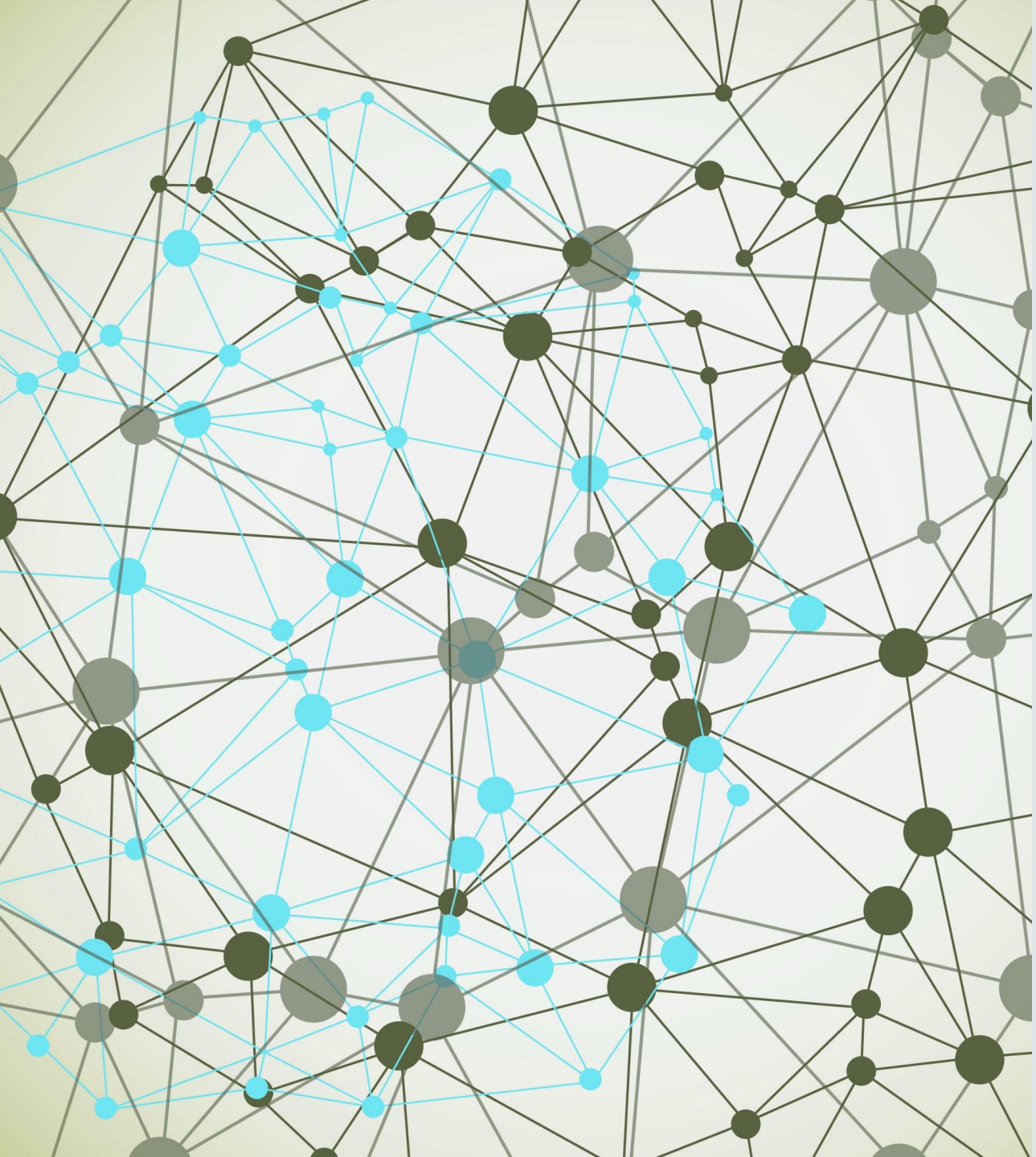


Case Study-1
Lending Club

Submitted by :

Koushik & Monal Okhandiar

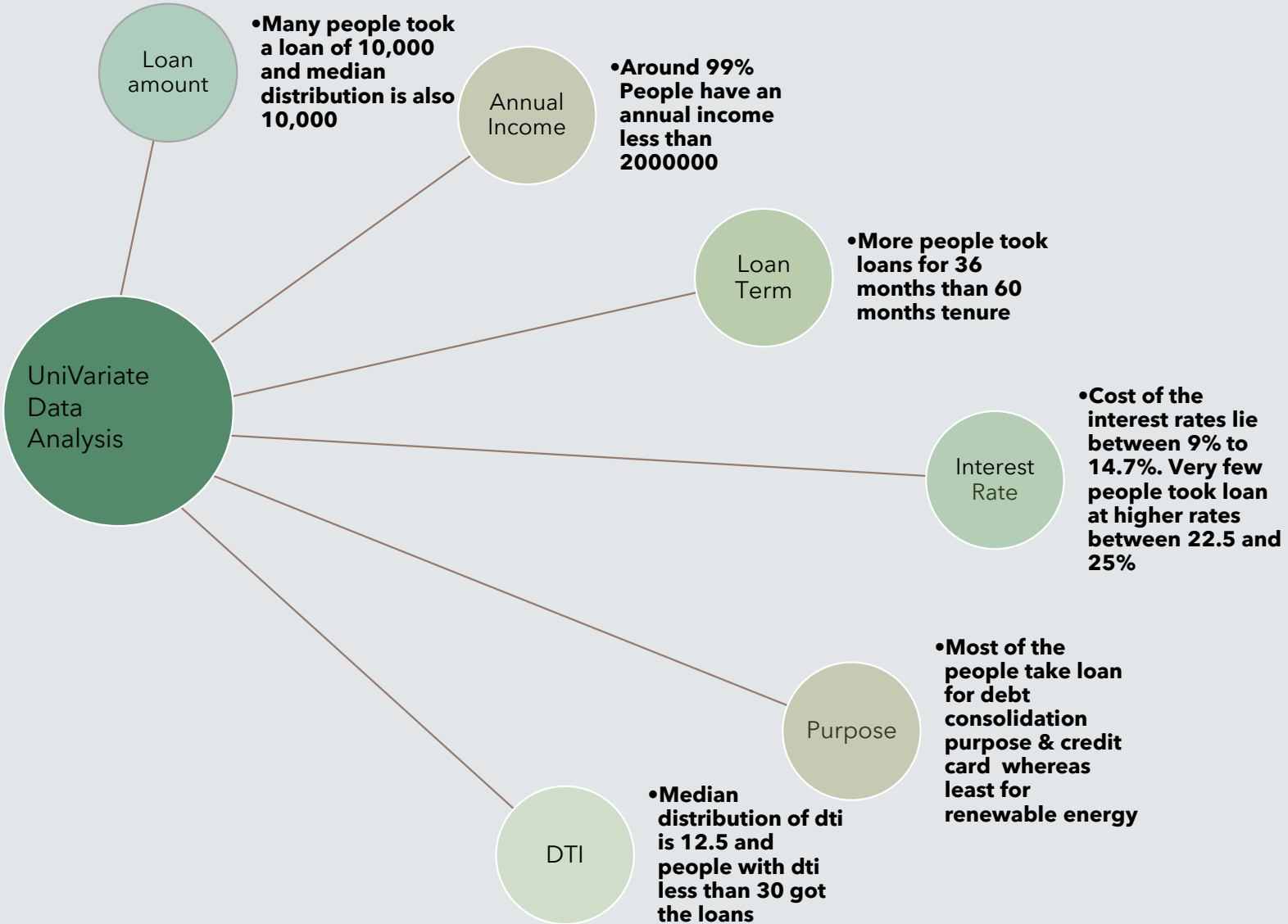
Problem Statement

- For lending companies, lending loans to 'risky' applicants is the largest source of financial loss (called credit loss). These Companies faces Credit loss when the borrower "defaults " i.e. refuses to pay or runs away with the money owed.
- In this case study , 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 which can help them to minimise huge credit loss.

Analysis approach

1) For the given data set , first we will do **data cleaning**
2) Identify the columns which are actually helpful for our analysis
3) Perform EDA (univariate, segmented univariate and bivariate)
4) Observations are taken note by looking at the plots
5) Final insights inferred from all the above observations

Data Analysis - UniVariate & Observation



Univariate Data Analysis

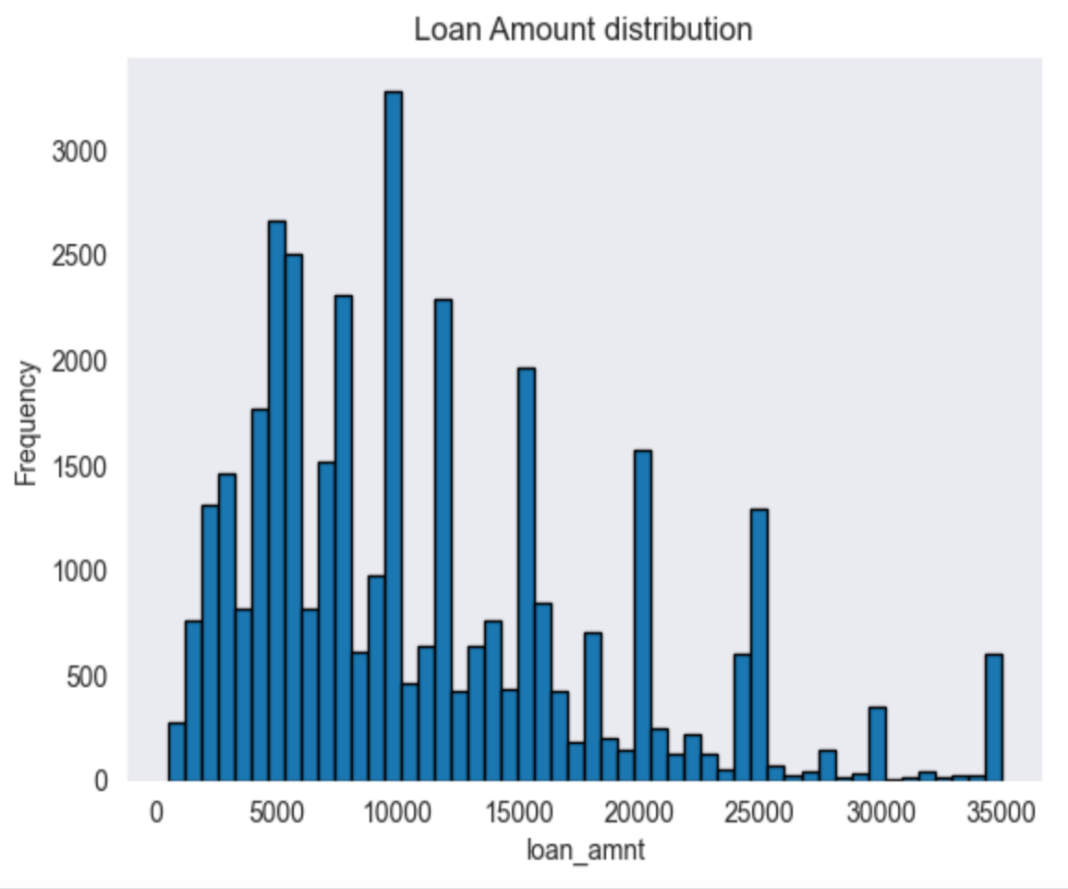


Fig 1.1 Load amount distribution – univariate

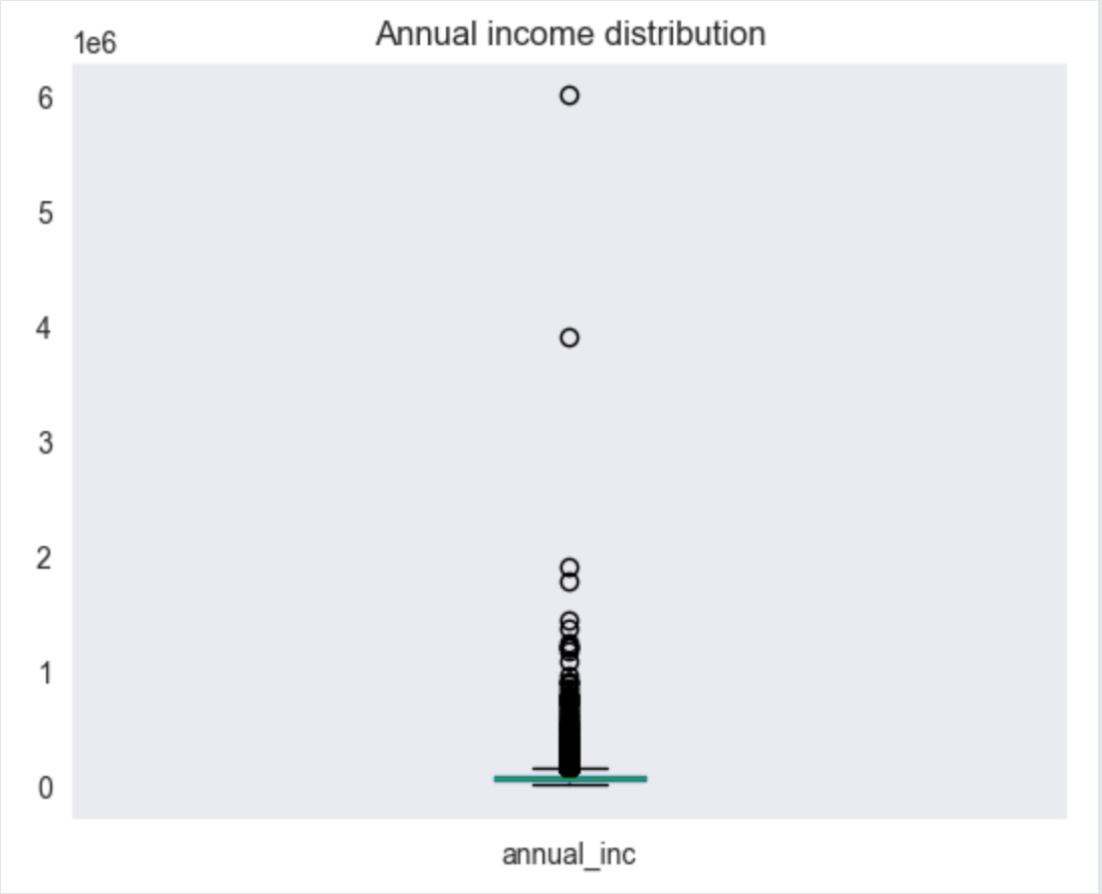


Fig 1.2 Annual Income Distribution - Univariate

Univariate Data Analysis

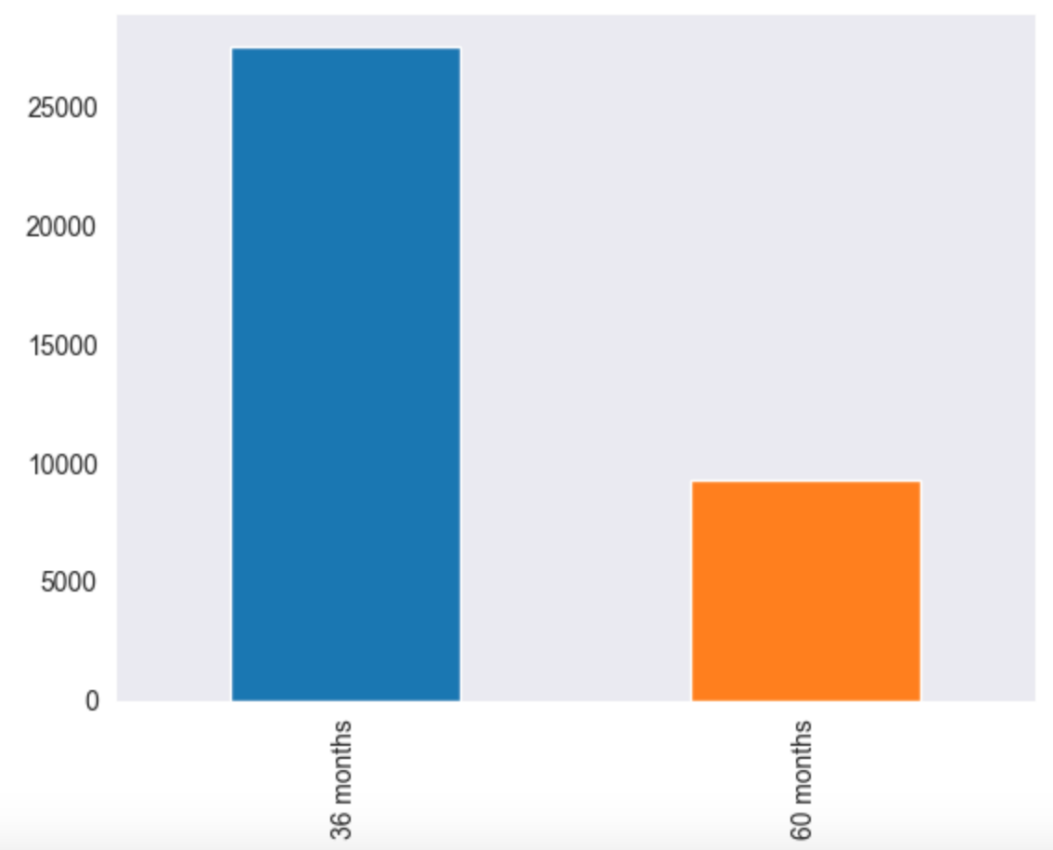


Fig 1.3 Loan Distribution- Univariate

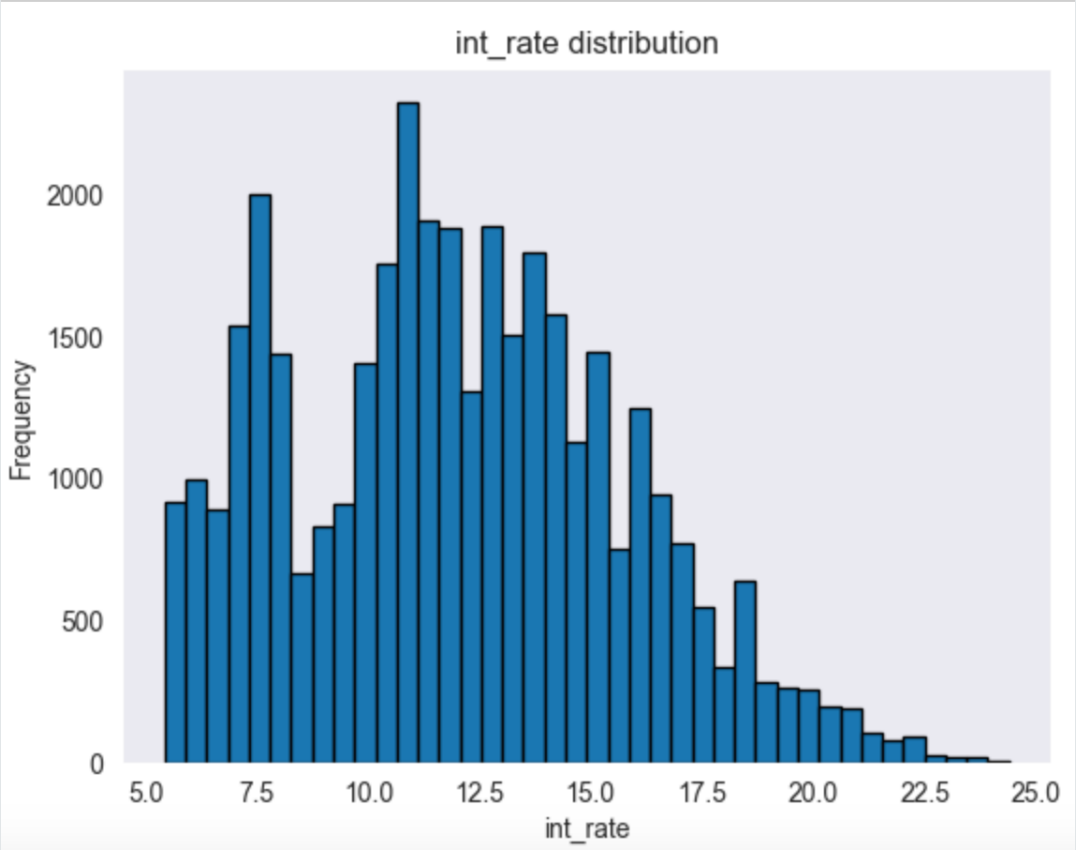


Fig 1.4 Interest Rate Distribution- Univariate

Univariate Data Analysis

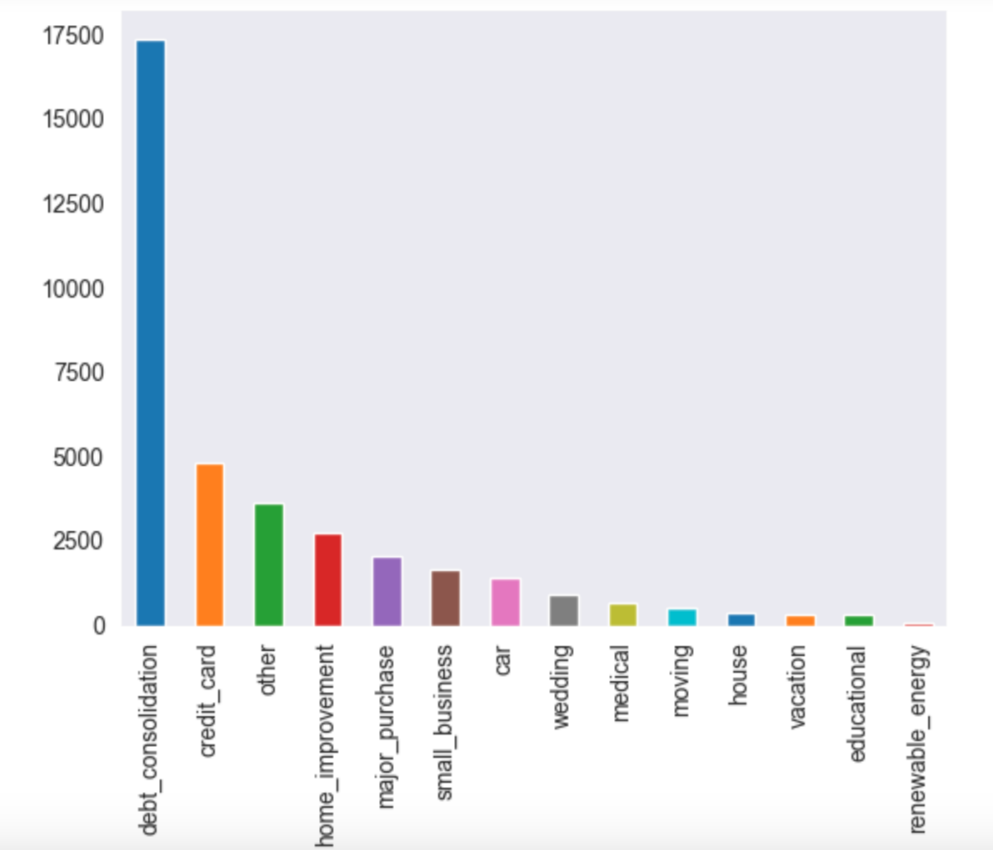


Fig 1.5 Purpose Distribution- Univariate

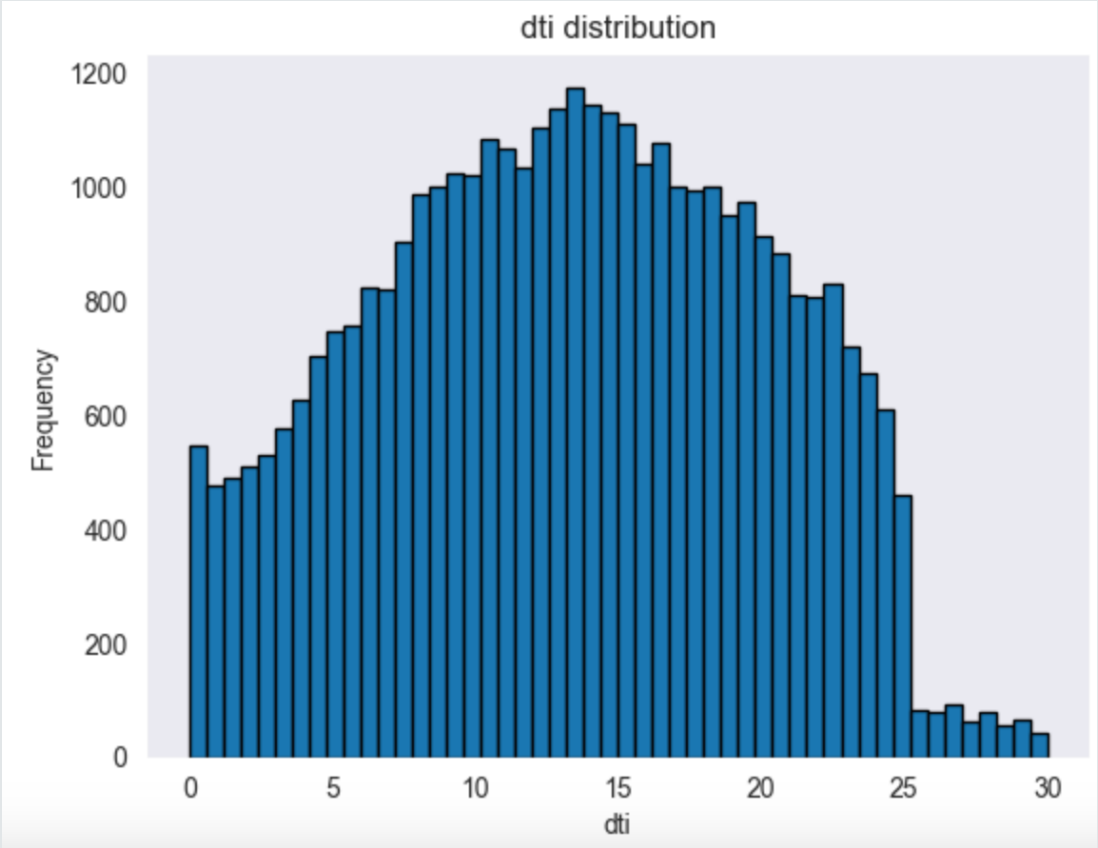


Fig 1.6 DTI Distribution- Univariate

Univariate Data Analysis

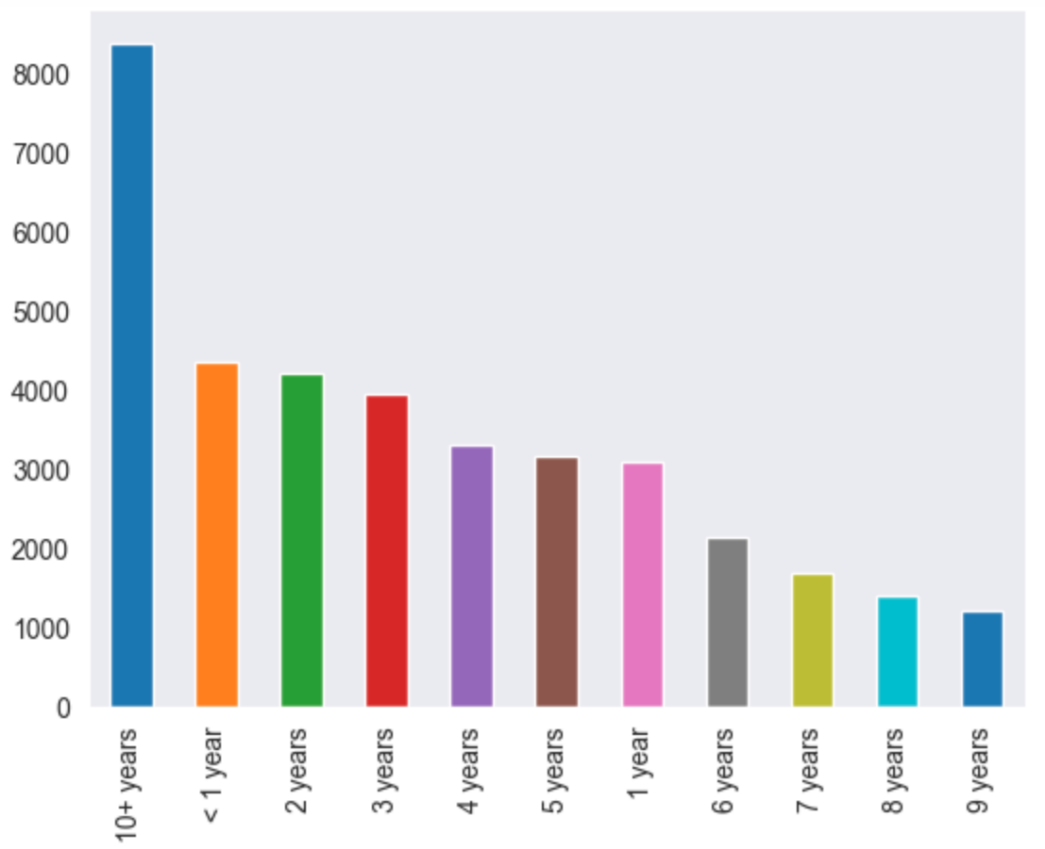


Fig 1.7 Employment Length Distribution- Univariate

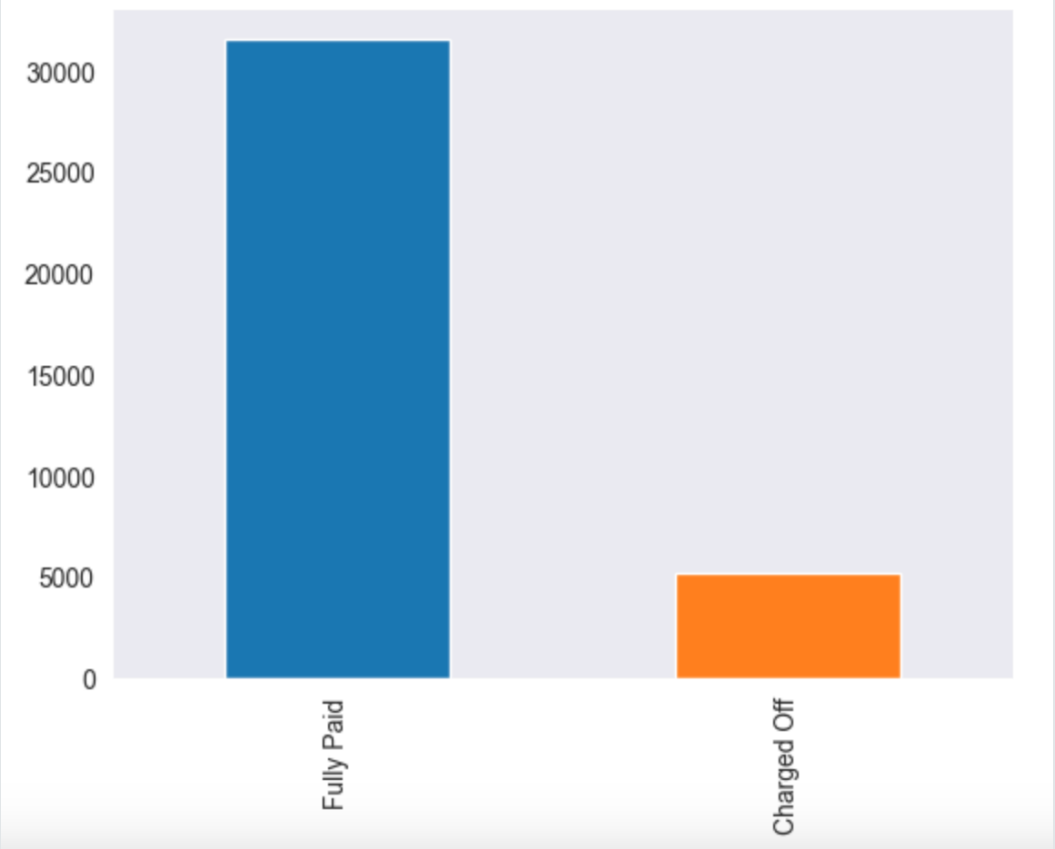
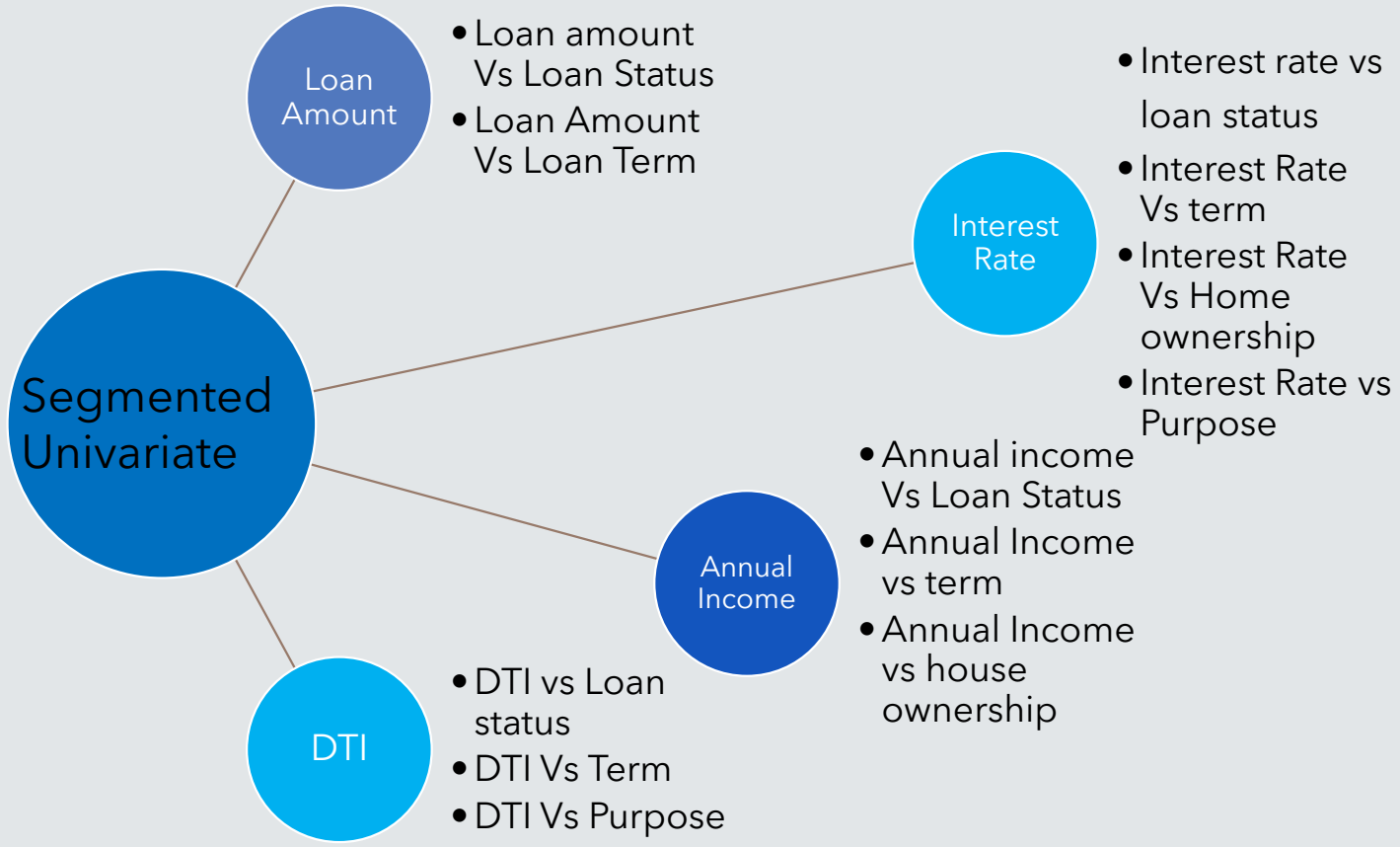


Fig 1.8 Loan Payment Status

Observation – UniVariate

- More people took loans for 36 months than 60 months tenure. (Fig 1.3)
- Many people took a loan of 10,000 and median distribution is also 10,000 (Fig 1.1))
- Around 99% People have an annual income less than 2000000.(Fig 1.2)
- Most of the interest rates lie between 9% to 14.7%. Very few people also took loan at higher rates between 22.5 and 25%.(Fig 1.4)
- The median distribution of dti is 12.5 and people with dti less than 30 got the loans. (Fig 1.6)
- Most of the people take loan for debt consolidation purpose and least for renewable energy. (Fig 1.7)

Data Analysis : Segmented Univariate



Segmented Univariate – Loan Amount Vs Other Variables

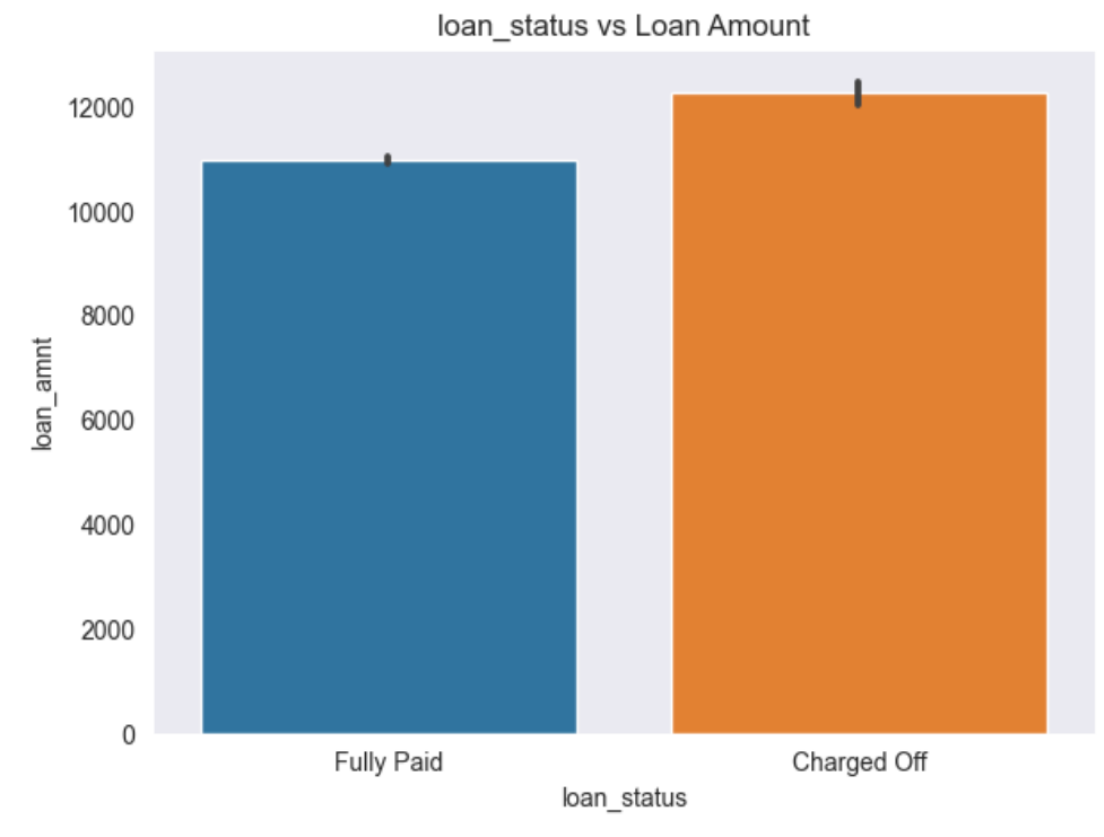


Fig 2.1 Loan Amount Vs Loan Status

Fig 2.2 Loan Amount Vs Term

Segmented Univariate – Interest Rate Vs Other Variable

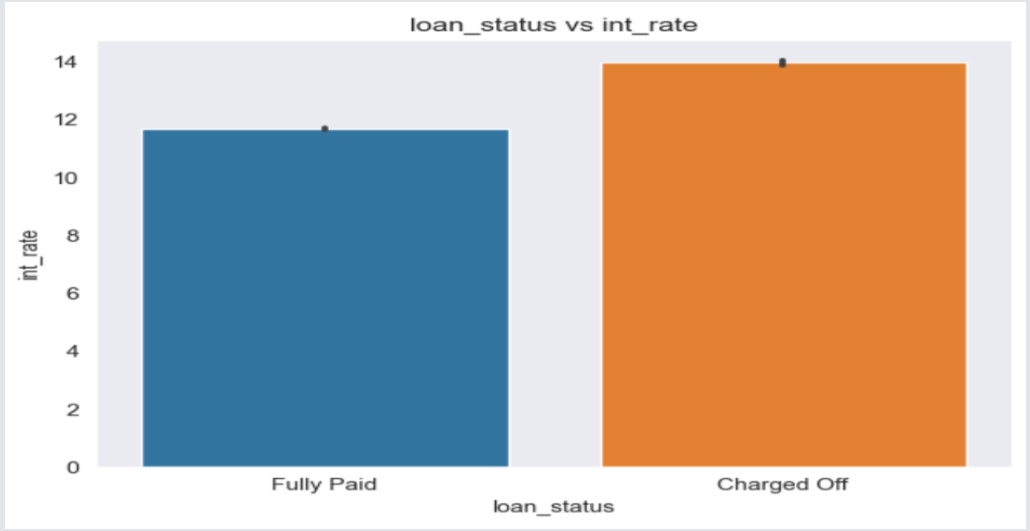


Fig 2.3 Interest rate Vs Loan Status

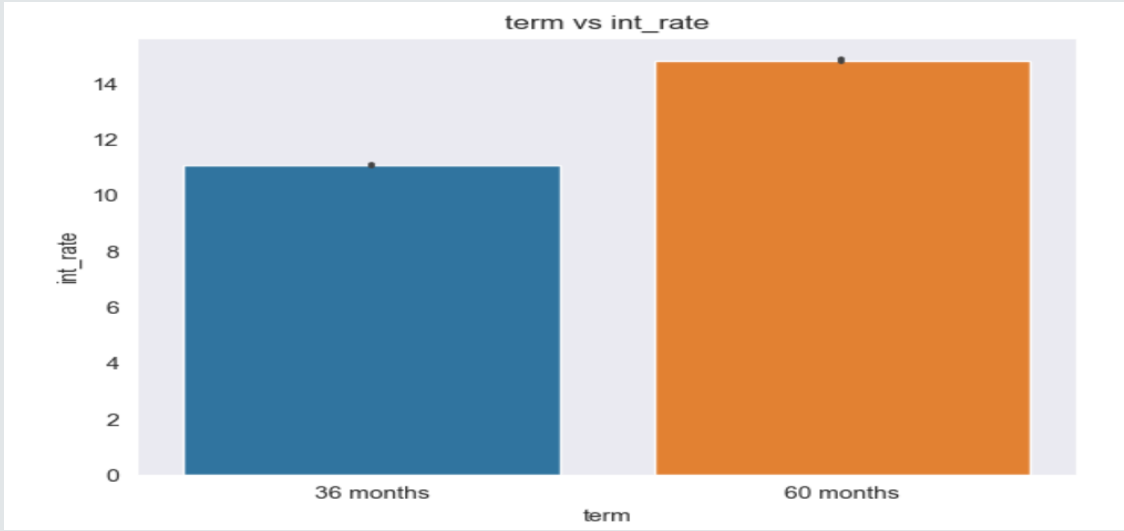


Fig 2.4 Interest Rate Vs Loan Term

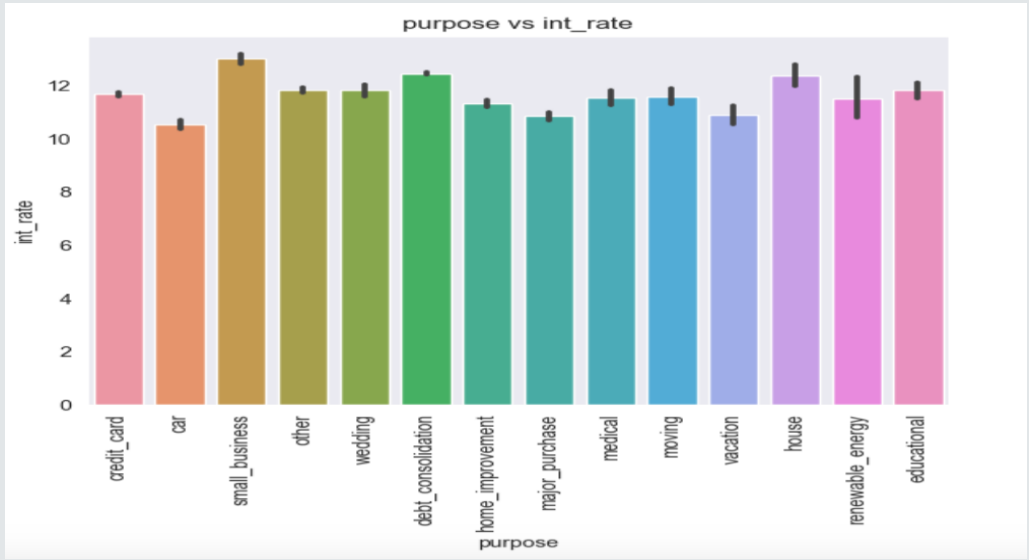


Fig 2.5 Interest Rate Vs Purpose

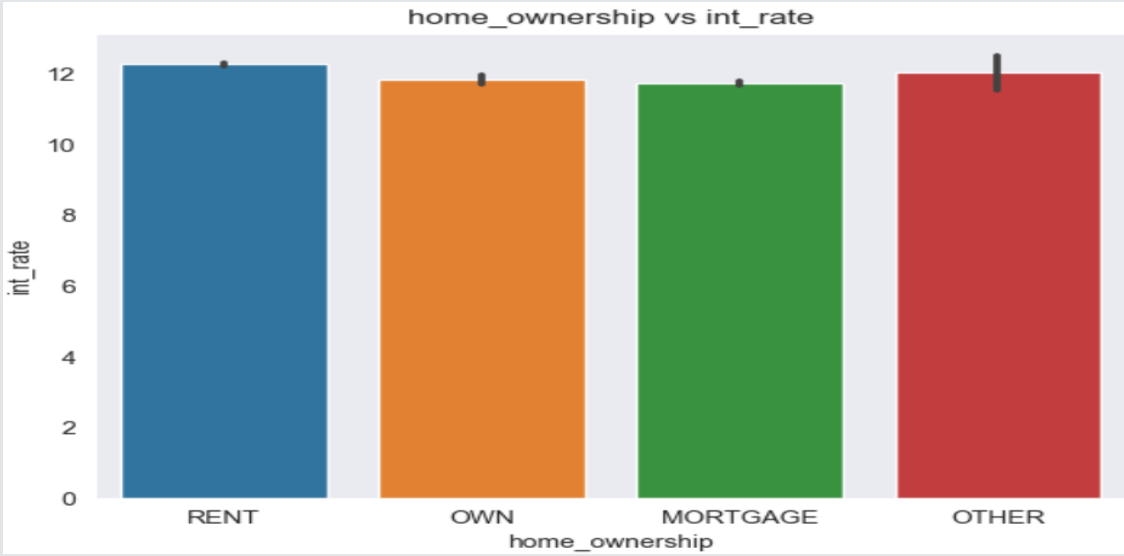


Fig 2.6 Interest rate Vs Home ownership

Segmented Univariate – Annual Income Vs Other Variable

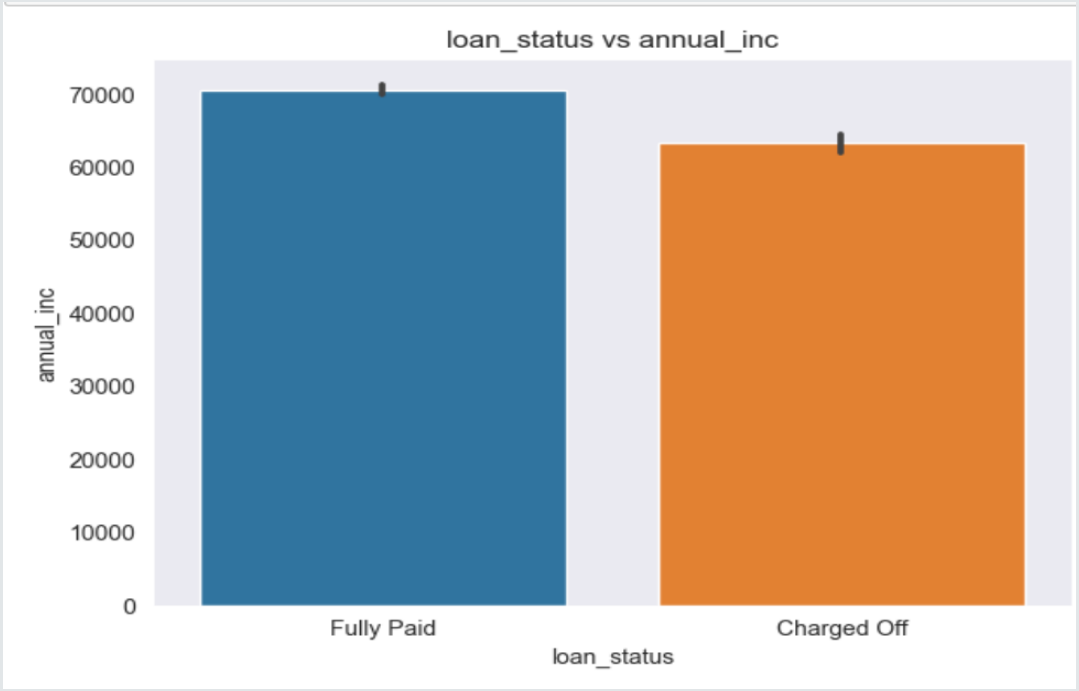


Fig 2.7 Annual Income Vs Loan Status

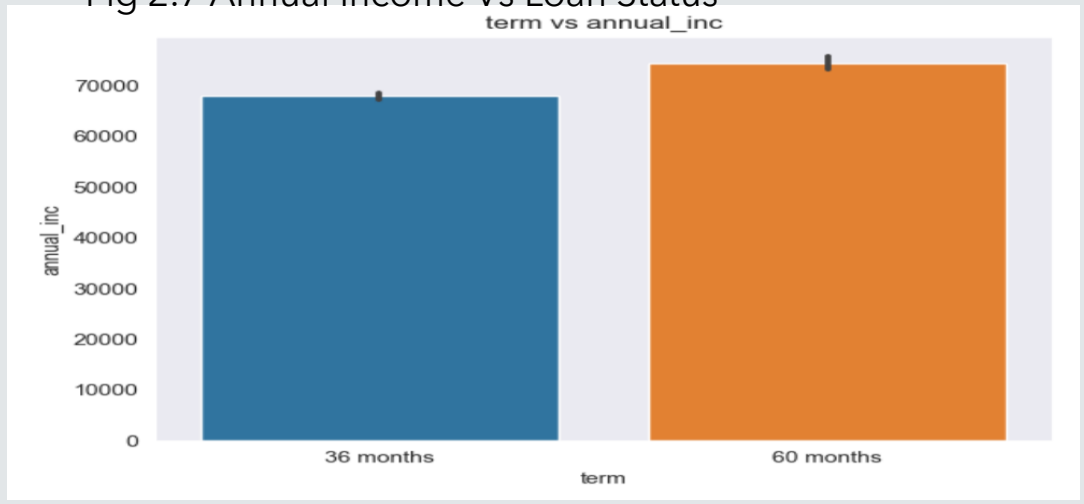


Fig 2.9 Annual Income Vs House Ownership

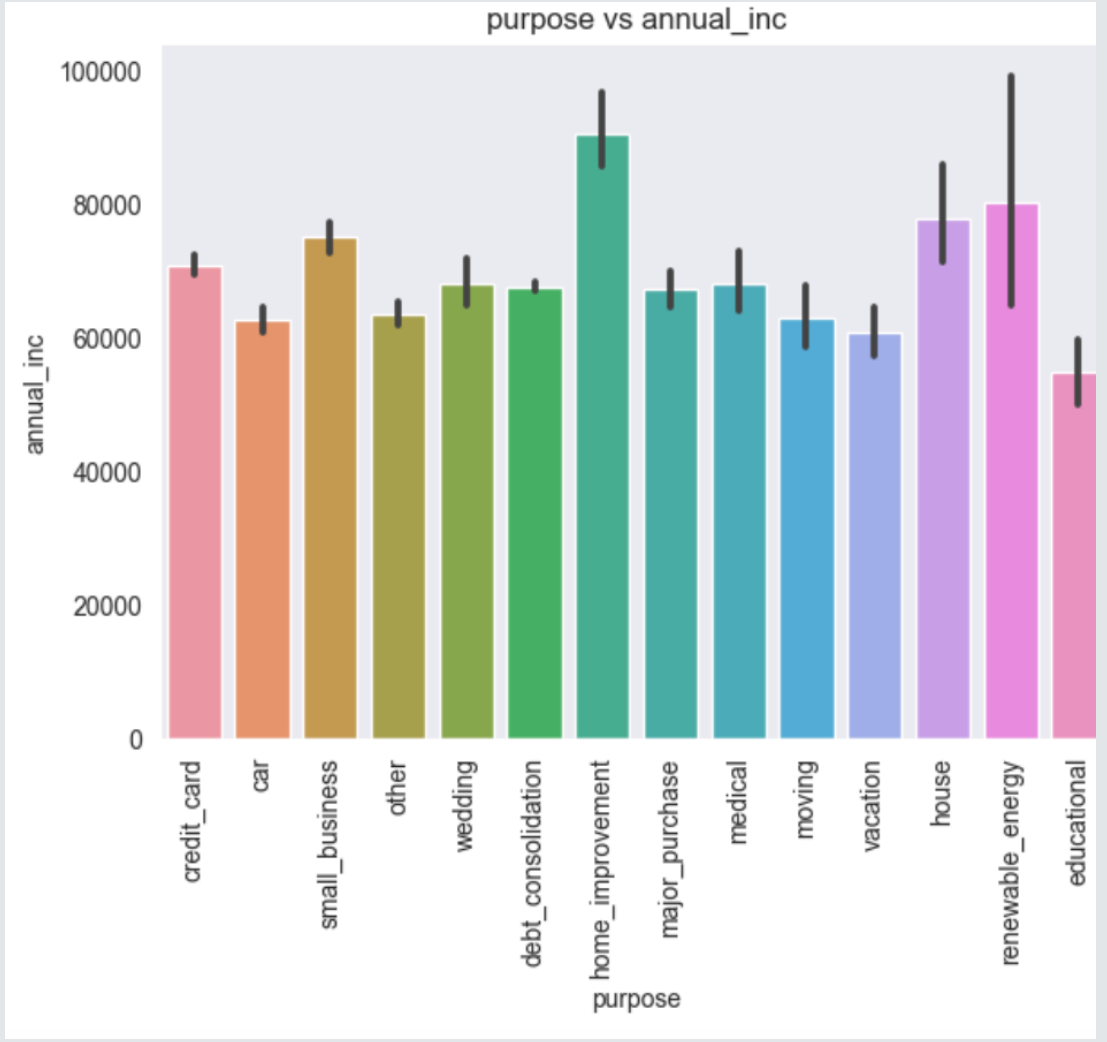


Fig 2.9 Annual Income Vs Purpose

Segmented Univariate – DTI Vs Other Variable

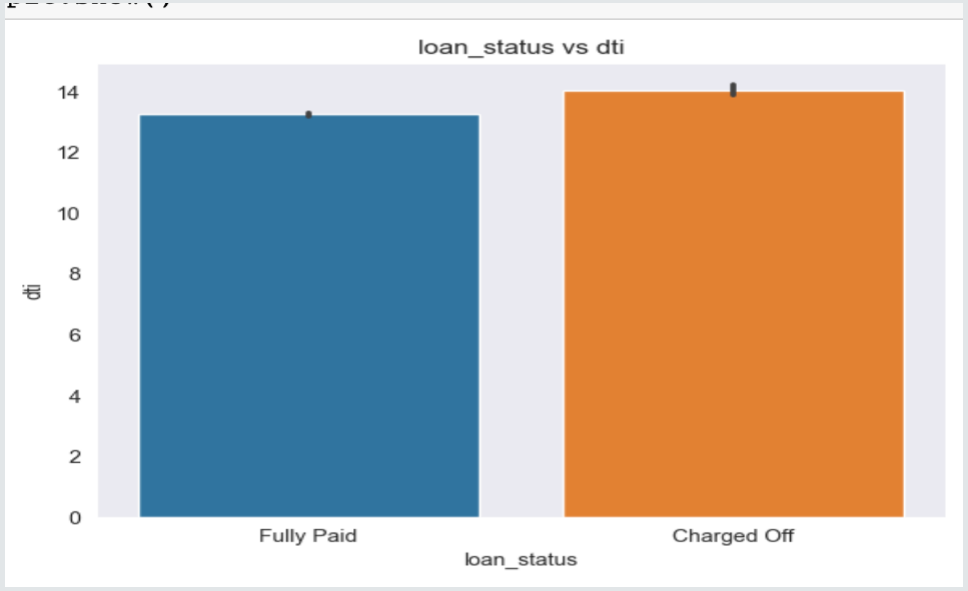


Fig 2.10 DTI Vs loan status

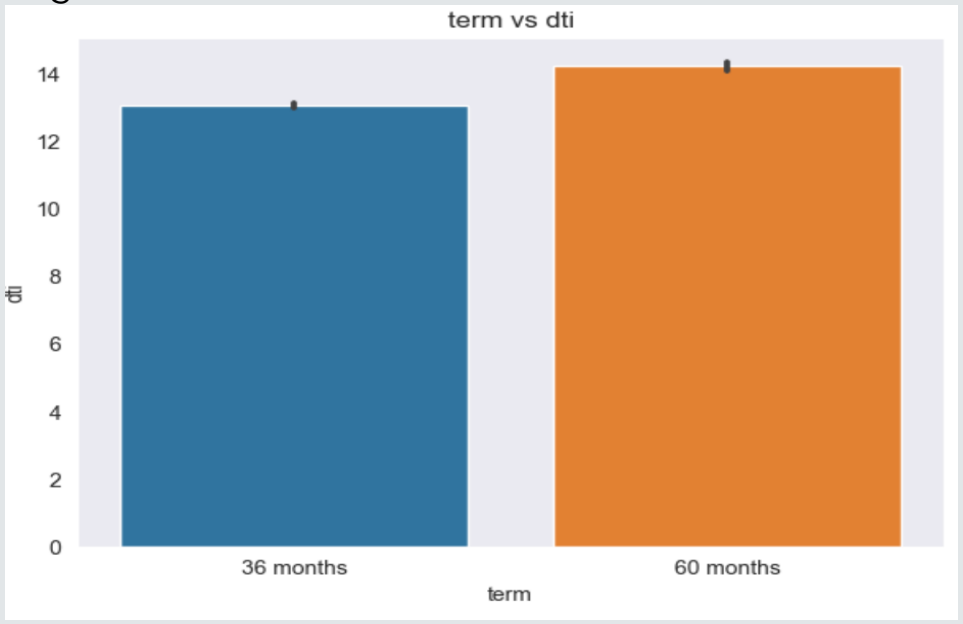


Fig 2.12 DTI Vs loan term

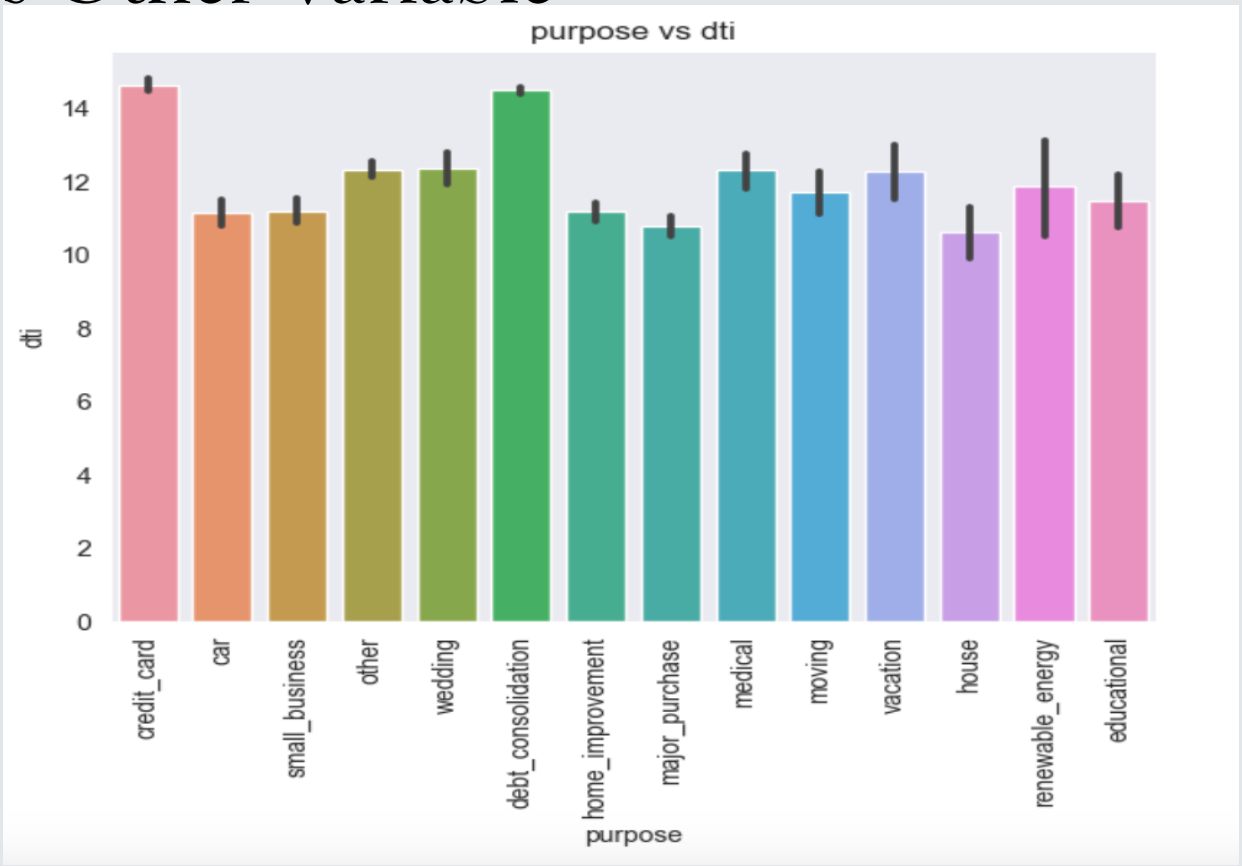


Fig 2.11 DTI Vs loan status

Observation – Segmented UniVariate

- The higher the loan amount, the higher the default rate (Fig 2.1)
- Most loans are taken for 60 months tenure (Fig 2.4)
- More loans are given for small business, house, house improvement and debt_consideration (Fig 2.5)
- High rate of interests are being defaulted more (Fig 2.3)
- 60 month tenure loans have high rate of interests (Fig 2.4)
- small business loan have high rate of interests and hence small business have greater chance of defaulting (Fig 2.5)
- Homeownership has no effect on interest rate (Fig 2.6)
- Borrowers with higher annual income are more likely to completely pay off

Data Analysis : Bivariate

- Employment Length Vs Loan Amount
- Purpose Vs Loan Amount
- Public Bankruptcies Vs Loan Amount
- Term Vs Loan Status

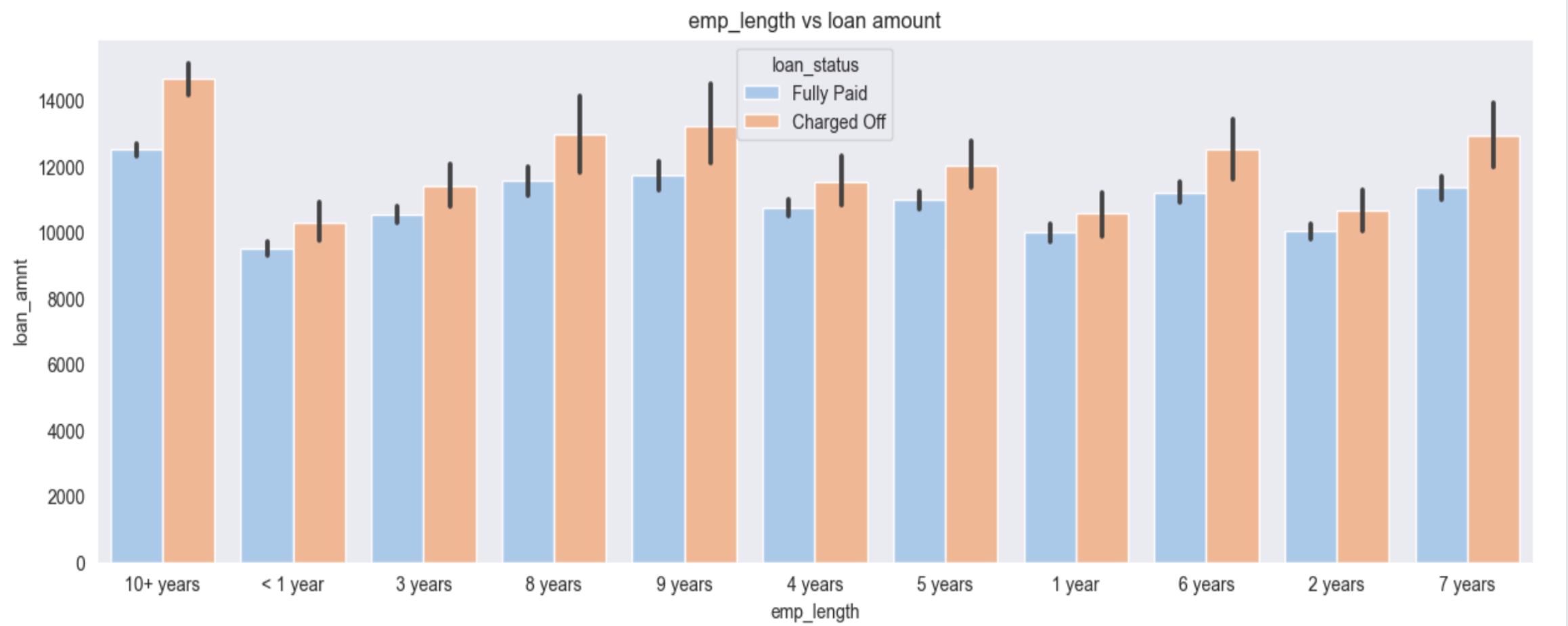


Fig 3.1 : Employment Length Vs Loan Amount

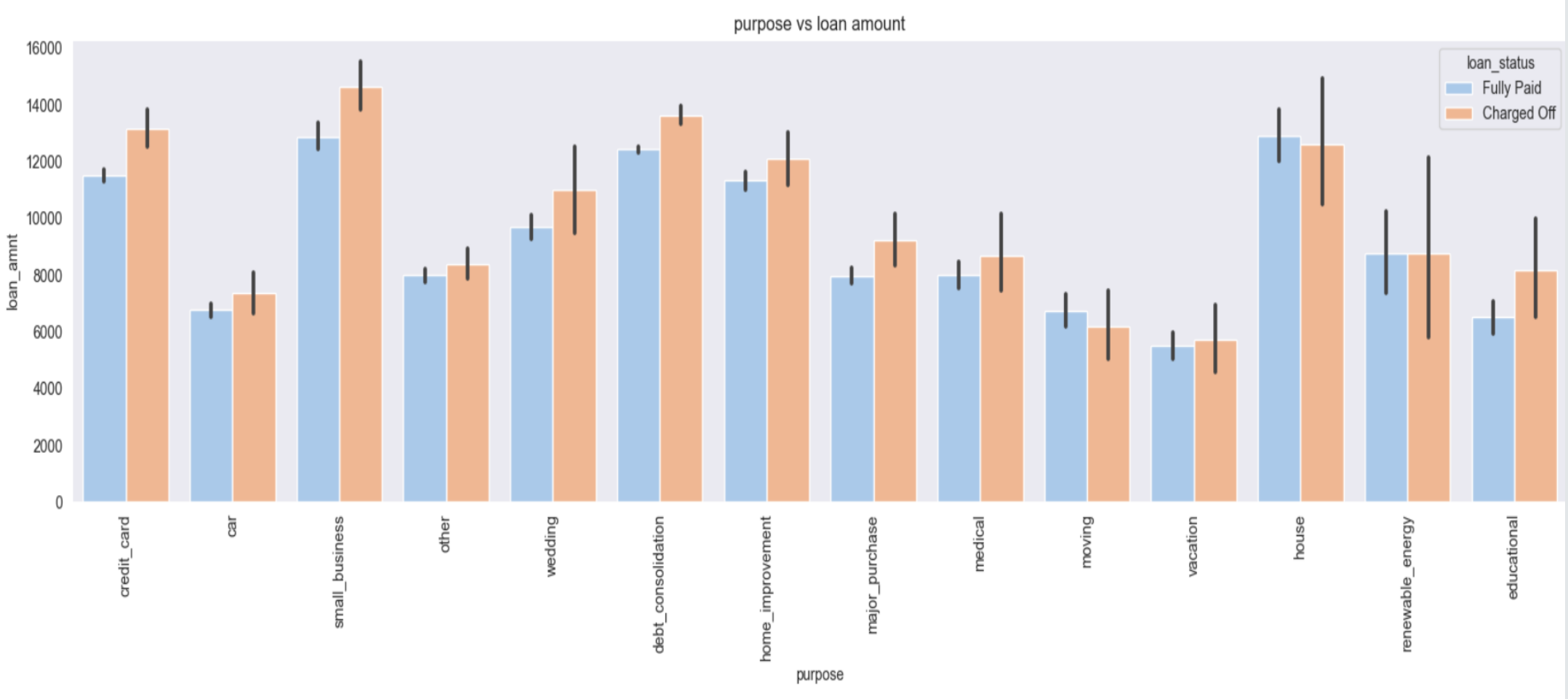


Fig 3.2: Purpose Vs Loan Amount .

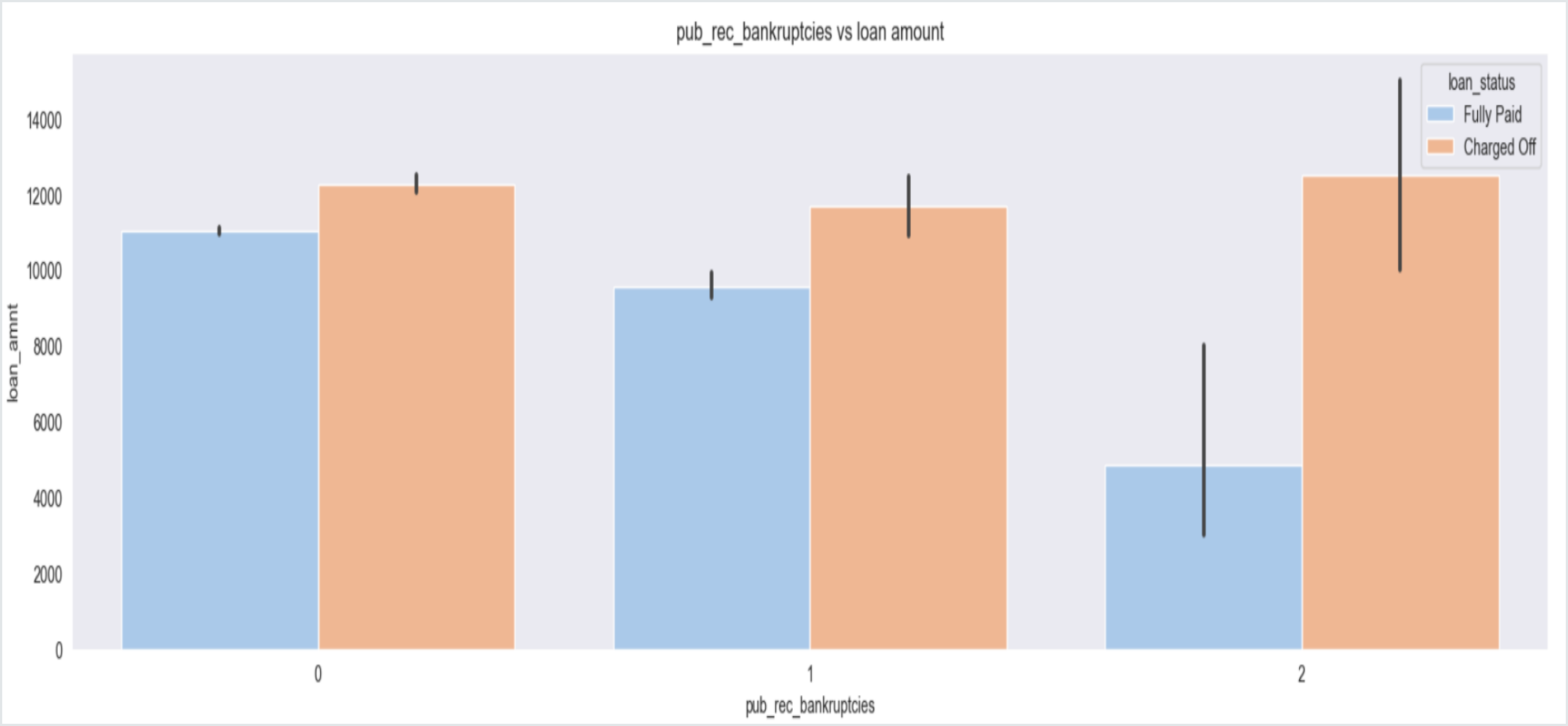


Fig 3.3 : Public Bankruptcies Vs Loan Amount

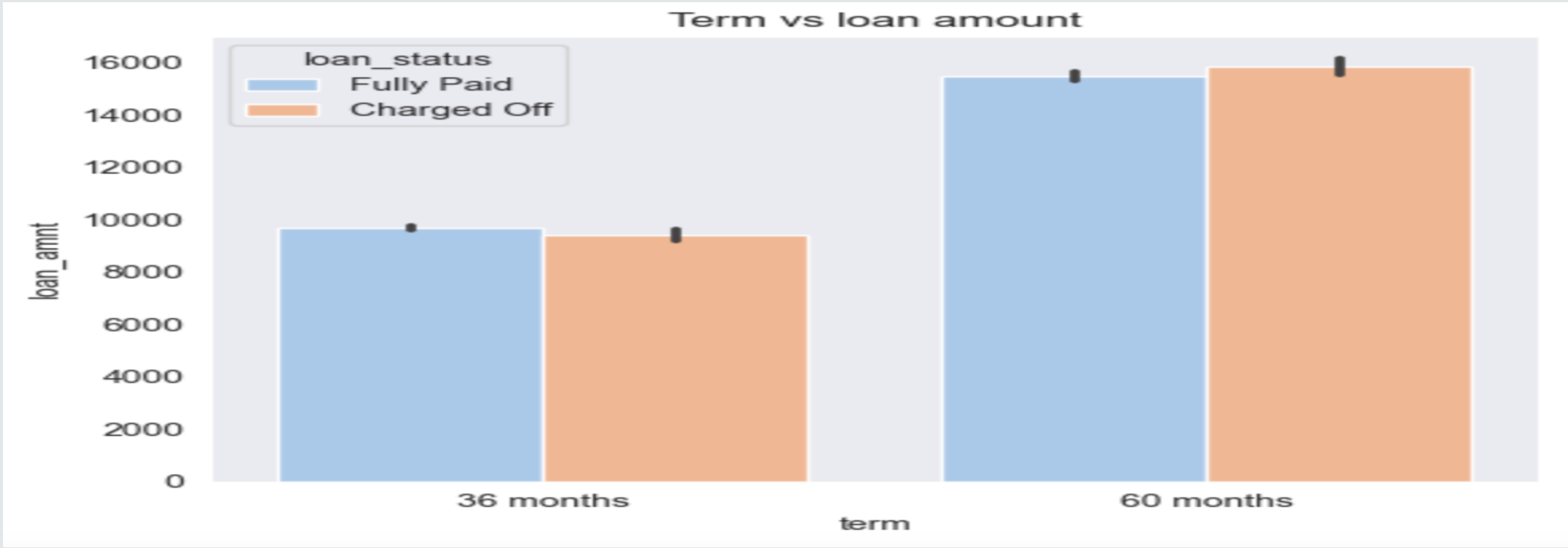


Fig 3.4 : Loan Term Vs Loan Amount

Correlation Matrix

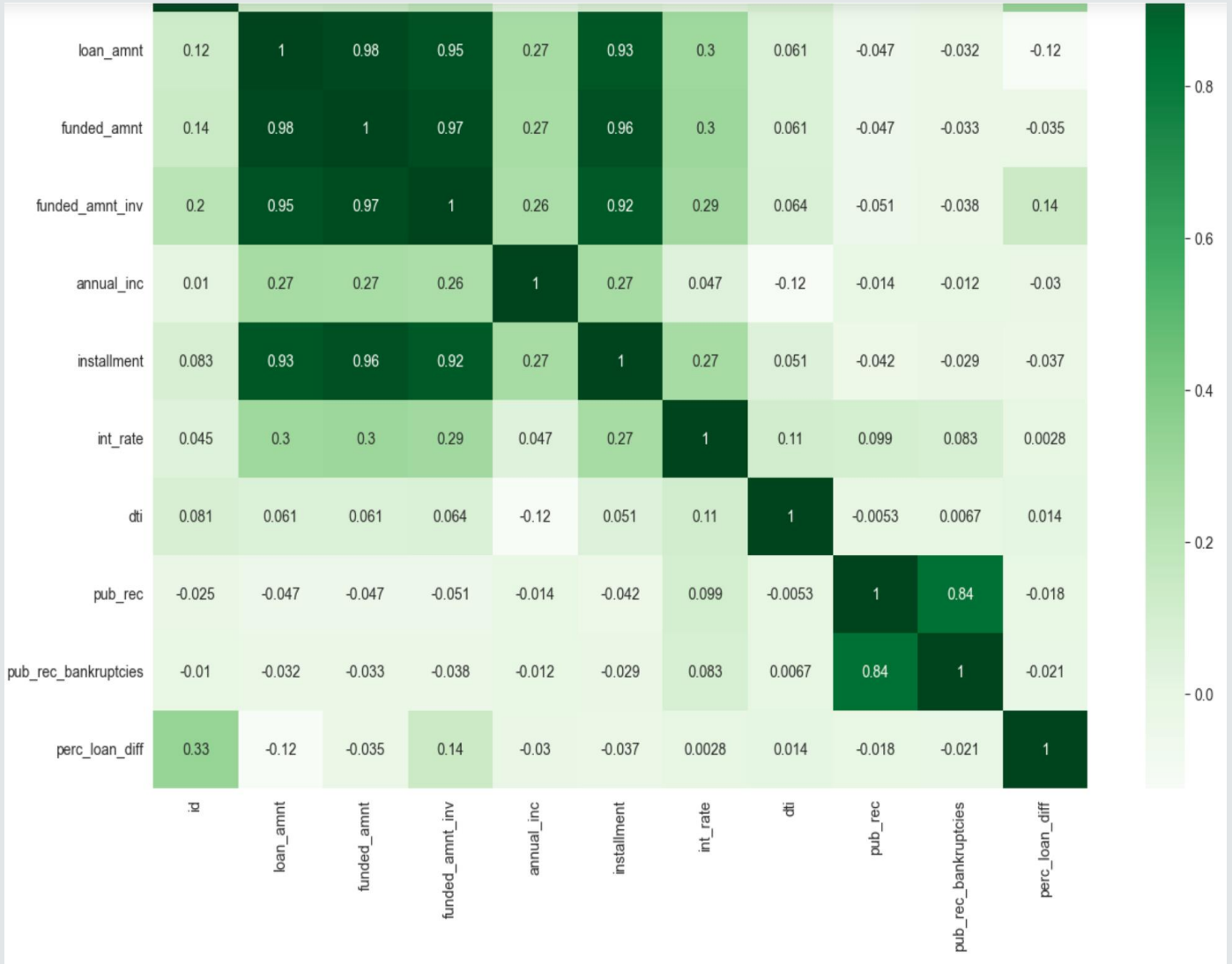


Fig: 4 , Correlation between various driving factors of Credit Loss

- No of derogatory public records is highly correlated with public record bankruptcies

Observation – BiVariate

- Borrowers took higher amounts for small business, credit card, debt_consideration and default rate is also higher.(Fig 3.2)
- Borrowers with 10+ years of employment took higher loan amounts, and the defaulting rate is also high.(Fig 3.1)
- Borrowers with more public bankruptcies records tends to take higher loan amount and are likely to default.(Fig 3.3)
- Default rate is high in both the tenures irrespective of loan amount (Fig 3.4)
- Borrowers are more likely to default if they have public derogatory records ,which is also related to their bankruptcy (Fig 4)

In order to reduce the credit loss of the lending club, it should follow below suggestions

- Club should issue balanced number of loans to borrowers from CA, FL and NY
- Club should reduce issuing higher number of loans of 60 months tenure
- Club should reduce issuing loans for credit card, debt consolidation
- Borrowers are more likely to default if they have public derogatory records ,which is also related to their bankruptcy. So club shouldn't issue loans to people with public derogatory records.
- Borrowers with their house in mortgage shouldn’t be issued loans amounts greater than 12000 and club should also issue balanced number of loans to them
- Borrowers with higher annual income are more likely to completely pay off.
- Club should not issue loan to borrowers with DTI is between 12-18
- House ownership only is not the deciding factor for defaulting

THANK YOU