Gramener Case Study

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Business Objectives and Strategy

Background:

When a consumer finance company that specializes in lending loans, receives a loan application, it 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

Business Objective :

- 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.
- Provide the recommendations to reduce the number of defaults.

Strategy :

- Understand the dataset and perform univariate & bi-variate analysis.
- Find out the strong indicators of default.

Assumption :

- Assumed only the categorical variables that are available during the time of application.
- Strategy is not based on 'Current loan' data as it would make the analysis irrelevant.
- Data considered is from 2007 to 2011.

Basic Strategy and Methodology

Data Understanding

Data Cleaning

Univariate Analysis
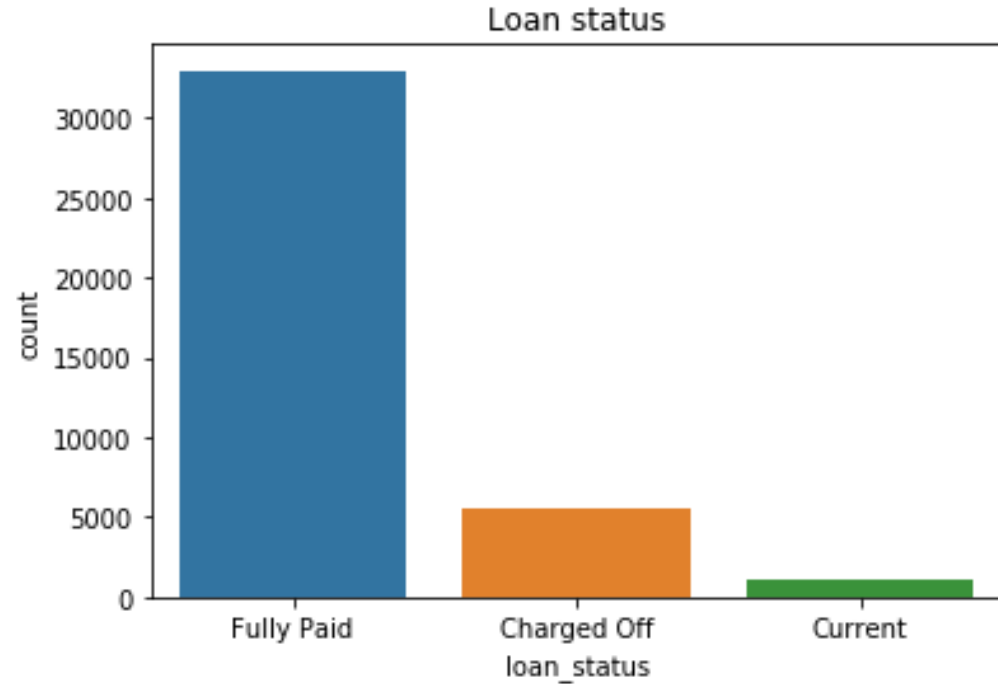
Bivariate Analysis

Recommendations

Overall Analysis for Loan status

- **Total number of loan status available**= 39717

- **Loan status count:**
  - Fully Paid= 32950 (82.96%)
  - Charged Off=5627 (14.17%)
  - Current=1140 (2.87%)

- Data is available for 5 years i.e. from 2007 to 2011
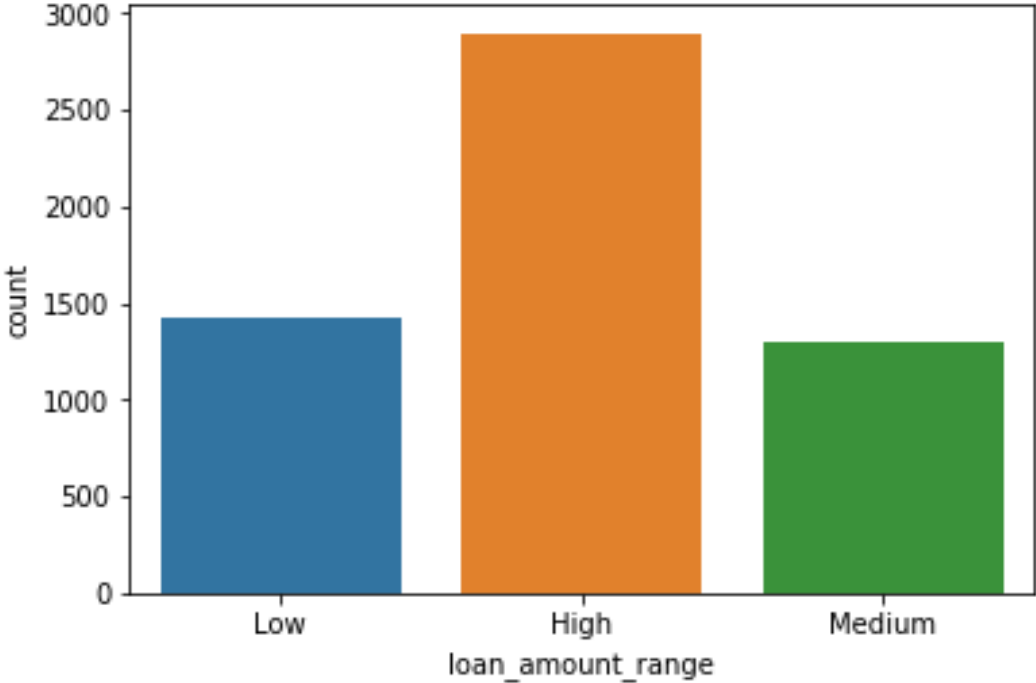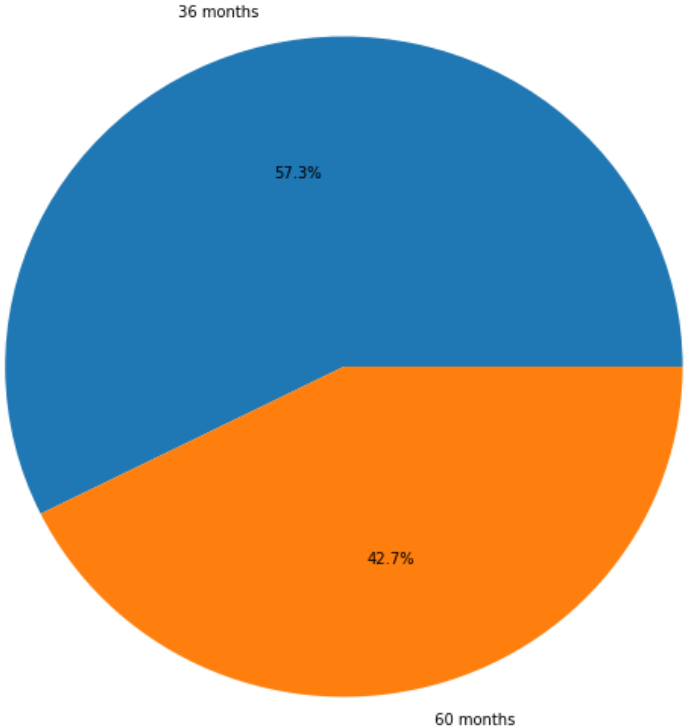
- **Year-wise defaults:**

Year	Percentage of defaults
2007	0.80
2008	4.39
2009	10.56
2010	26.39
2011	57.86

Analysis – Loan Term & Loan Amount

- The Loan Term analysis shows that for 36 months term, the number of defaults are more.
- The Loan Amount analysis shows that High amount of loans default the most.
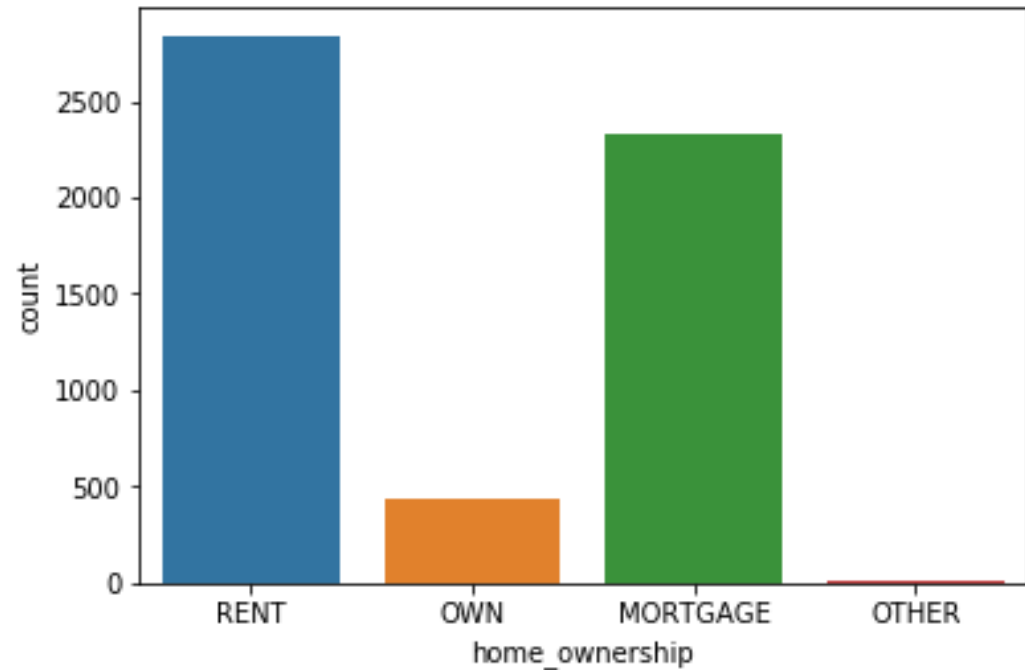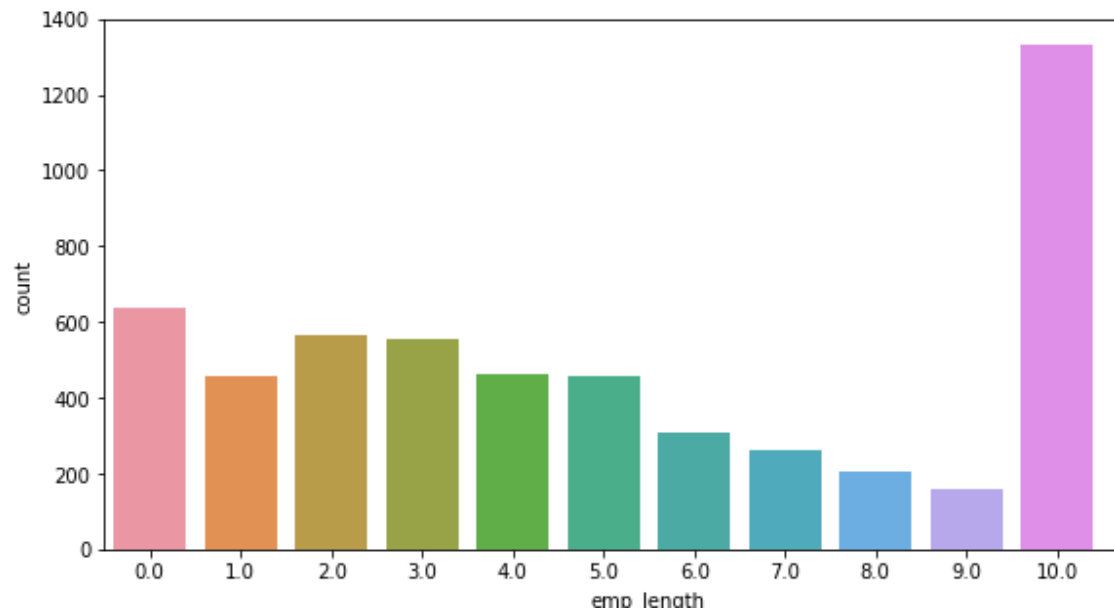

Loan defaulters - Term wise

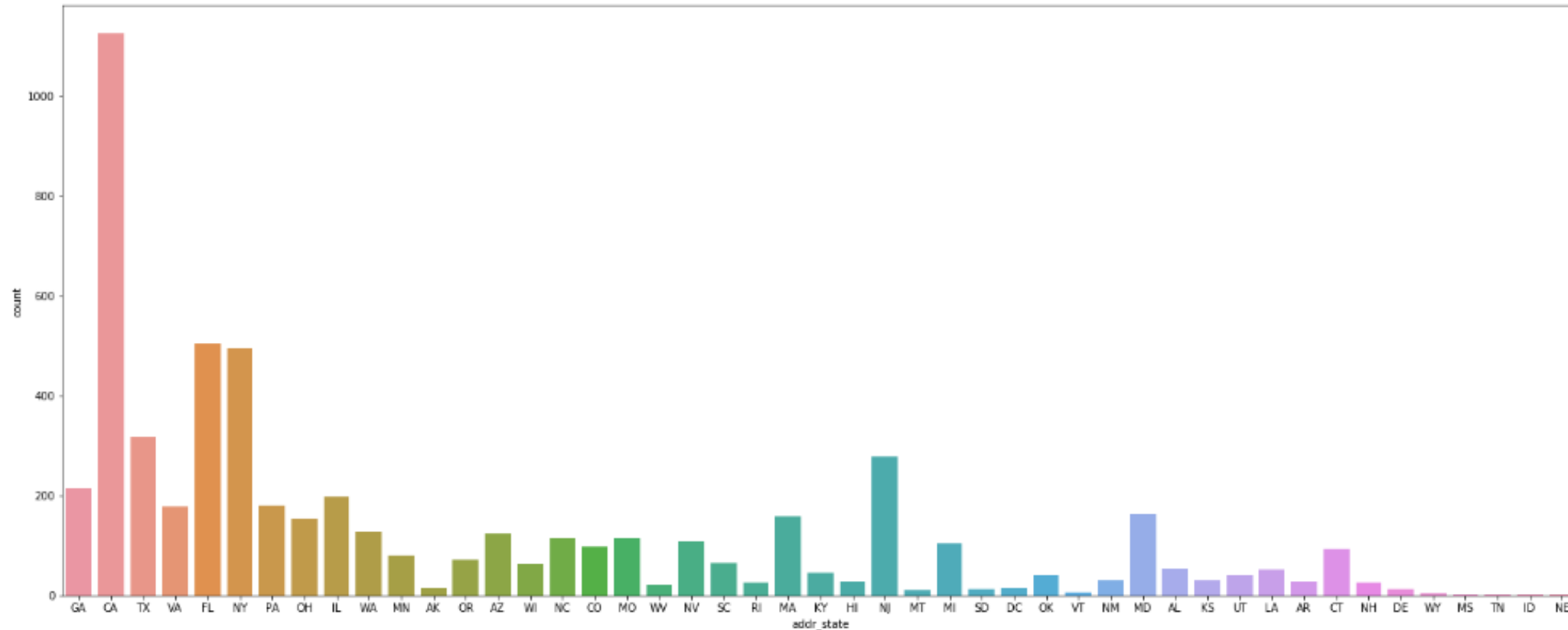|	36 months	60 months
None	3227	2400

Analysis – Employment Length & Home Ownership

- The Employment Length analysis shows that customers with more than 10 years of experience default the most.

- The Home Ownership analysis shows that Rent & Mortgage customers default the most.
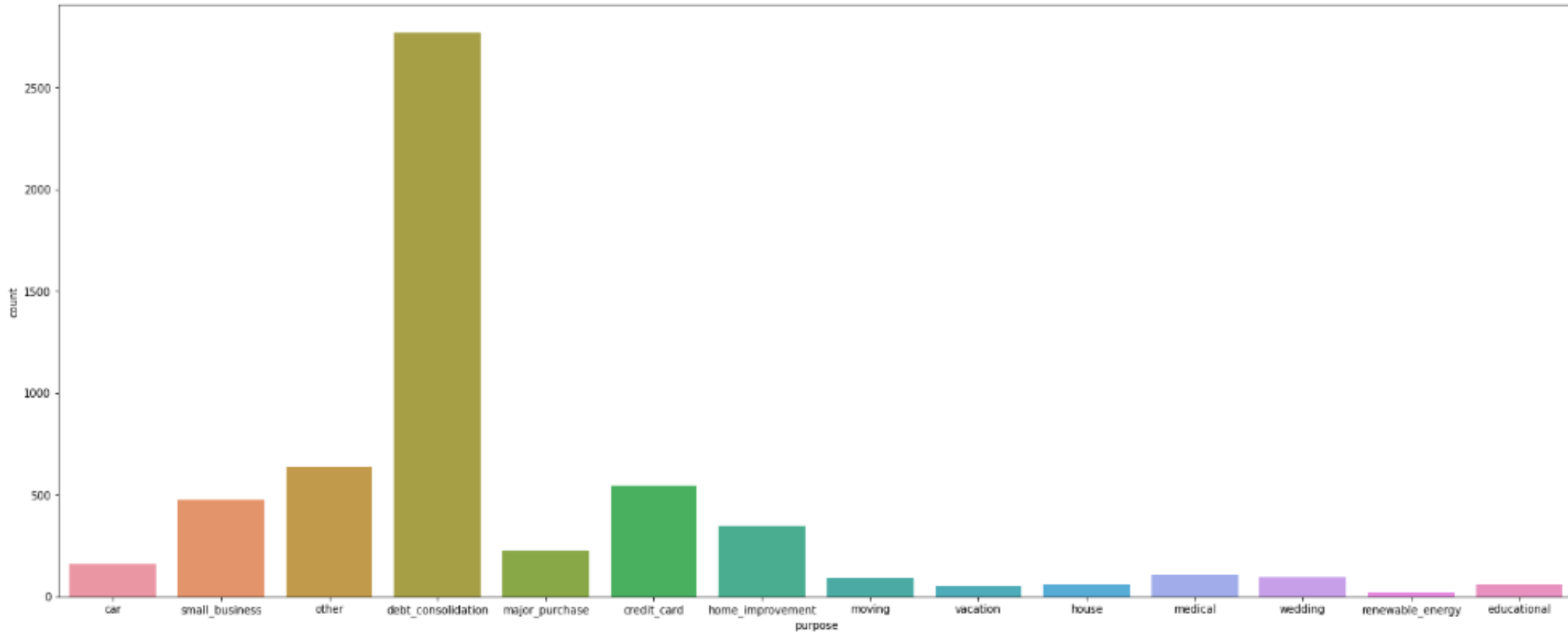
Analysis on Address State

- The Address state analysis shows that CA state customers default the most.
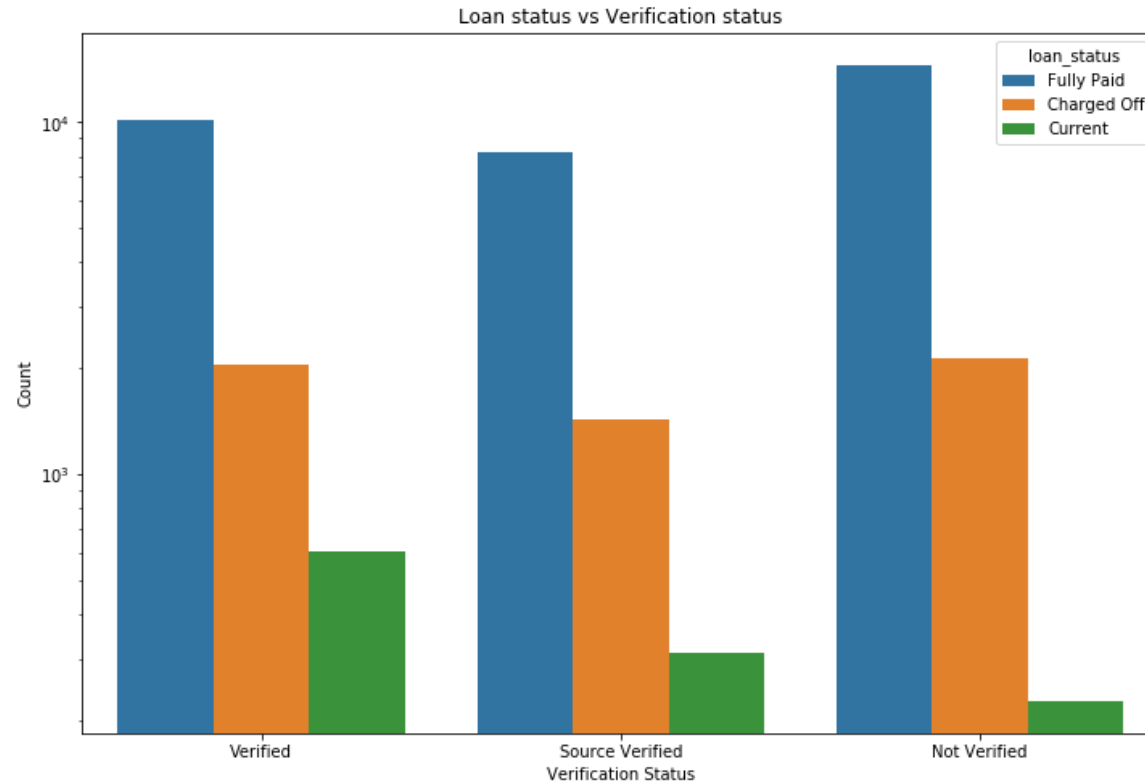- CA is followed by FL, NY, TX and NJ.

Analysis on Loan Purpose

- The Purpose analysis shows that customers that have purpose as Debt Consolidation default the most.

- Debt Consolidation is followed by 'Other', 'Small Business' and 'Credit Cards'.

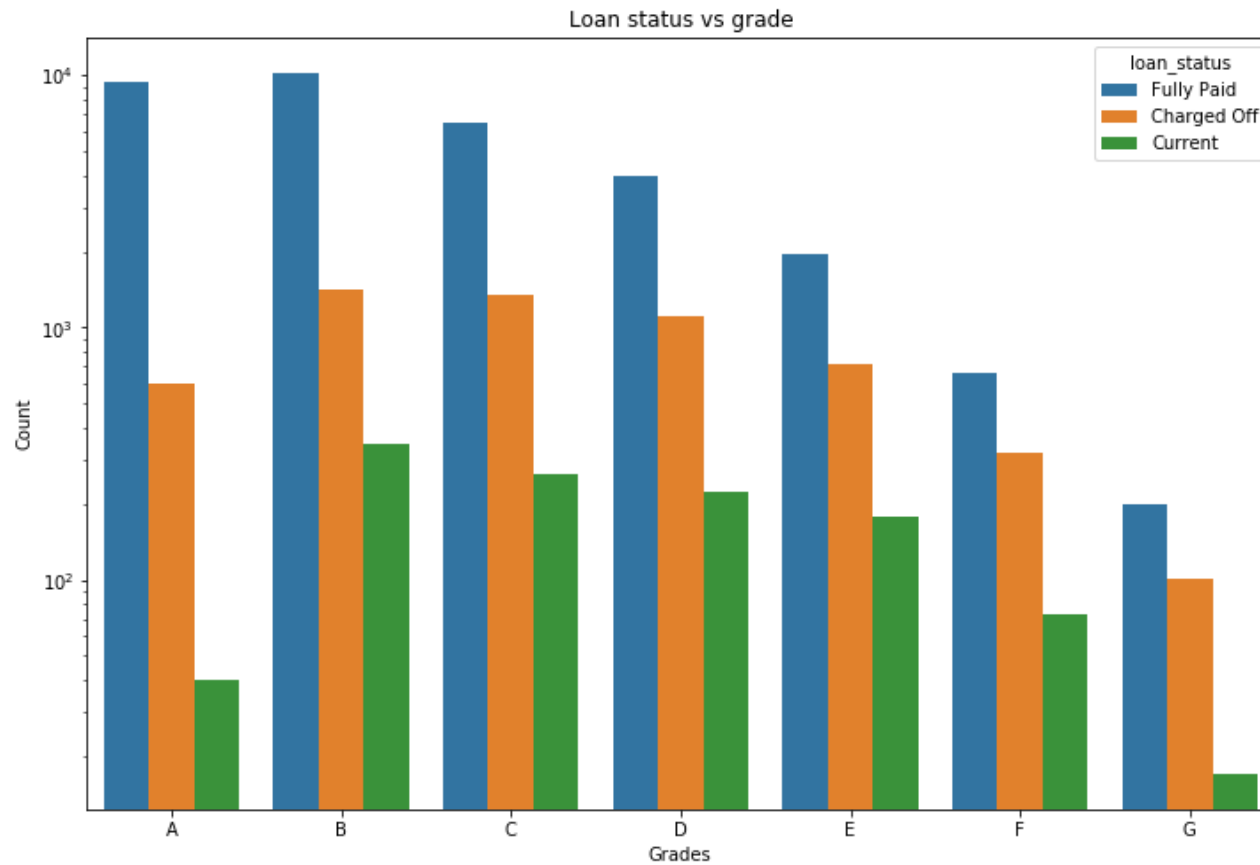# Bi-variate Analysis on Loan Status vs Verification Status

- For Not-Verified customers, defaults are the highest.

- However, it cannot be termed as a strong indicator as the other two parameters – 'Verified' and 'Source Verified' do not show significant difference.

Bi-variate Analysis on Loan Status vs Grades

- Grades B & C have the highest number of defaults.
- B & C are followed by D, E and A.

Heat Map comparison for Loan Amount (Status- Charged Off)

- We tried to find the correlation between loan amount with Loan status – Charged off .
- However, we could not find any strong correlation between them.

Hover to magify

	loan_amnt	funded_amnt	int_rate	emp_length	annual_inc	dti	issue_yr	issue_month
loan_amnt	1	0.98	0.34	0.19	0.35	0.065	0.13	0.07
funded_amnt	0.98	1	0.35	0.19	0.34	0.062	0.14	0.069
int_rate	0.34	0.35	1	0.043	0.13	0.045	0.19	0.081
emp_length	0.19	0.19	0.043	1	0.14	0.058	0.12	0.0058
annual_inc	0.35	0.34	0.13	0.14	1	-0.089	-0.014	0.0098
dti	0.065	0.062	0.045	0.058	-0.089	1	0.098	0.035
issue_yr	0.13	0.14	0.19	0.12	-0.014	0.098	1	-0.0028
issue_month	0.07	0.069	0.081	0.0058	0.0098	0.035	-0.0028	1

Conclusion & Recommendations

- Based on the univariate and bivariate analysis, below indicators can be considered as strong indicators of default:
    - Loan Term
    - Loan Grade
    - Debt to Income (DTI)
    - Employment Length
    - Loan Amount
    - Interest Rates
    - Home Ownership
    - Purpose
    - Address State

- Company must reduce approvals for 36 months loan term as they default more.

- Company must stop giving loans for Grade B as they default the most.

- Company must stop approving high amount loans to customers who have less than 1 year of experience.

- Company needs to reduce approvals for Customers that have purpose as 'Debt Consolidation'.

- Company can scrutinize the applications more for California state customers.

Data Science IIITB

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