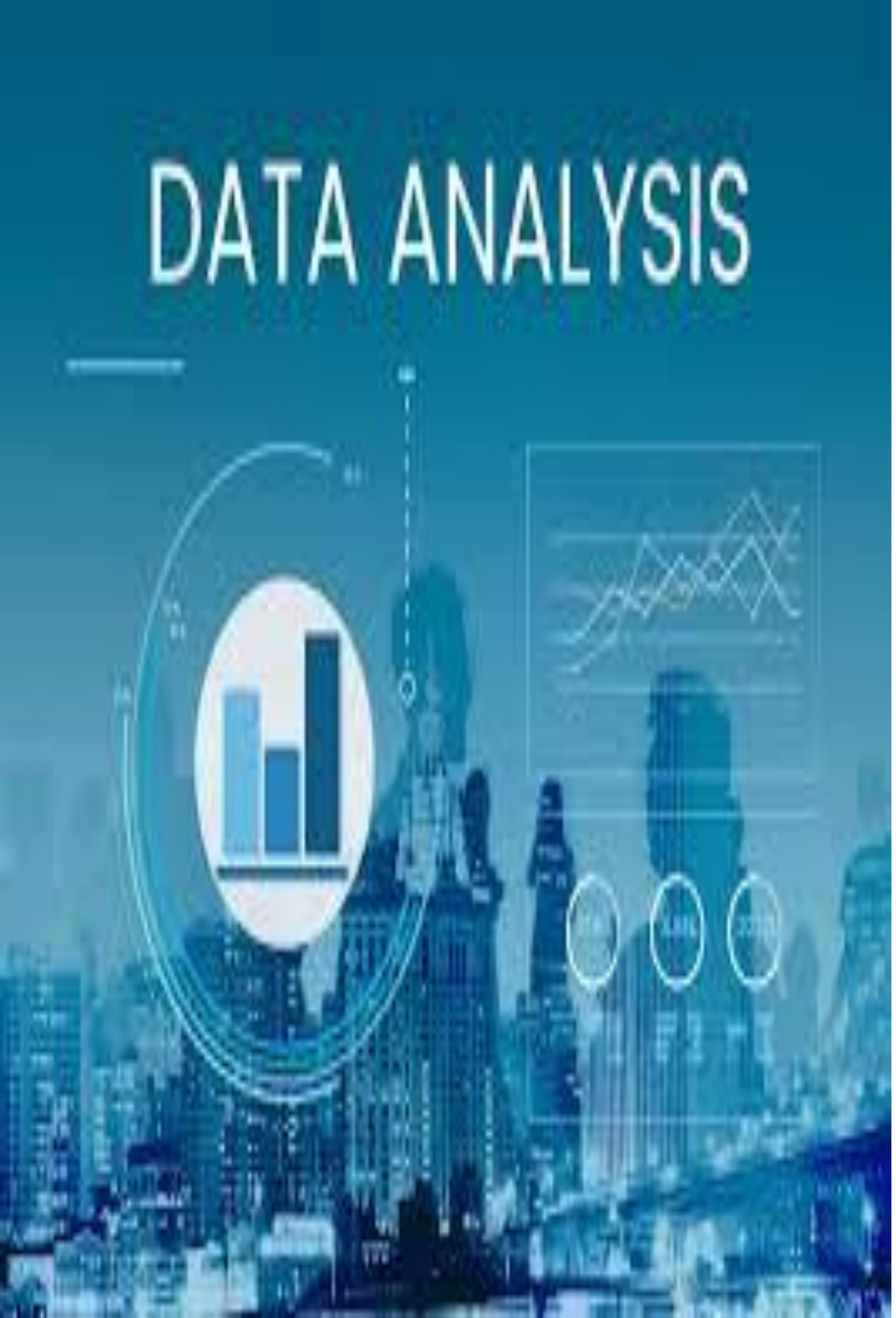


Lending Case Study

IIIT BANGALORE – AI/ML – BATCH 63

SUBMITTED BY
Sunita Saraf
Sivananda Reddy Mylarapu

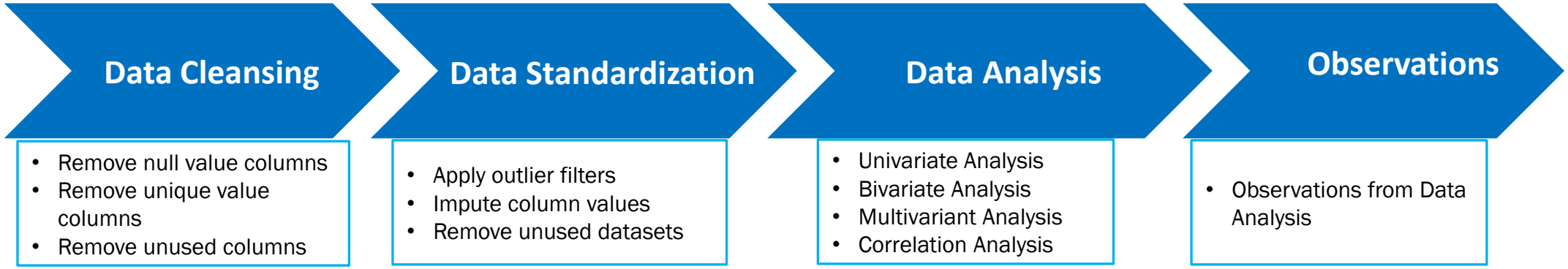
Agenda

The primary objective of the Lending Club case study is to mitigate the credit loss while approving or denying the loans to their customers. This challenge arises from two potential scenarios

- *Rejecting the loans to the applicants who has the capability to repay the loans will result in a loss of business to the company*
- *Approving the loans to the customers who are likely to default may lead to financial loss for the company*

The objective is to determine the applicants at risk of defaulting on loans, enabling a reduction in credit losses. This case study aims to achieve this goal through Exploratory Data Analysis (EDA) using the provided dataset.

Case Study Approach



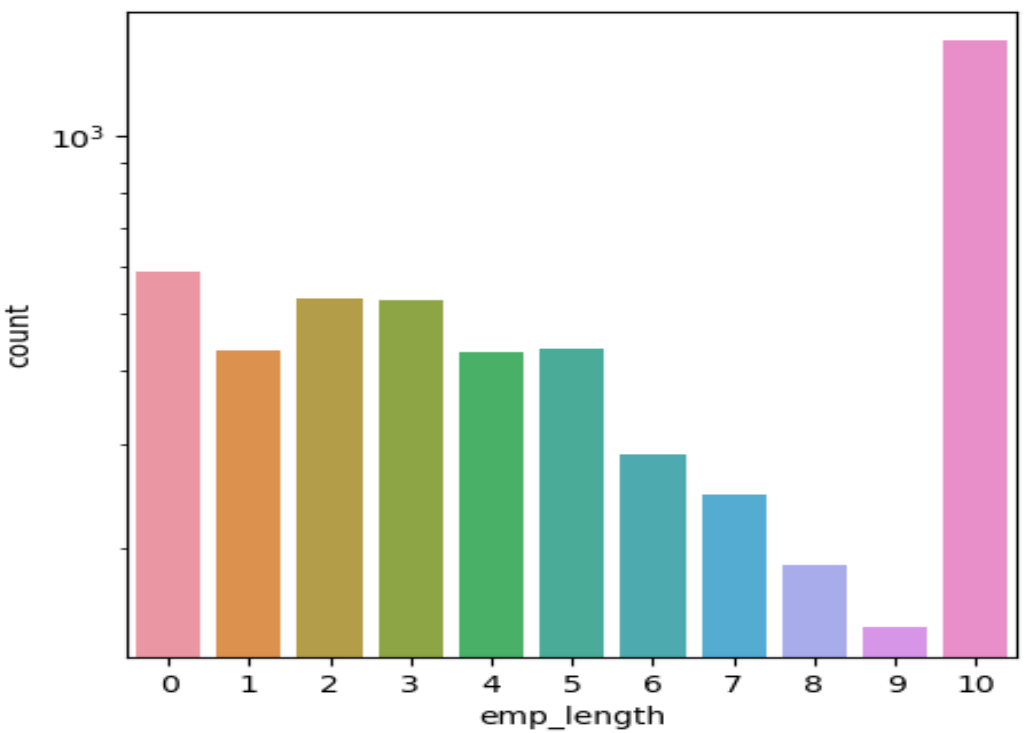
Loan Status: The key Attribute for the case study(**loan_status**). This column contains three distinct values:

Fully-Paid: Signifies customers who have successfully repaid their loans.

Charged-Off: Indicates customers who have been labeled as "Charged-Off" or have defaulted on their loans.

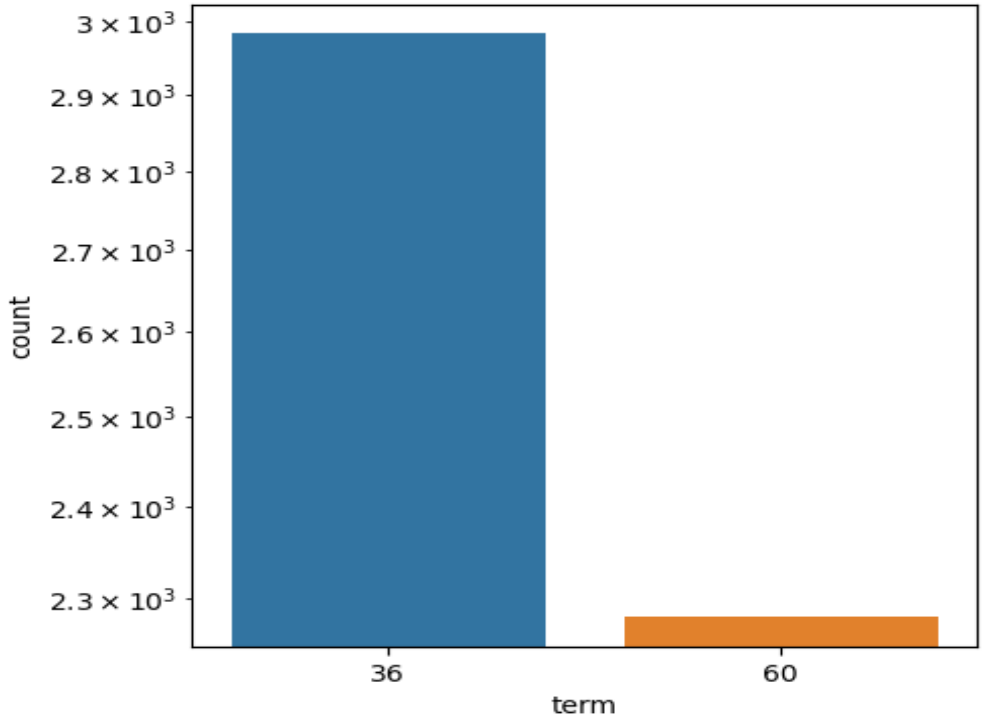
Current: Represents customers whose loan process is in progress and cannot provide conclusive evidence regarding. For the case study all these records will be excluded

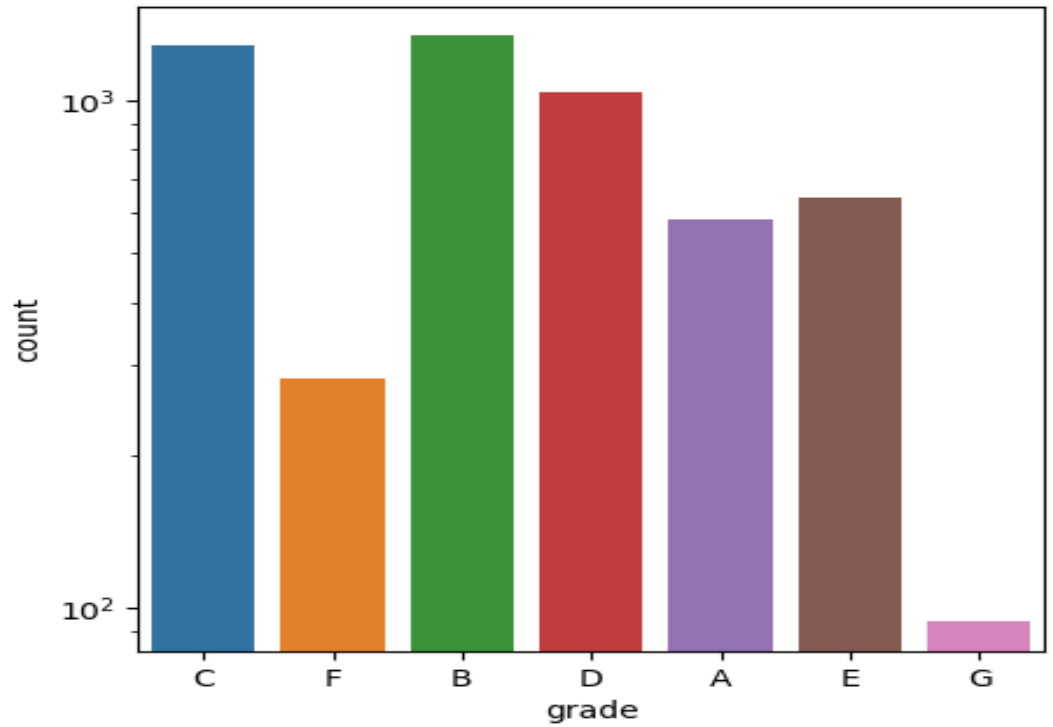
Data Analysis
Univariate Analysis



Employment Length and Home Ownership Vs “**Charged Off**” Loans.

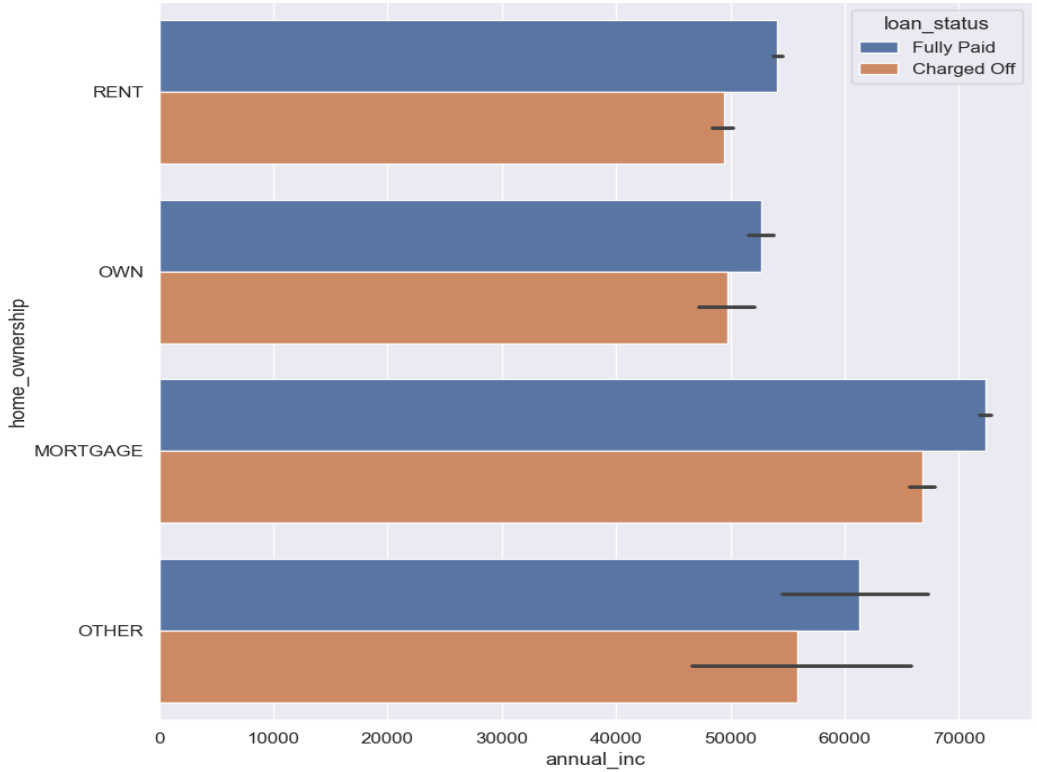
Univariate Analysis

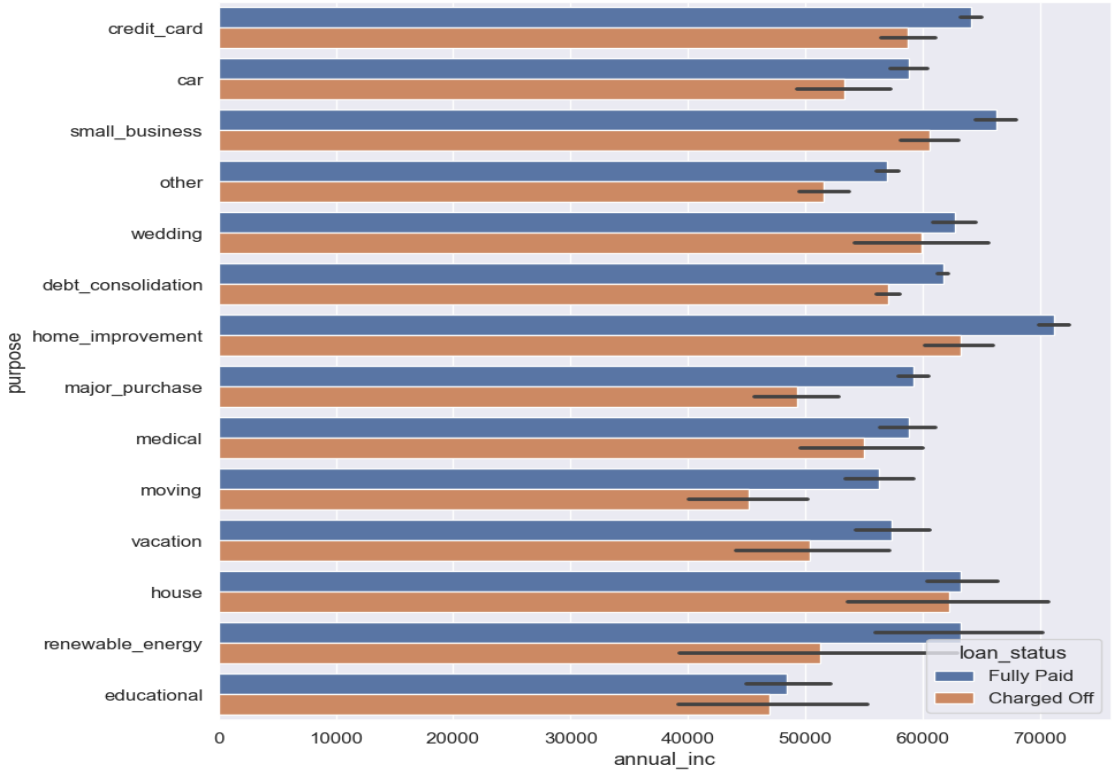




Loan term and Grade Vs “**Charged Off**” Loans

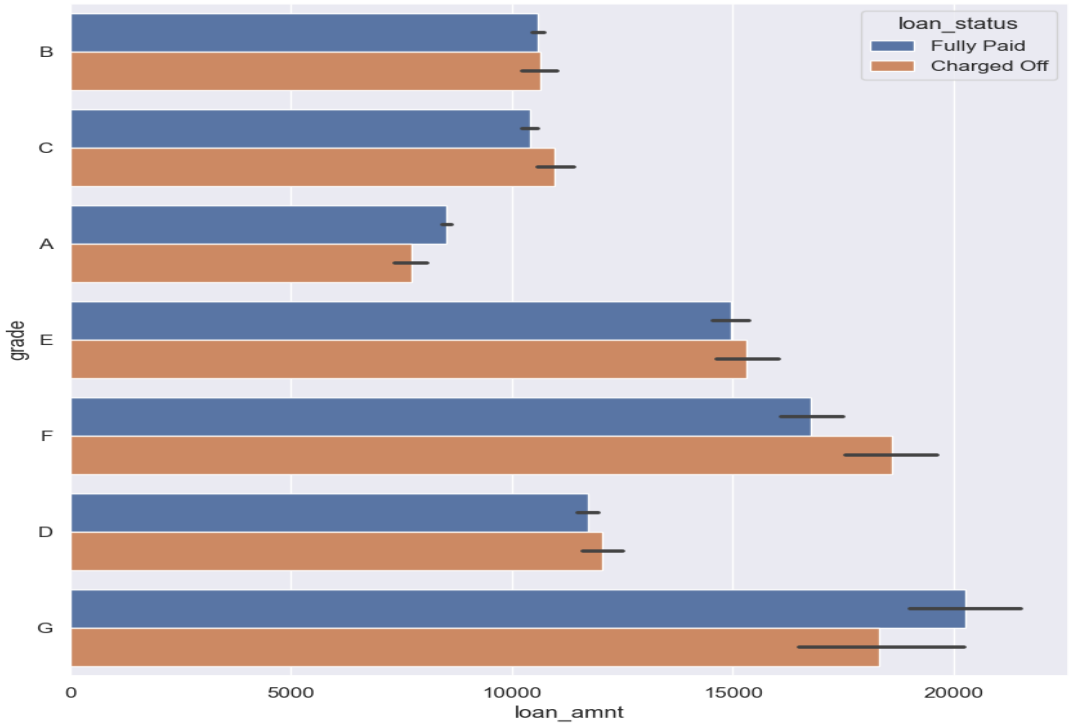
Bivariate Analysis – Annual Income

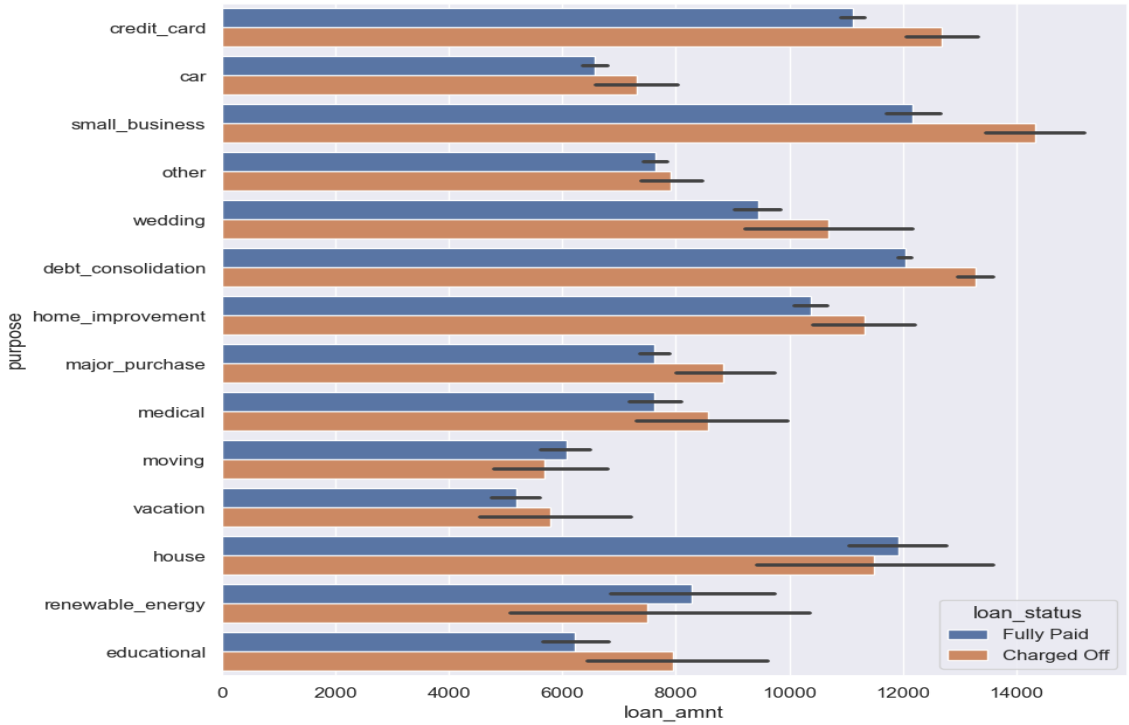




Home Ownership and purpose with Annual income combination

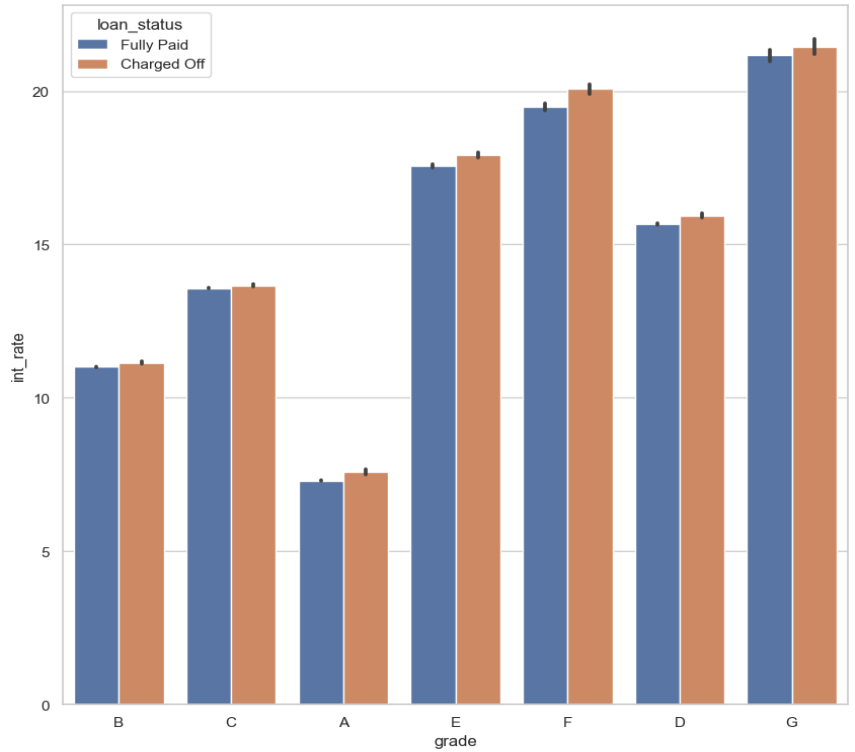
Bivariate Analysis – Loan Amount





Home Ownership and purpose with Loan Amount combination

Bivariate Segmented Analysis

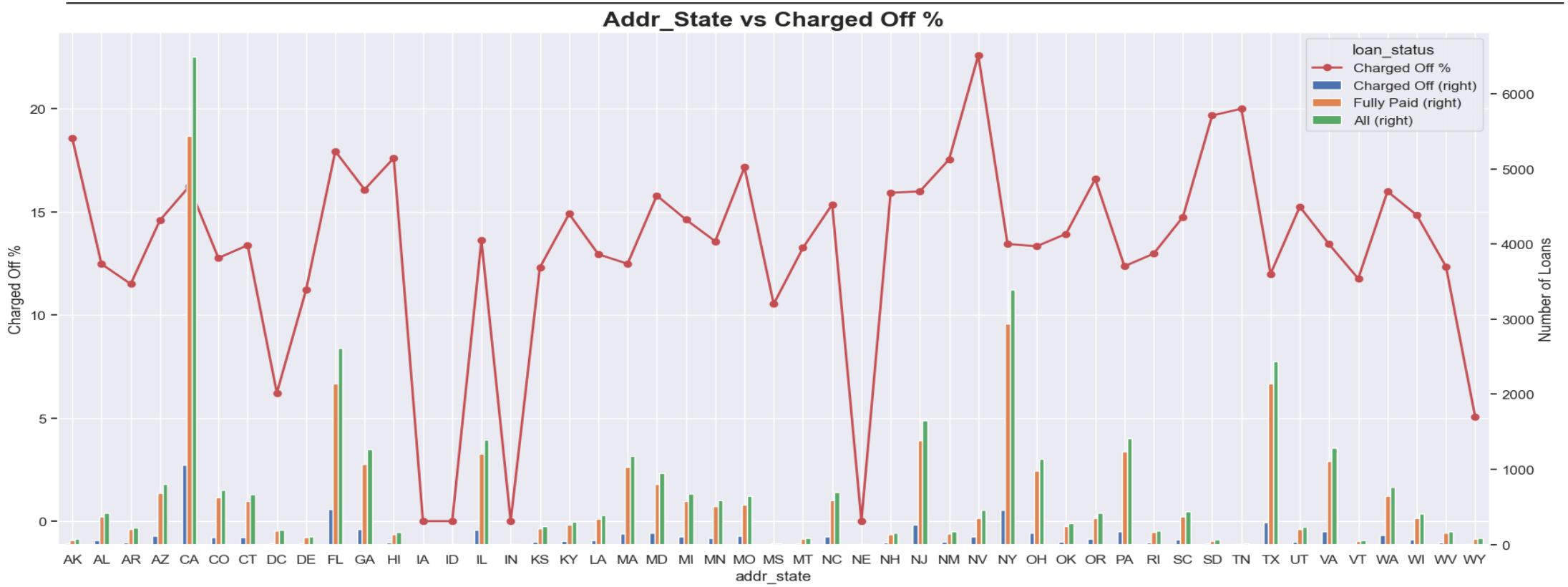


Grade and Interest rate combination

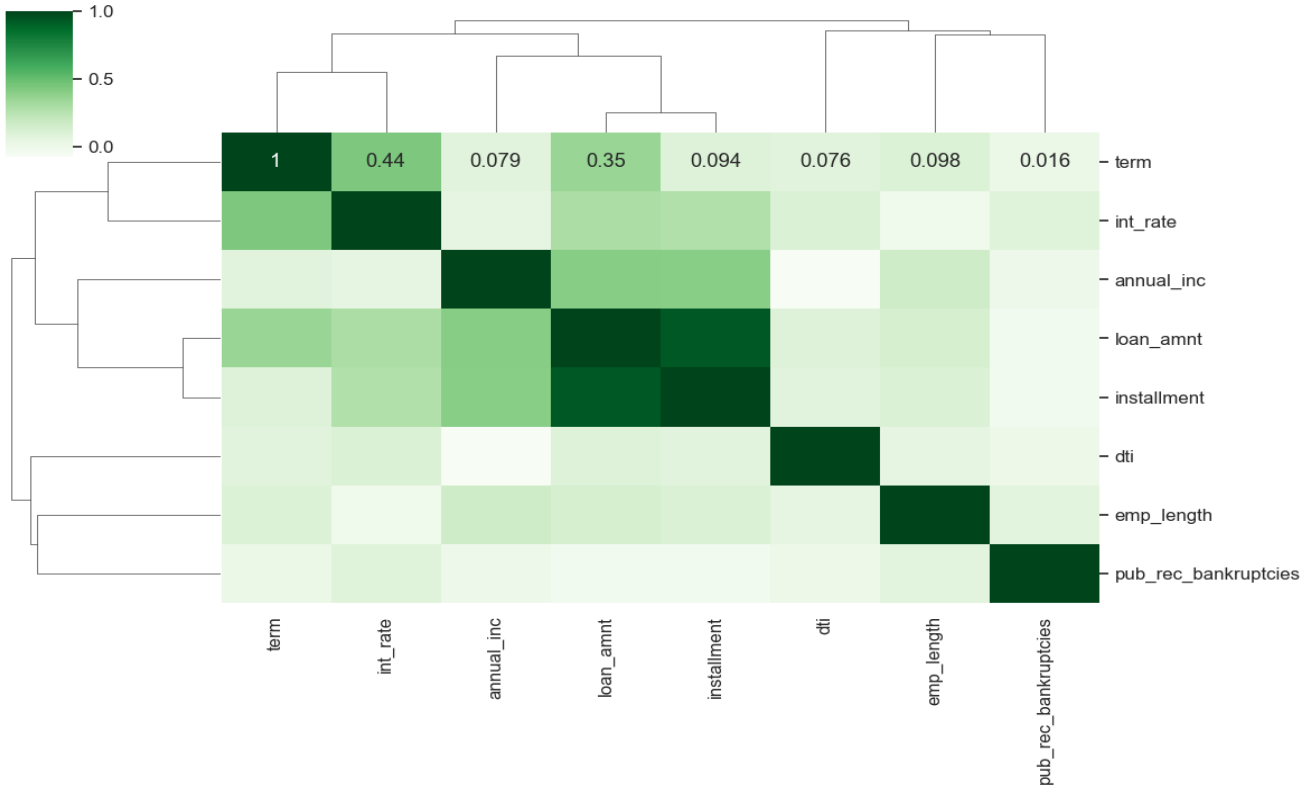
- “Charged Off” loans are likely to happen if the applicants annual income is over 70k and interest rate is between 21-24%
- “Charged Off” loans are likely to happen if the Loan amount is over 15k and interest rate is between 21-24%
- “Charged Off” loans are likely to happen with F & G grades if the interest rate is over 20%

Multivariate Analysis

Multivariate Segmented Analysis



Correlation Analysis



Correlation Matrix with variables term, int_rate, annual_inc, loan_amnt, installment, pub_rec_bankruptcies,, emp_length

- Installment and loan amount has a strong correlation
- Term and interest rate has strong correlation
- Annual income and loan amount has a strong correlation
- dti has weak correlation with other fields
- emp_length has weak correlation with other fields
- pub_rec_bankruptcies has weak correlation with every field
- dti and annual income has negative correlation

Conclusion

Limit short term Loans: Evaluate the risk associated with short term loans. Review the process to limit the short term or adjusting interest rates for longer-term loans to decrease the “Charged Off loans”

Anticipate Peak Periods: Assess the loan applications during peak periods like December and Q4. Ensure efficient processing to meet customer demands during these busy seasons.

Evaluation for Debt Consolidation Loans: Strict evaluations required for applicants seeking debt consolidation, house loans, considering potential interest rate adjustments to manage the associated risks.

Housing Stability: Consider housing status into account during the assessment process to assess housing stability and applicant's ability to repay the loan.

Assessment for High Loan Amounts: Conduct more thorough assessments for loan amounts of $15,000 or higher. Consider capping loan amounts for higher-risk applicants to mitigate potential defaults.

Adjust Interest Rates Based on DTI Ratios: Review the interest rate determination process and consider adjusting rates based on Debt-to-Income (DTI) ratios to align with the borrower's ability to repay.

Income Levels: Consider setting the maximum loan amounts based on annual incomes below $40,000 to ensure loan affordability for borrowers.

Observations

- Applicants who are employed for more than 10 years are accountable for the highest number of "Charged off" loans.
- The majority of defaulted loan members are individuals, living in rented houses.
- "Charged off" loans are mostly that are taken during the 4th quarter(December, November and October) primarily in December. This might be the reason for loan application during the holiday season.
- The trend says, the Charged Off loans are increasing year by year.
- Most of the Charged off loans are due to Debt Consolidation.
- California state had the highest number of Charged off loan applicants.
- Short term loans with a duration of 3 years or 36 months are popular among Charged Off loan applicants.
- Applicants with annual income more than 60k and applying for either home or home improvement or small business has higher chances of defaulting.
- Applicants with Grade E, F, G and applying for 15k or more loan amount.
- Applicants applying for over 12k loan amount for the purpose of credit card, debt consolidation or house are prone to default.

Appendix

References

Technology/Library	Version	Reference Link
Python	3.11.7	https://www.python.org/
Pandas	2.1.4	https://pandas.pydata.org/
NumPy	1.26.4	https://numpy.org/
Matplotlib	3.8.0	https://matplotlib.org/
Seaborn	0.12.2	https://seaborn.pydata.org/

Git Hub Link: [mrsivanandareddy/lending-club-case-study: Lending Club case study using EDA (github.com)]