

CONSUMER FINANCE CASE STUDY

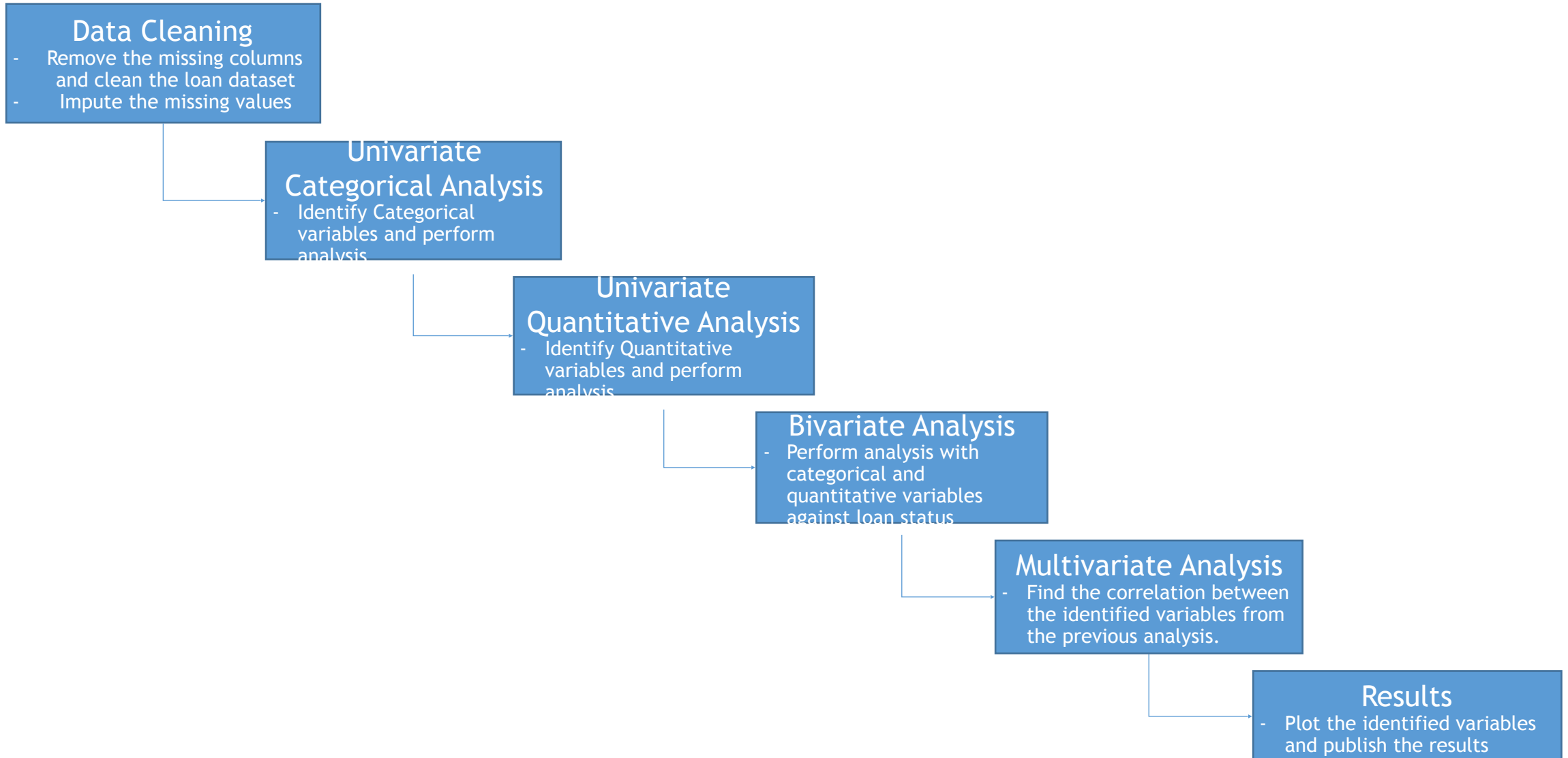
SUBMISSION

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Abstract

- A Consumer Finance 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.
- 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

Problem Solving Methodology



Univariate Analysis

Categorical Variables:

Observations of Categorical variables		
Variable Name	Attribute Type	Observation
term	Loan	Term with 36 months has more number of defaults.
grade	Consumer	Grade B and A has more number of defaults.
sub_grade	Consumer	More defaults in all levels for the Grade B and A.
emp_length	Consumer	Employee length greater than 10 years has some default rate.
home_ownership	Consumer	Home ownership with RENT has more default rate than the others
verification_status	Loan	Not Verified status has more defaults rate.
issue_d	Loan	2011 has more defaults rate
purpose	Consumer	Debt Consolidation has more number of defaults
addr_state	Consumer	CA and FL has more number of defaults
earliest_cr_line	Consumer	2000 has more defaults rate
last_credit_pull_d	Loan	2016 has more number of defaults

Quantitative Variables:

Observations of Quantitative variables		
Variable Name	Attribute Type	Observation
loan_amnt	Loan	Loan Amount less than 10000 has more defaults.
int_rate	Loan	Interest rate more than 12 has more defaults
installments	Loan	Found more defaults in instalments less than 400 but no significant difference.
annual_inc	Consumer	Annual Income less than 60000 has more defaults.
dti	Consumer	Debt to Income rate more than 14% has more defaults
delinq_2yrs	Consumer	Found more default rate that has 1 or more Delinquency incidences
inq_last_6mths	Consumer	Found more default rate that has 0 inquiries
open_acc	Consumer	One has less than 10 open accounts has more defaults.
pub_rec	Consumer	Found more default rate that has 1 or more public records
revol_util	Consumer	Revolving utilization rate greater than 50% has more defaults.

Bivariate Analysis

Categorical Variables:

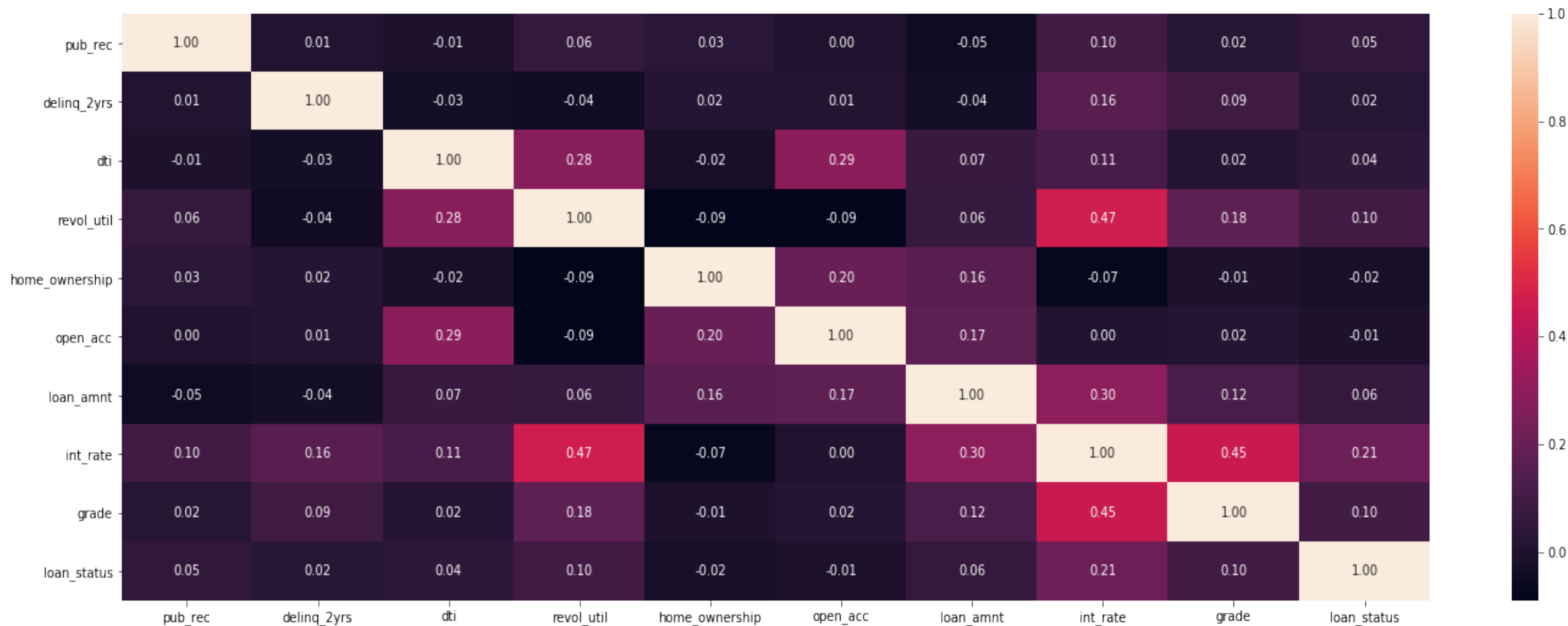
Observations of Categorical variables		
Variable Name	Attribute Type	Observation
term	Loan	Term with 60 months has more defaults.
grade	Consumer	Grade C to G has more defaults.
sub_grade	Consumer	Found more defaults in all levels for the Grade C to G.
emp_length	Consumer	Employee length greater than 10 years has some default rate.
home_ownership	Consumer	Home ownership with RENT has more default rate than the others
verification_status	Loan	Verified and Source verified status has few defaults.
issue_d	Loan	2011 has more defaults rate
purpose	Consumer	Debt Consolidation has more number of defaults
addr_state	Consumer	CA and FL has more number of defaults
earliest_cr_line	Consumer	2000 has more defaults rate
last_credit_pull_d	Loan	2016 has more number of defaults

Quantitative Variables:

Observations of Quantitative variables		
Variable Name	Attribute Type	Observation
loan_amnt	Loan	Loan Amount greater than 15000 has more defaults.
int_rate	Loan	Interest rate more than 12 has more defaults
installments	Loan	Found more defaults in instalments greater than 400.
annual_inc	Consumer	Annual Income less than 60000 has more defaults
dti	Consumer	Debt to Income rate more than 14% has more defaults
delinq_2yrs	Consumer	Found more default rate that has 1 or more Delinquency incidences
inq_last_6mths	Consumer	Found more default rate that has 1 or more inquiries
open_acc	Consumer	One has less than 5 open accounts has more defaults.
pub_rec	Consumer	Found more default rate that has 1 or more public records
revol_util	Consumer	Revolving utilization rate greater than 50% has more defaults.

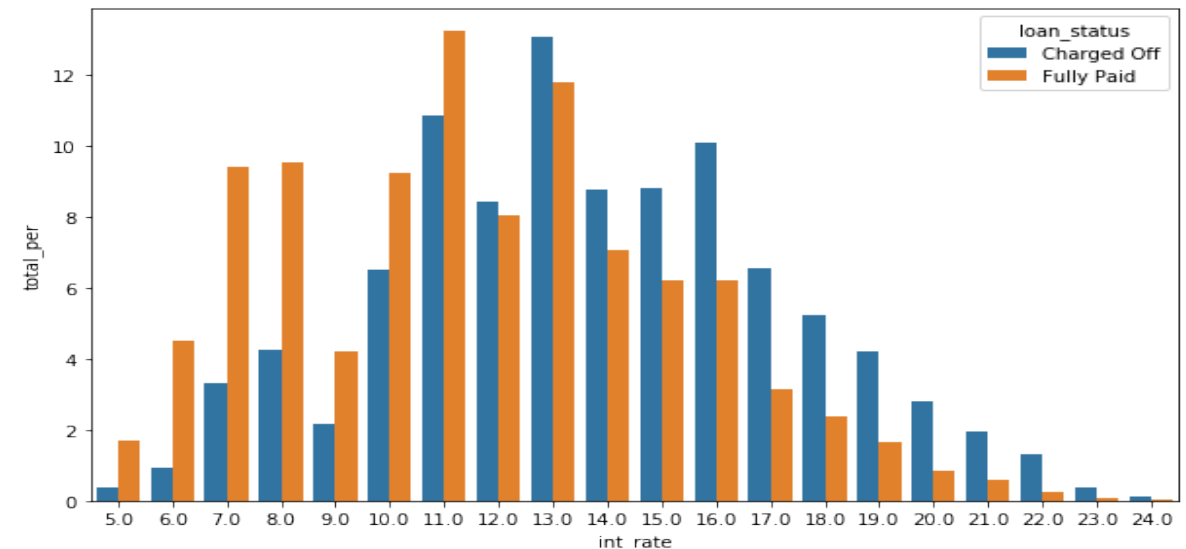
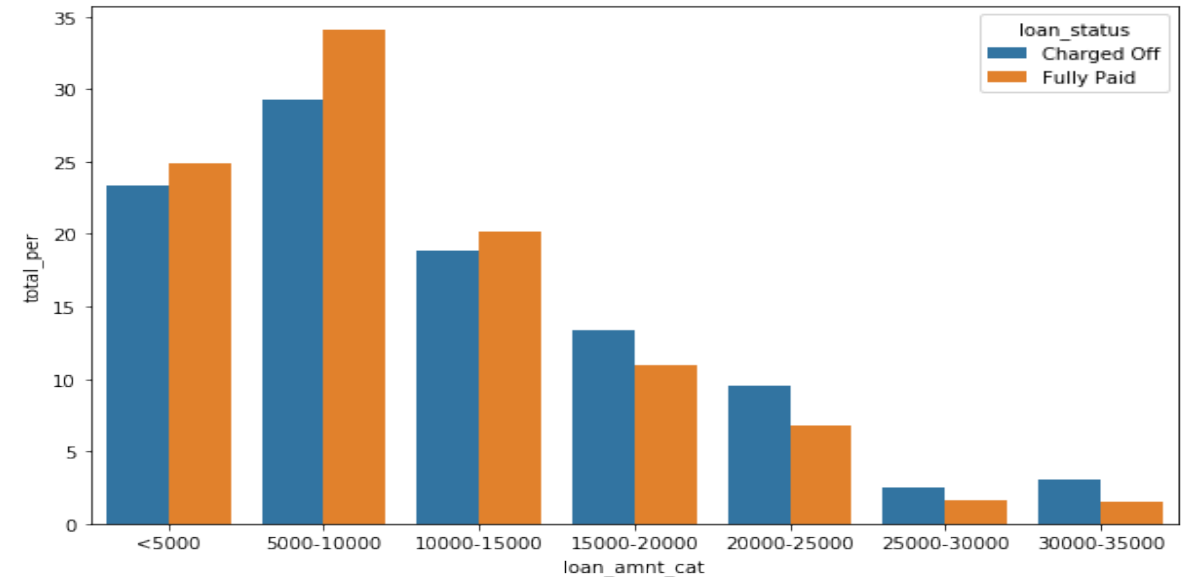
Multivariate Analysis

Correlation between the driver variables using Heat map:



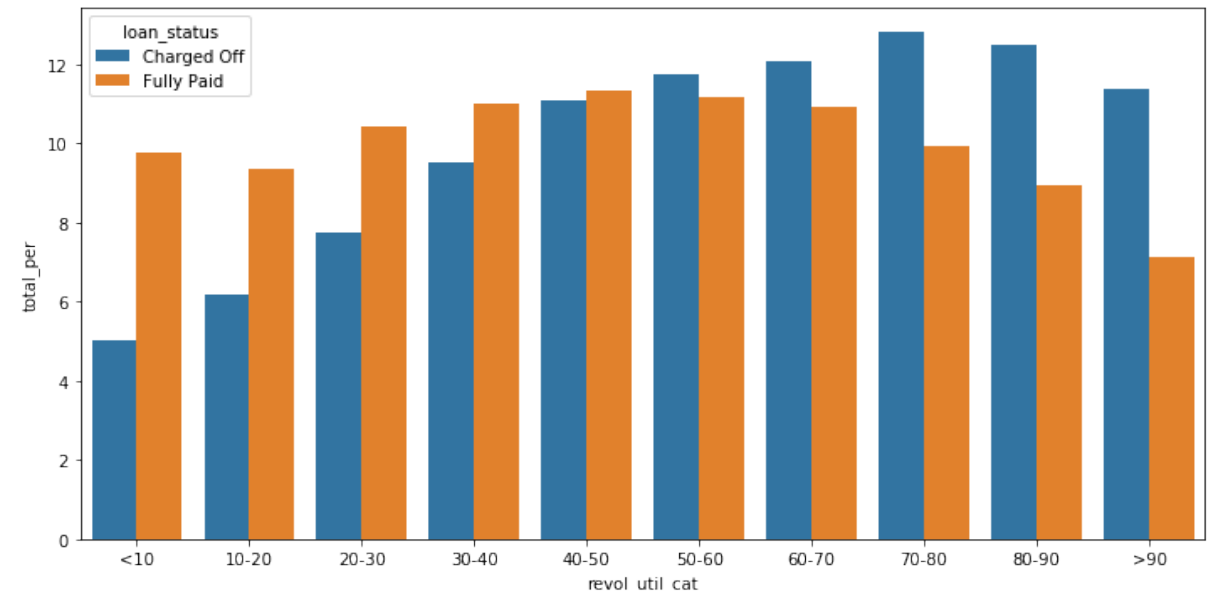
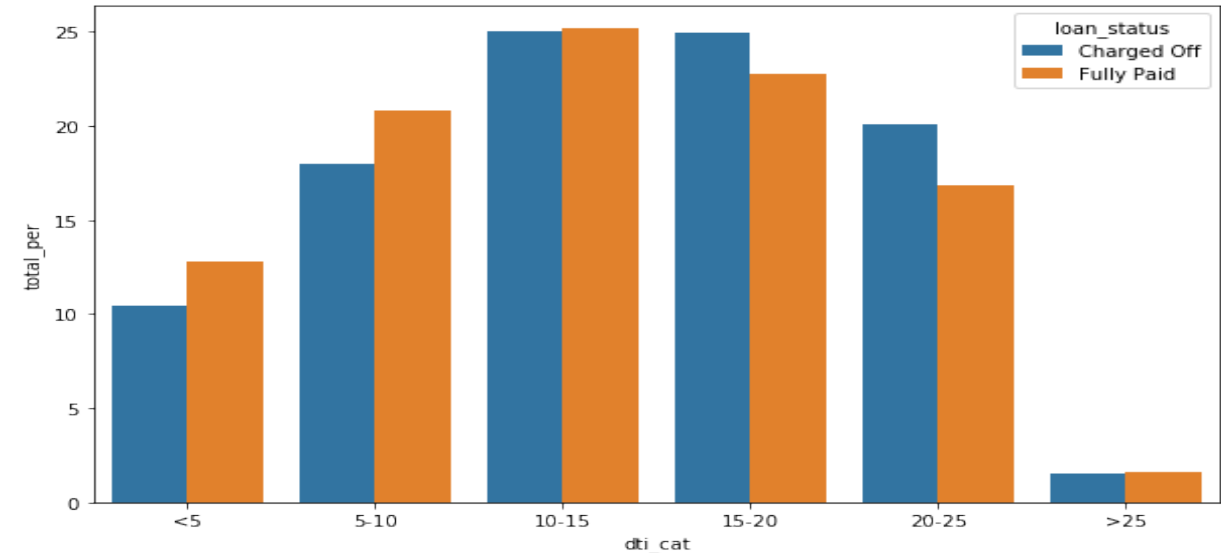
Loan Attribute Results

- From the Univariate and Bivariate analysis of loan attributes,
 - Loan Amount(loan_amnt)** greater than **15000** has been observed with more defaults.
 - Interest Rate(int_rate)** greater than **12** has more default rate
- Also there is a positive correlation of **30%** between the **Loan Amount** and **Interest Rate**.
- Hence the **Loan Amount** and **Interest Rate** will be the most suitable driver variables behind Loan Default from loan perspective.



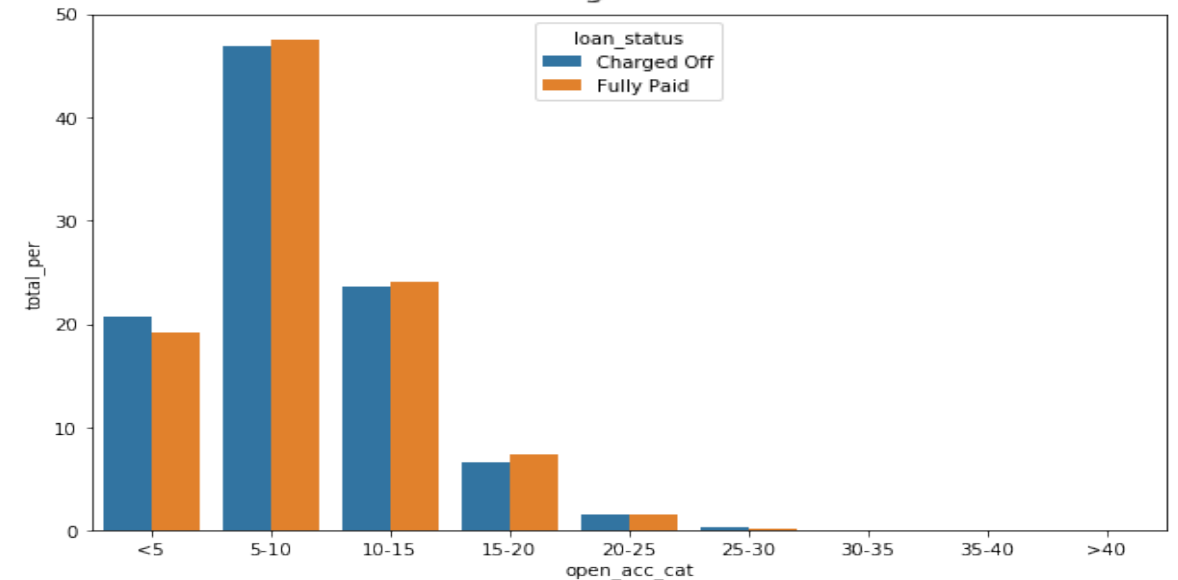
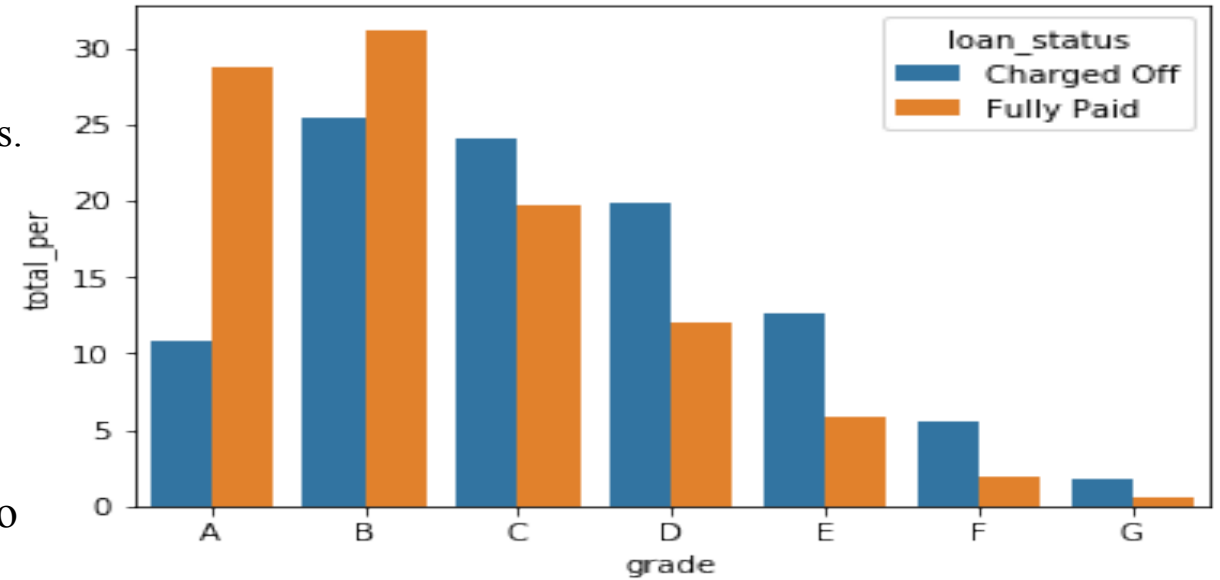
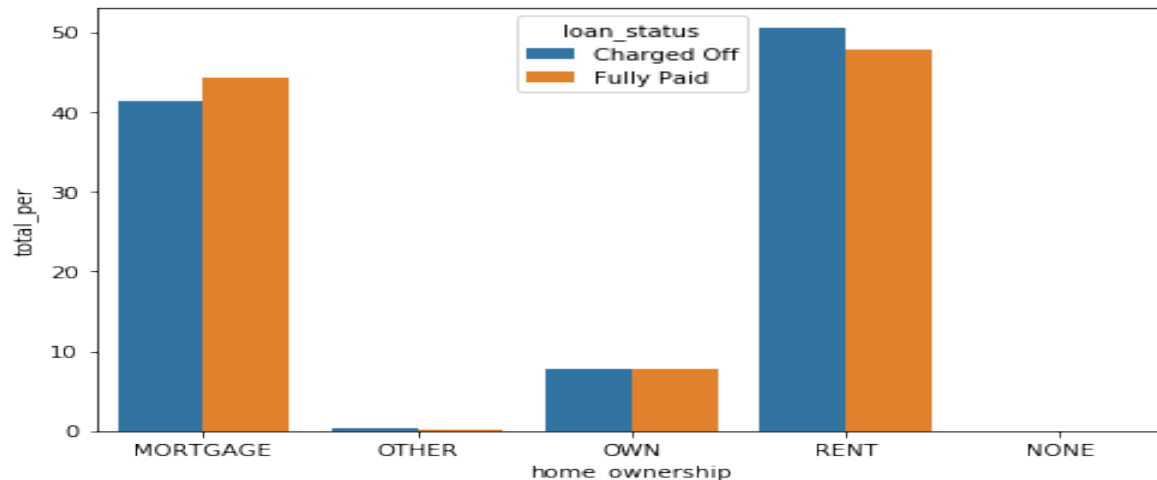
Consumer Attribute Results

- From the Univariate and Bivariate analysis of consumer attributes,
 - Debt-to-Income(dti)** greater than **15** has been observed with more defaults.
 - Revolving Utilization(revol_util)** greater than **50%** has more default rate
- There is a positive correlation of **28%** between the **dti** and **revol_util**.
- Also **revol_util** has a strong correlation with **int_rate** of **47%**.
- Hence the **dti** and **revol_util** will be the most suitable driving factors for Loan Default as far as consumer attributes are concerned.



Consumer Attribute Results

- From the Univariate and Bivariate analysis of consumer attributes,
 - Grade** between **C and G** has been observed with more defaults.
 - Open_acc** less than **5** has more default rate
 - Home Ownership** with **RENT** has more defaults
- Also **Grade** has a strong correlation of **45%** with **Int_rate**.
- And **Open_acc** has a positive correlation of **29%** with **Dti**.
- Hence the **Grade, Open_acc, Home_Ownership** will be the recommended driving factors for Loan Default with respect to consumer attributes.



Conclusion

The 3 main “C's of credit” for consumer are character, capacity, and collateral.

Character:

Grade is determined by the borrowers credit scores and credit history. So it can be used to understand the character of a consumer. Found that the **Grade between C and G** has more defaults.

Capacity:

Debt-to-Income(dti) and **Revolving Utilization(revol_util)** can used to measure the capacity of a consumer like how much credit is being used compared with how much credit is available.

Found that the **DTI > 15 and Revol_Util > 50%** has more number of defaults.

Collateral:

Open_acc and **Home_Ownership** can be used to determine the collateral of a consumer which can be used as security for repayment of a loan. Found that the **Open_acc < 5 and Home_Ownership as RENT** has more defaults.

Hence we recommend **Consumer Finance Company** to consider these driver variables which are strong indicators of default for its portfolio and risk assessment and also to determine the **loan amount** and the **interest rate** for a consumer loan.