Lending Club Case Study

Group Members:

- ❖ Mohit Duklan
- ❖ Nalinikanta Das

Business Understanding

Consumer finance company which specializes in lending various types of loans to urban customers. When the company receives a loan application, the company 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

If a Person is Likely To Default

- Denying the loan.
- Reducing the amount of loan.
- Lending at a higher interest rate.

Scenario that can happen if company accepted loan:

- **Fully paid:** Applicant has fully paid the loan.
- **Current:** Applicant is in the process of paying the instalments.
- **Charged-off:** Applicant has not paid the instalments in due time.

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Objective

The company wants to understand the driving factors (or driver variables) behind loan default:

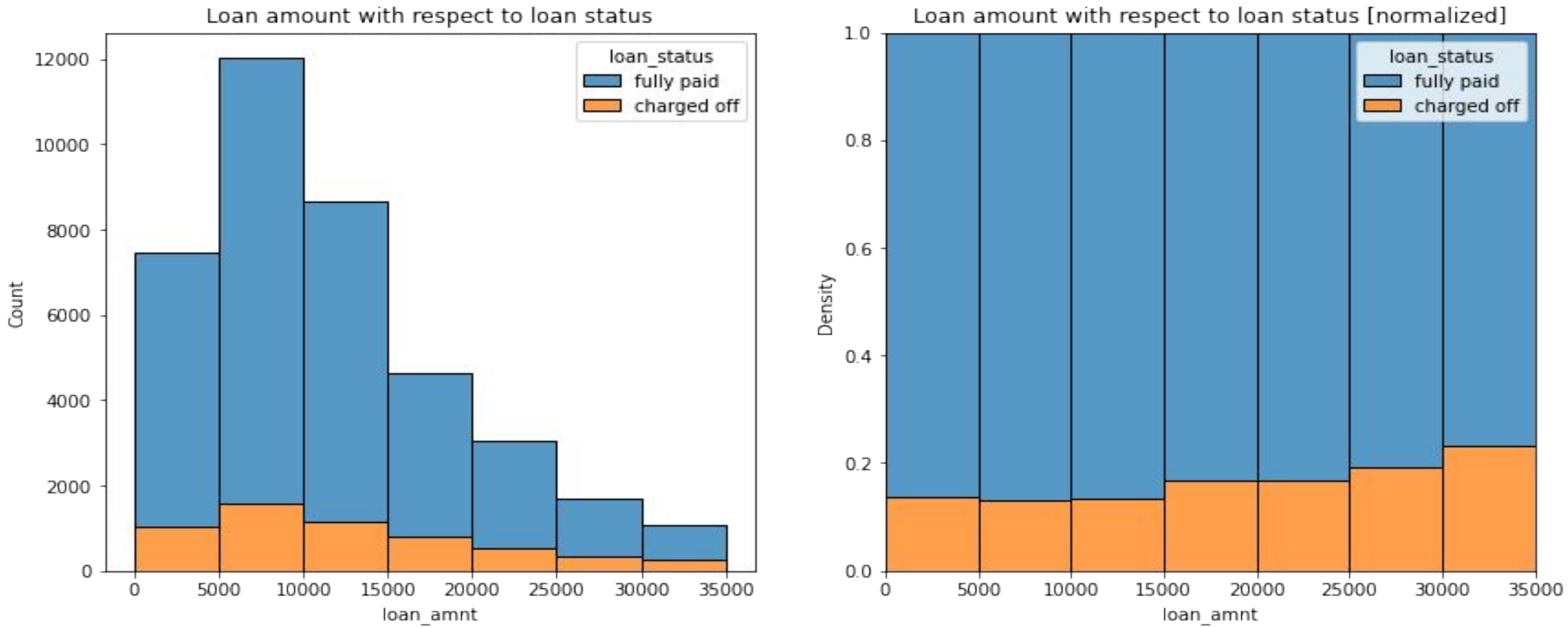
- Risk analysis for a consumer finance company that to make a decision about whether to lend loan to a applicant or not.
- The risks are determined according to the candidate's profile.
- The variables which are strong indicators of default.
- The company can utilize this knowledge for its portfolio and risk assessment.

Methods Used

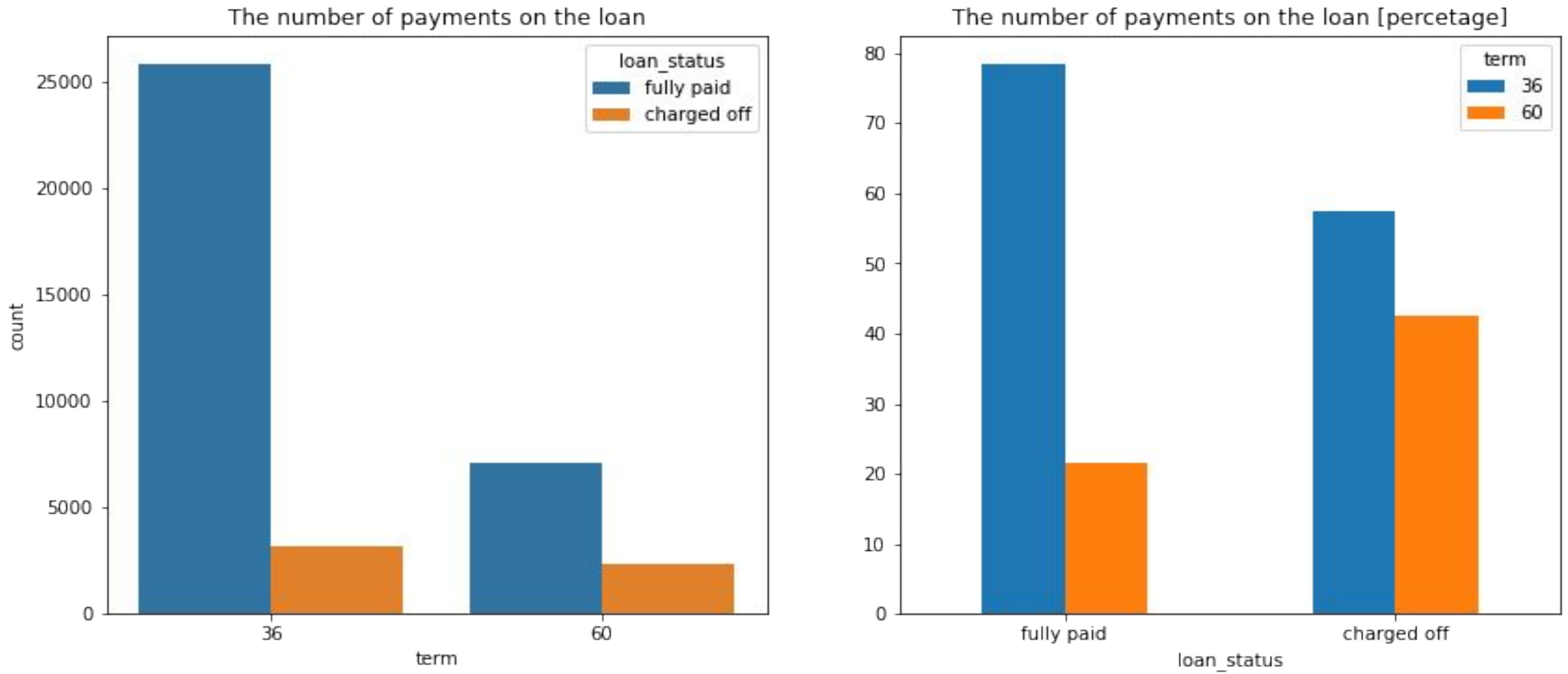
- Exploratory Data Analysis
- Data Visualization

Technologies

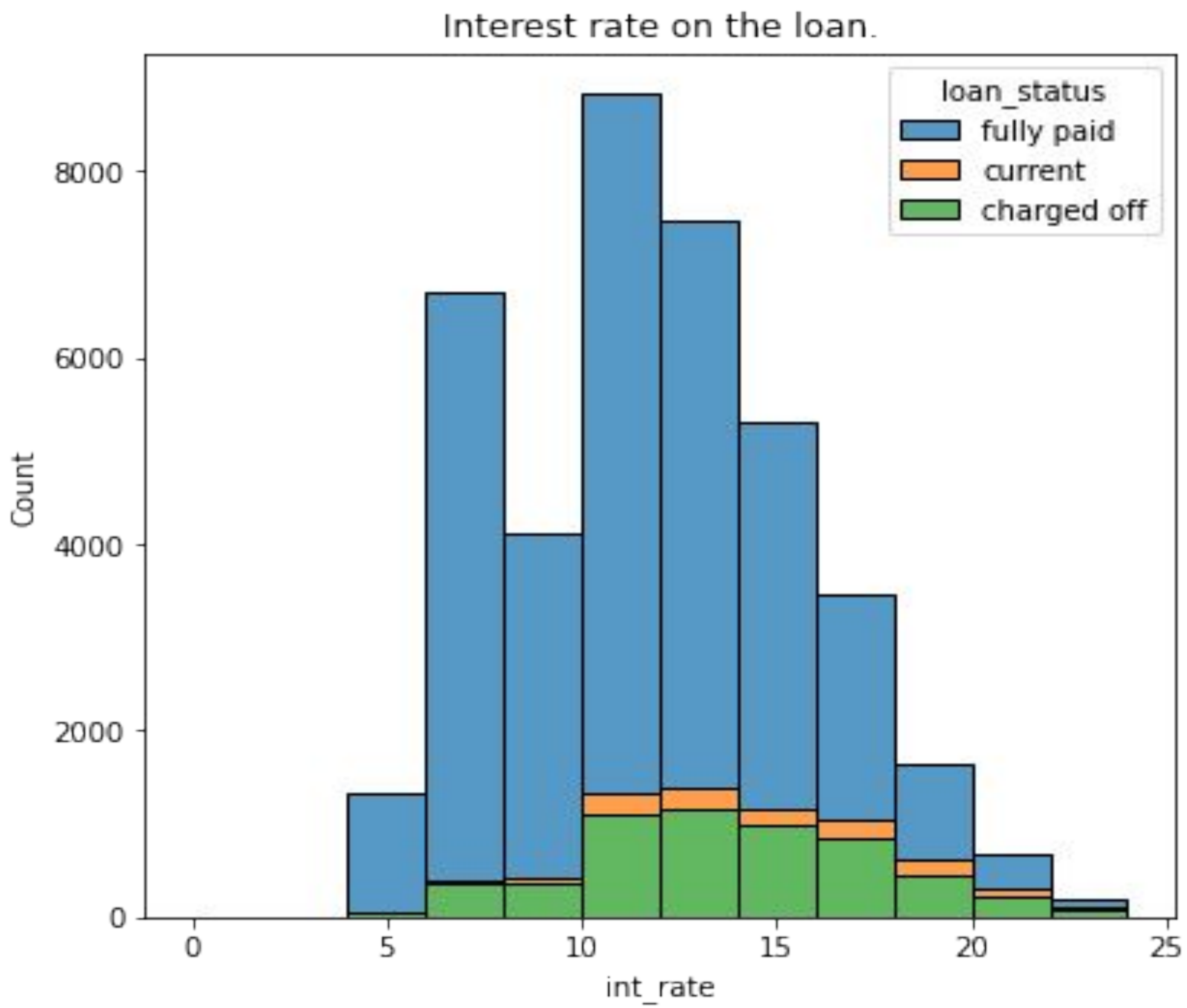
- Python
- Pandas
- Seaborn
- Matplotlib

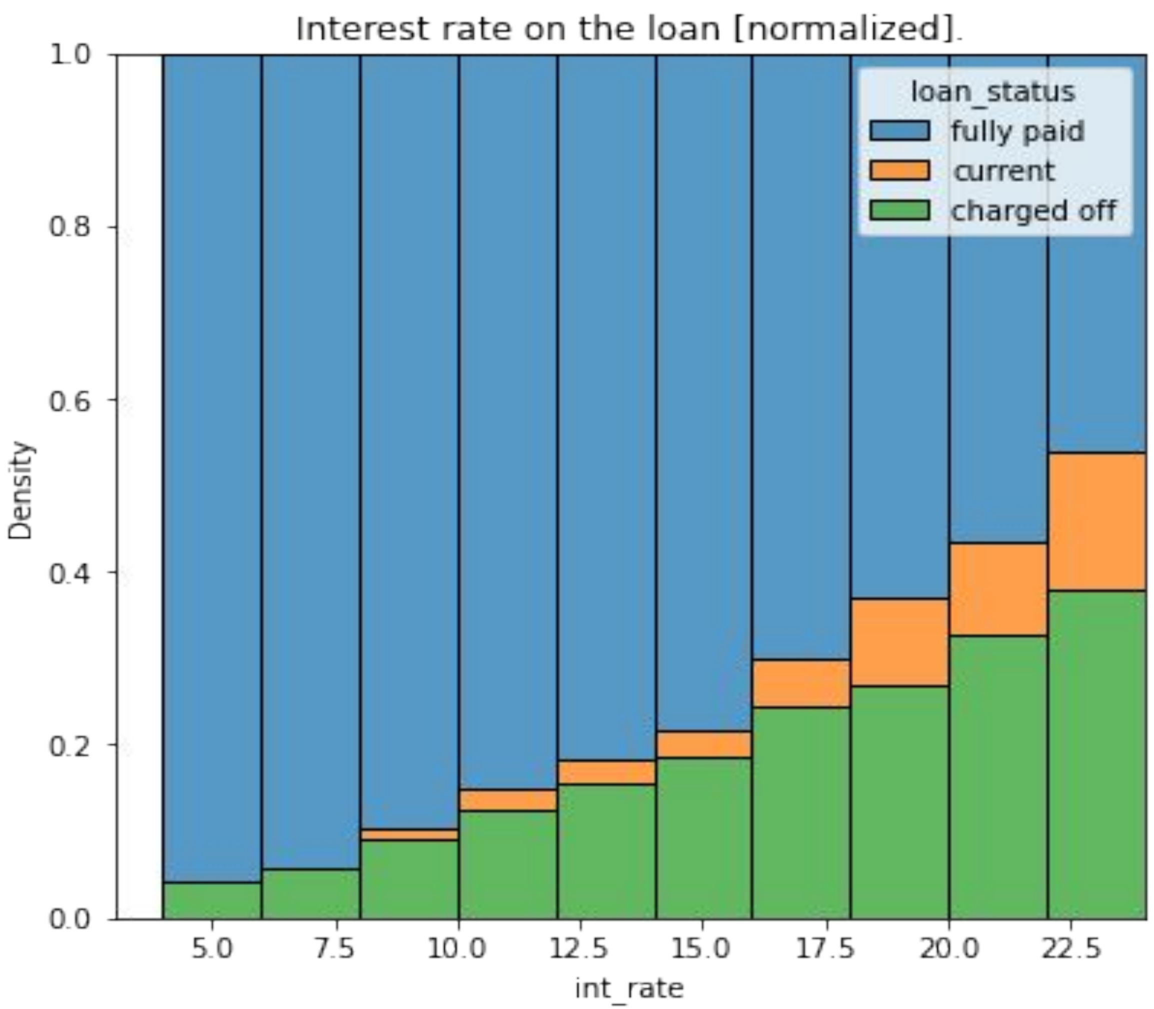


Loan amount with respect to loan status
Observation:
- Loan amount does affect charge off.
- As we increase loan amount, charge off increases by few percentage
- For amount 0-15000, chances of charge off is around 18%
- For amount 30000-35000, chances of charge off is more then 20%



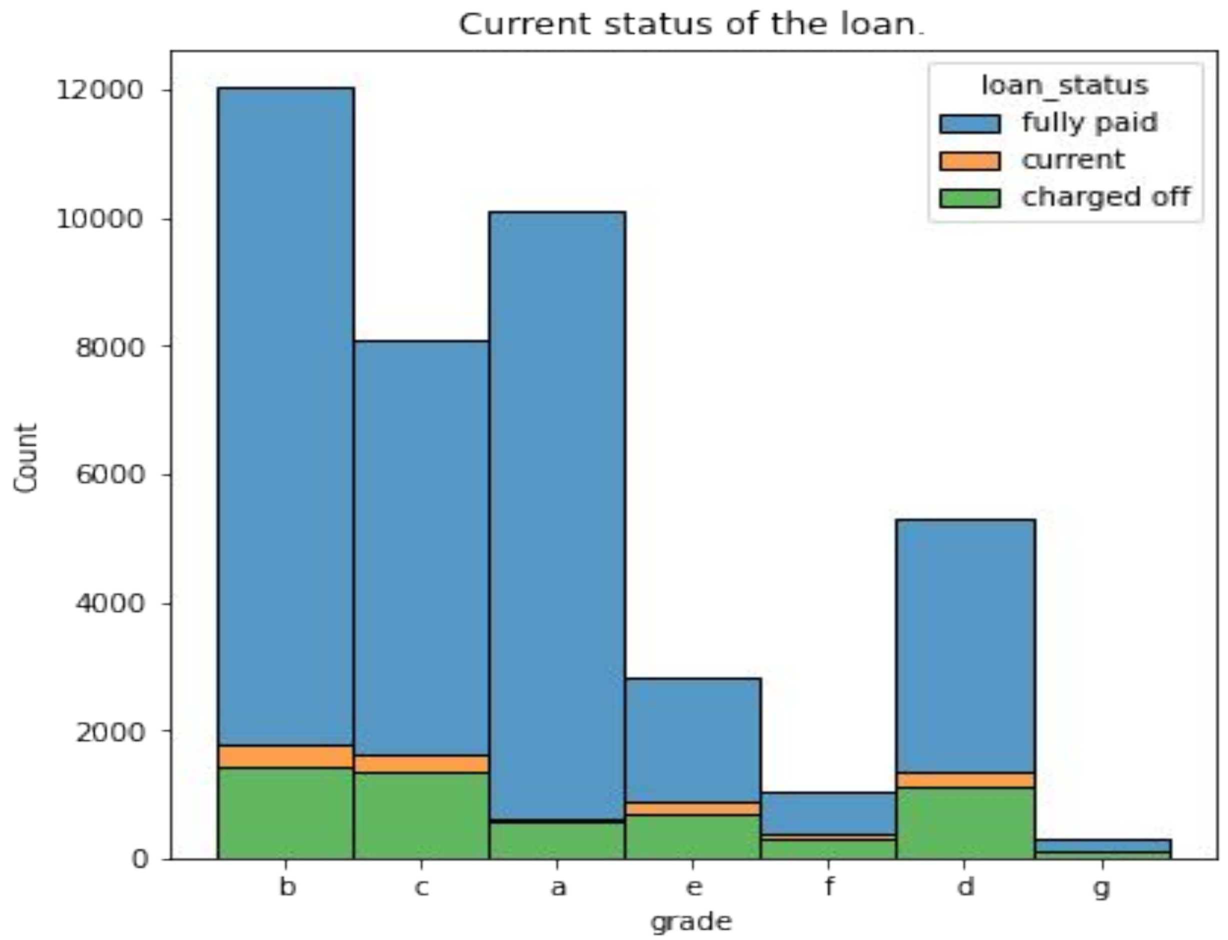
Observation:
- Term affect loan status
- More loans are given to less term ie 36
- When term is 36, chances of charge off is 20%
- When term is 60, chances of charge off is more then 40%

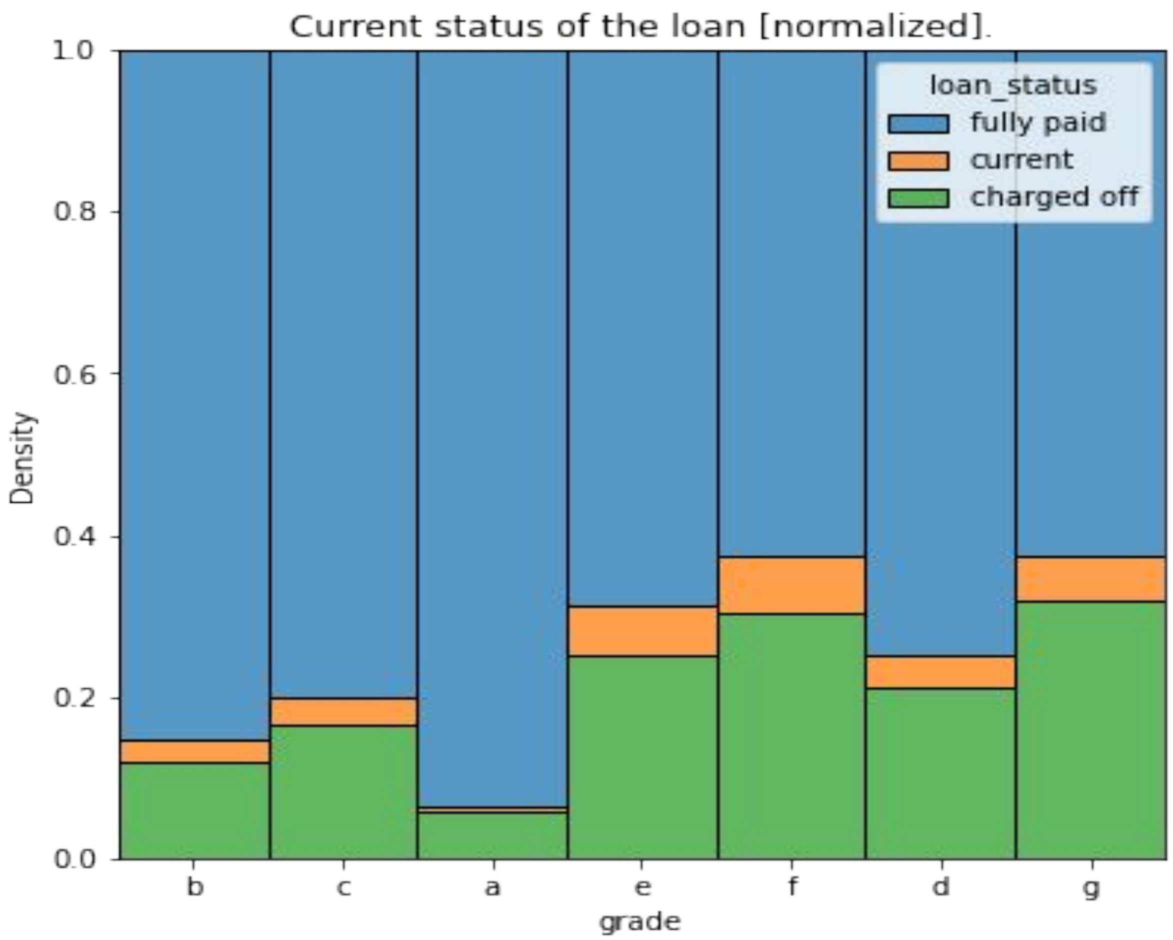




Observation:

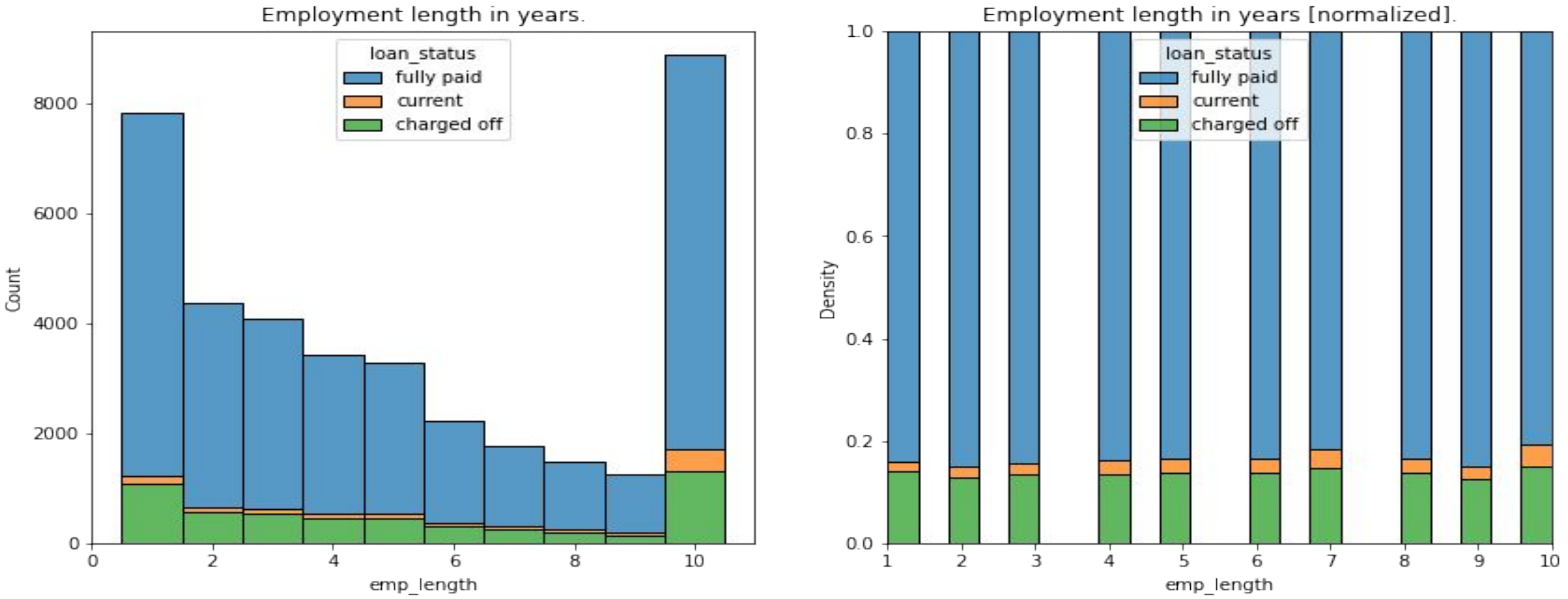
- Most loans are given at 7-8 and 10-13 interest rate
- Count of loan borrowers decreases after 14 interest rate
- Right graph shows that as interest rate increases charge off also increases
- When interest rate is 5-7, chances of charges off is 7%
  When interest rate increases to 15, chances of charges off is 20%
  When interest rate increases to 24, chances of charges off is more then 40%



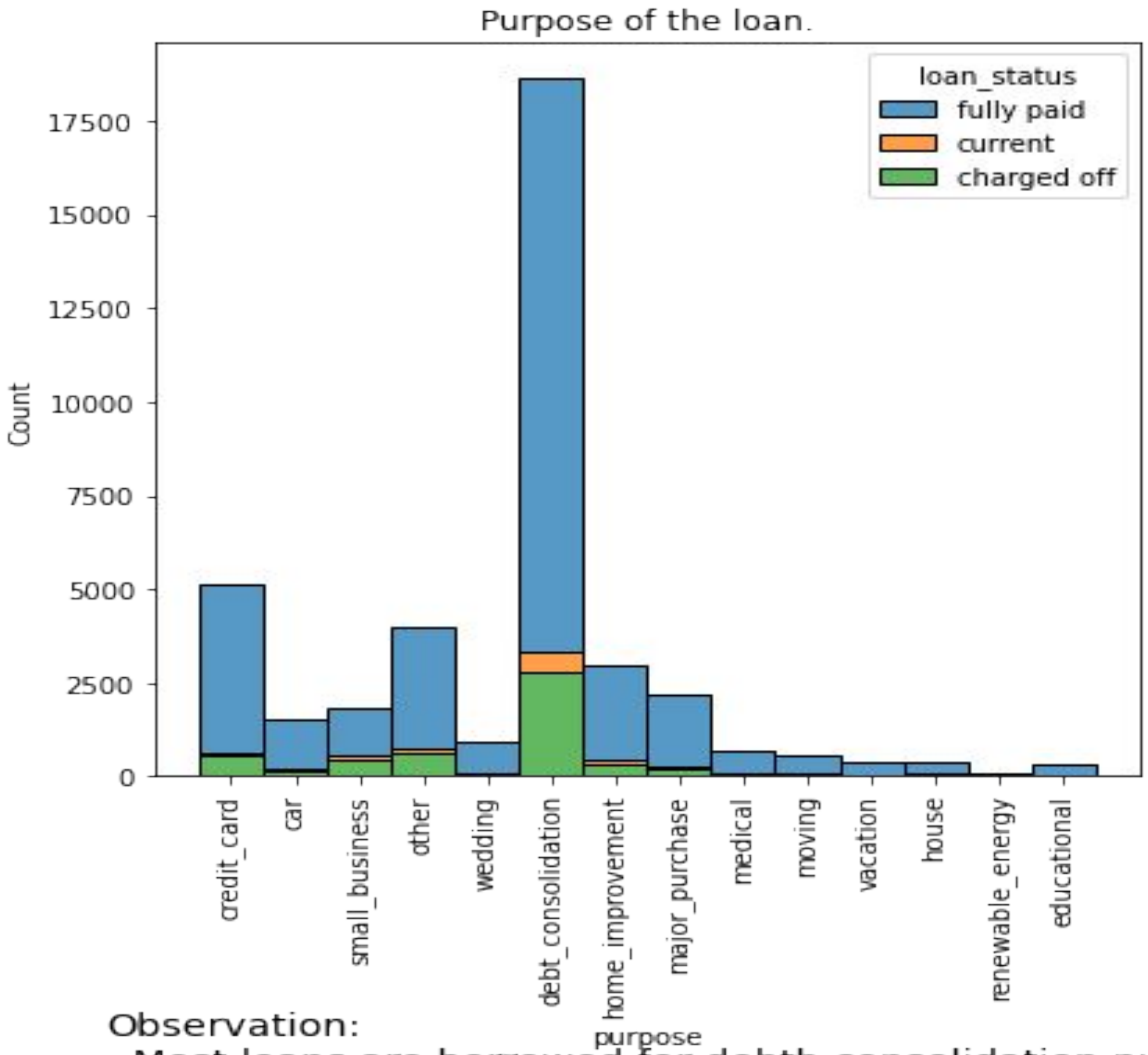


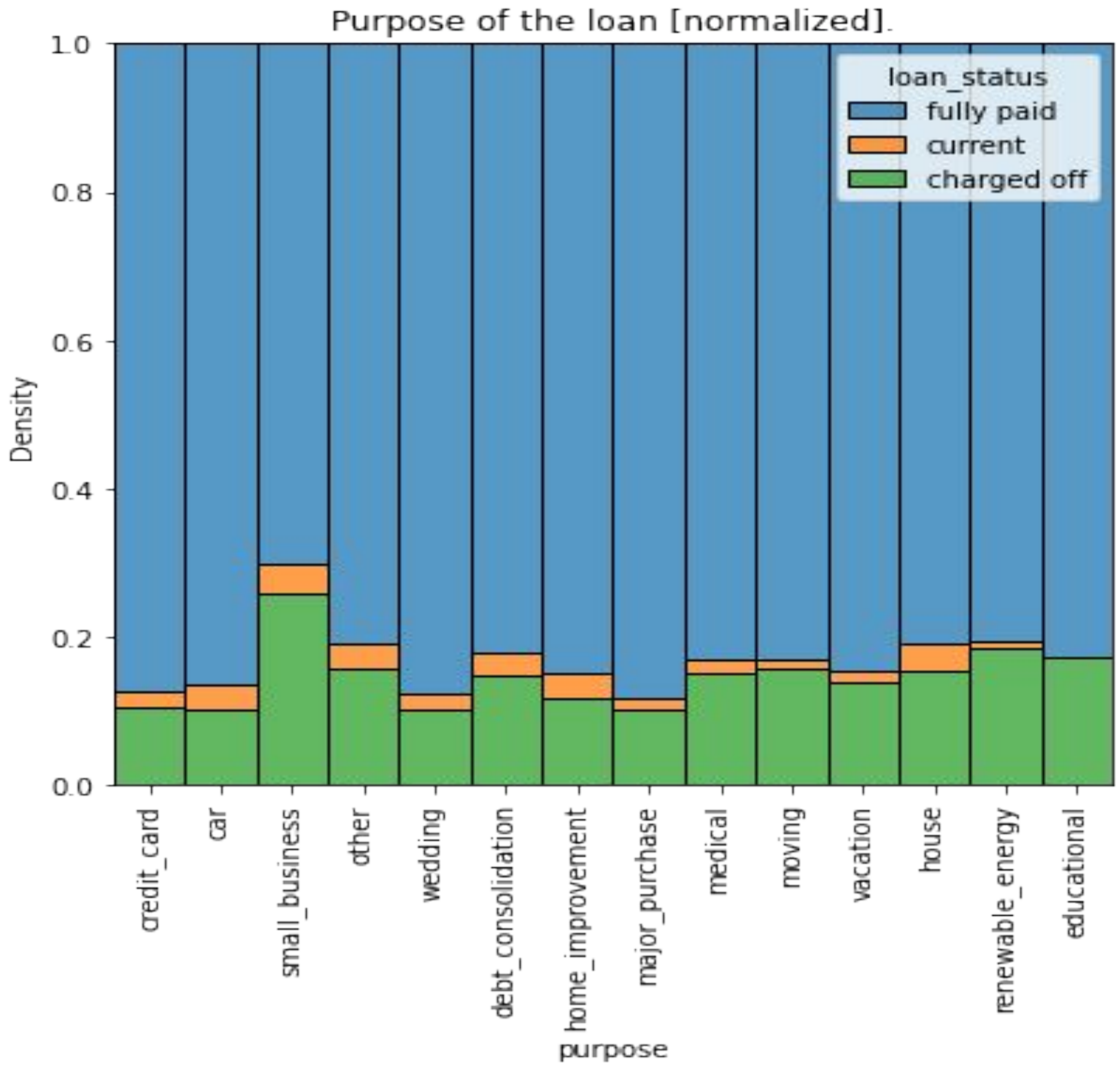
Observation:

- More loanes are given with higher grade ie A B C
- B grade loans are mostly given
  followed by A grade C grade
- Least loanes are given with G grade
- As loan grade decreases chances of charge off increases
  for A, B grade chances of charge off are 10%
  for C, D grade chances of charge off are 20%
  for E, F, G grade chances of charge off are 33-36%

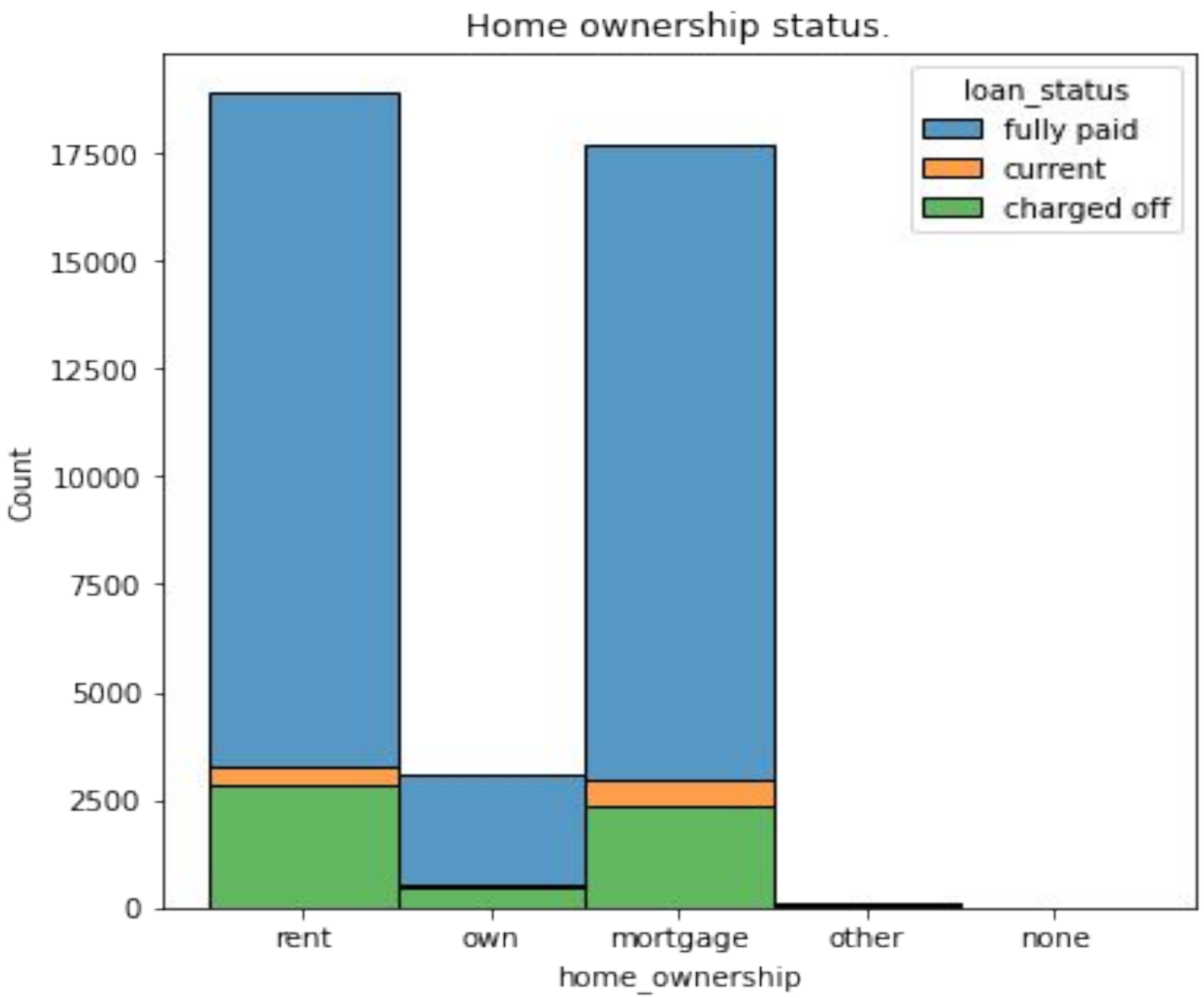


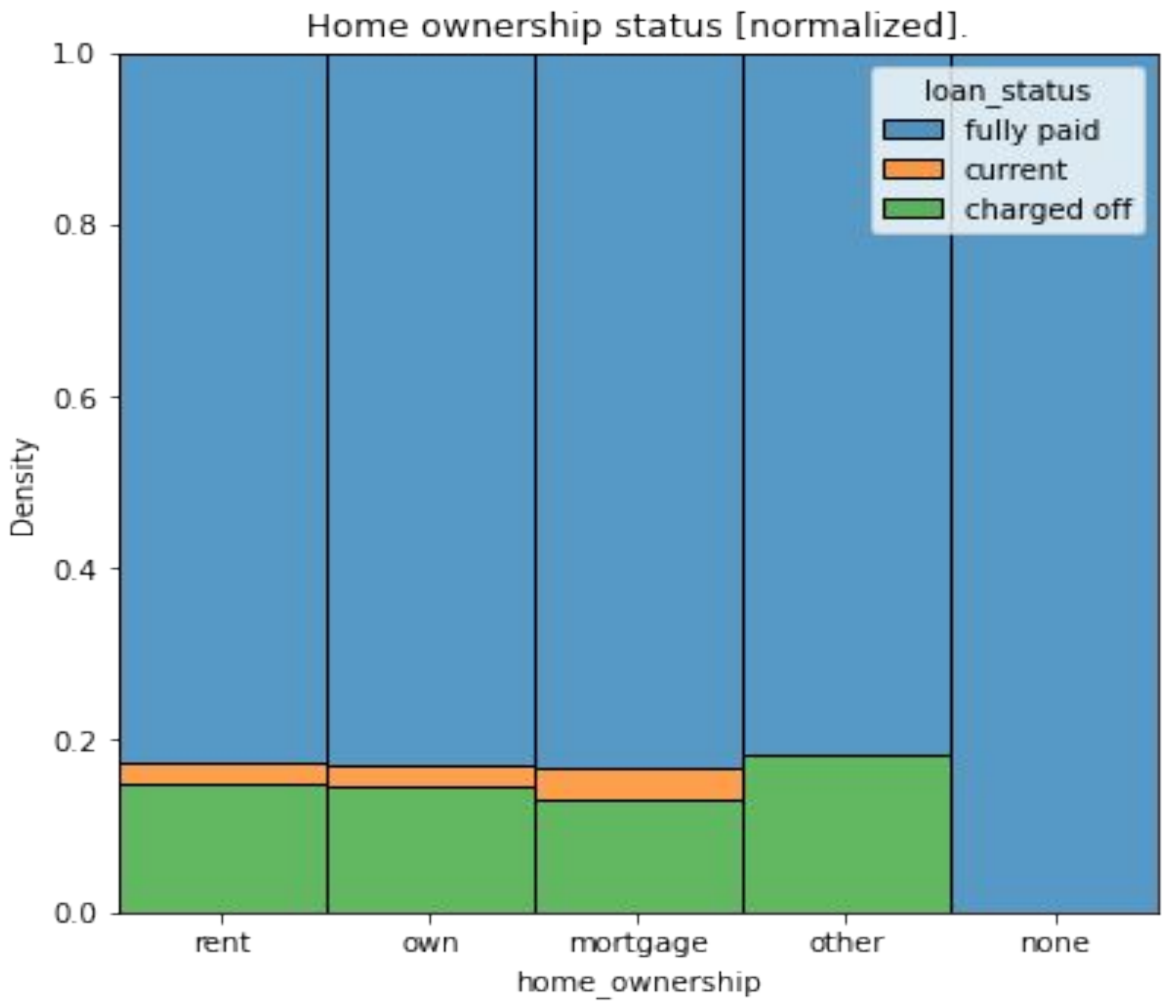
Observation:
- Most loans borrower have employment length
more then 9 years followed by less then 2 years.
- Borrowes are less as their employment length increases
from 2years to 9 years.
- Employment length dosnt seem a good metric for loan status
Since charge off percent doesnt change with employment length



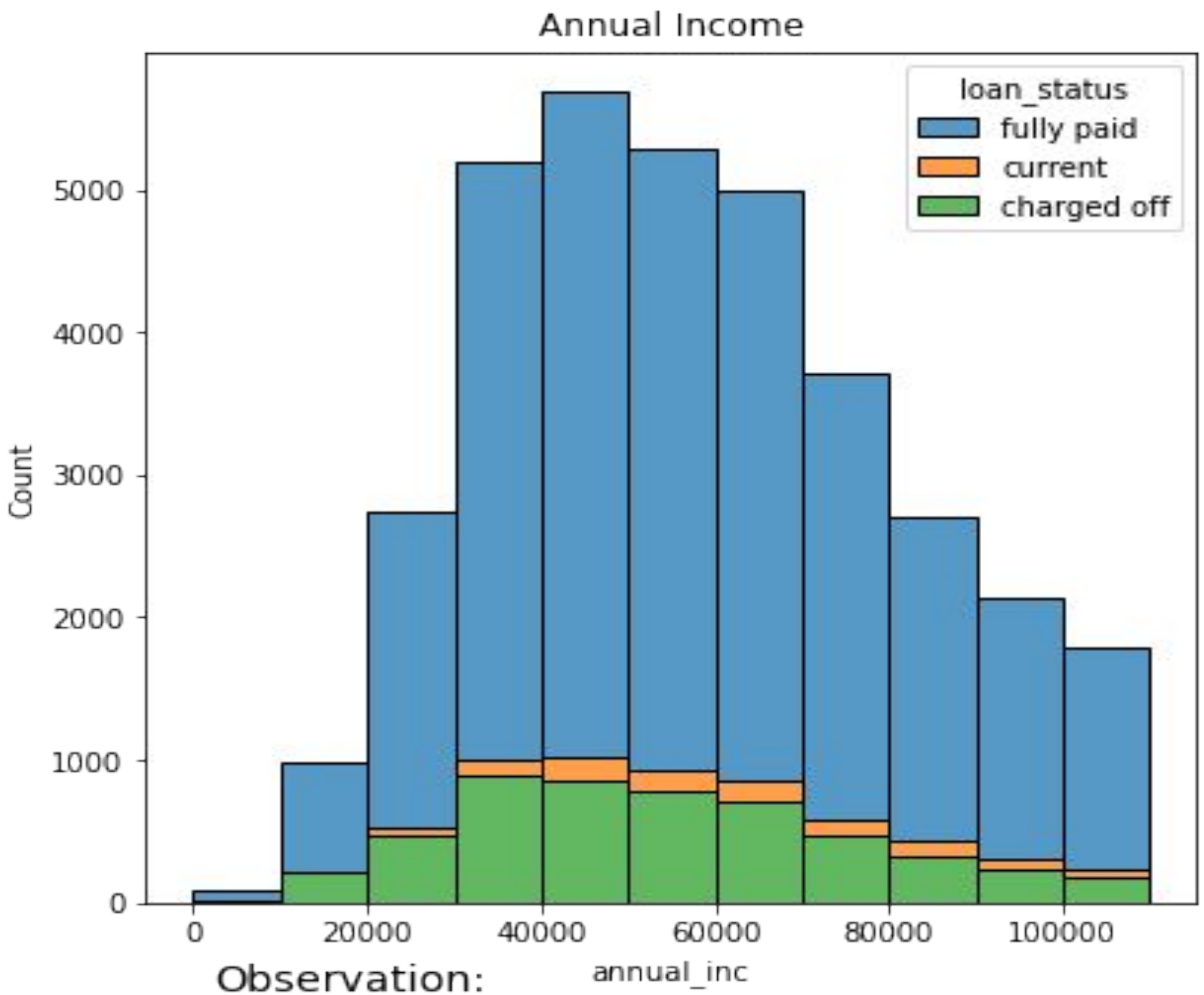


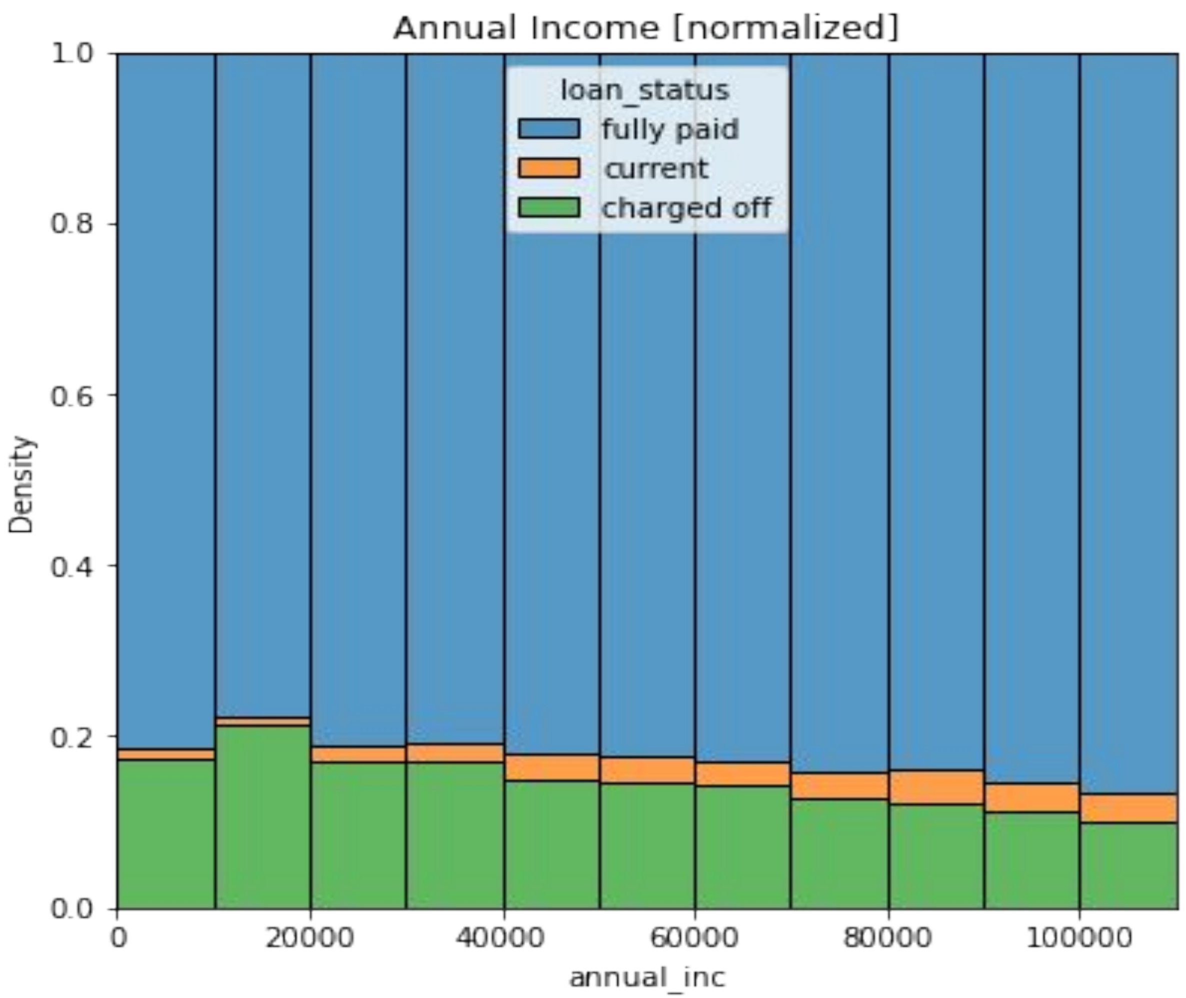
Observation:
- Most loans are borrowed for debth consolidation purposes
  followed by credit card.
- Highest number of charged off loan is lent for small business.
  chances of charge off by small business is 26%.
  followed by renewable energy, charge off is 18%.
  followed by education, charge off is 16%.



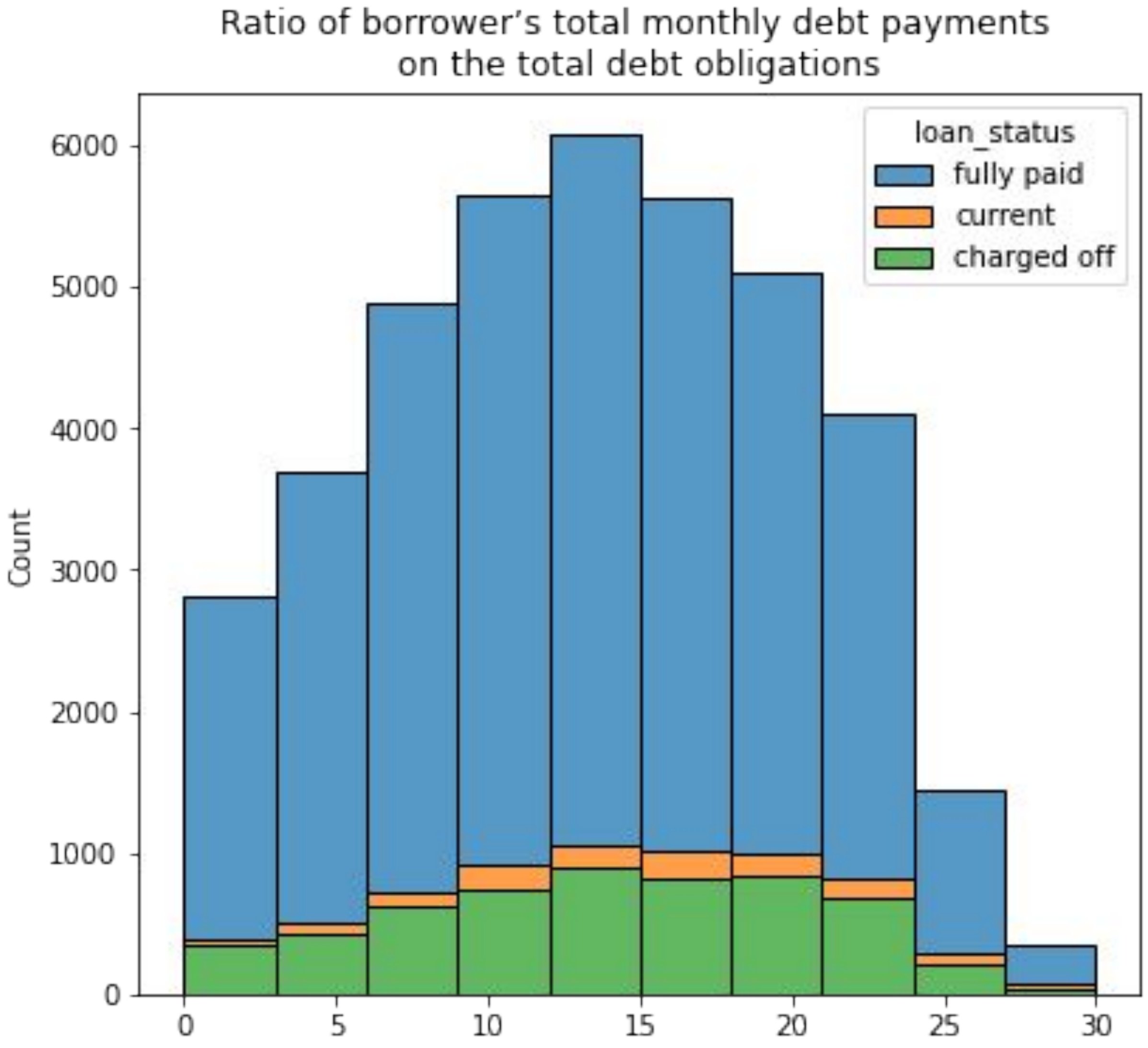


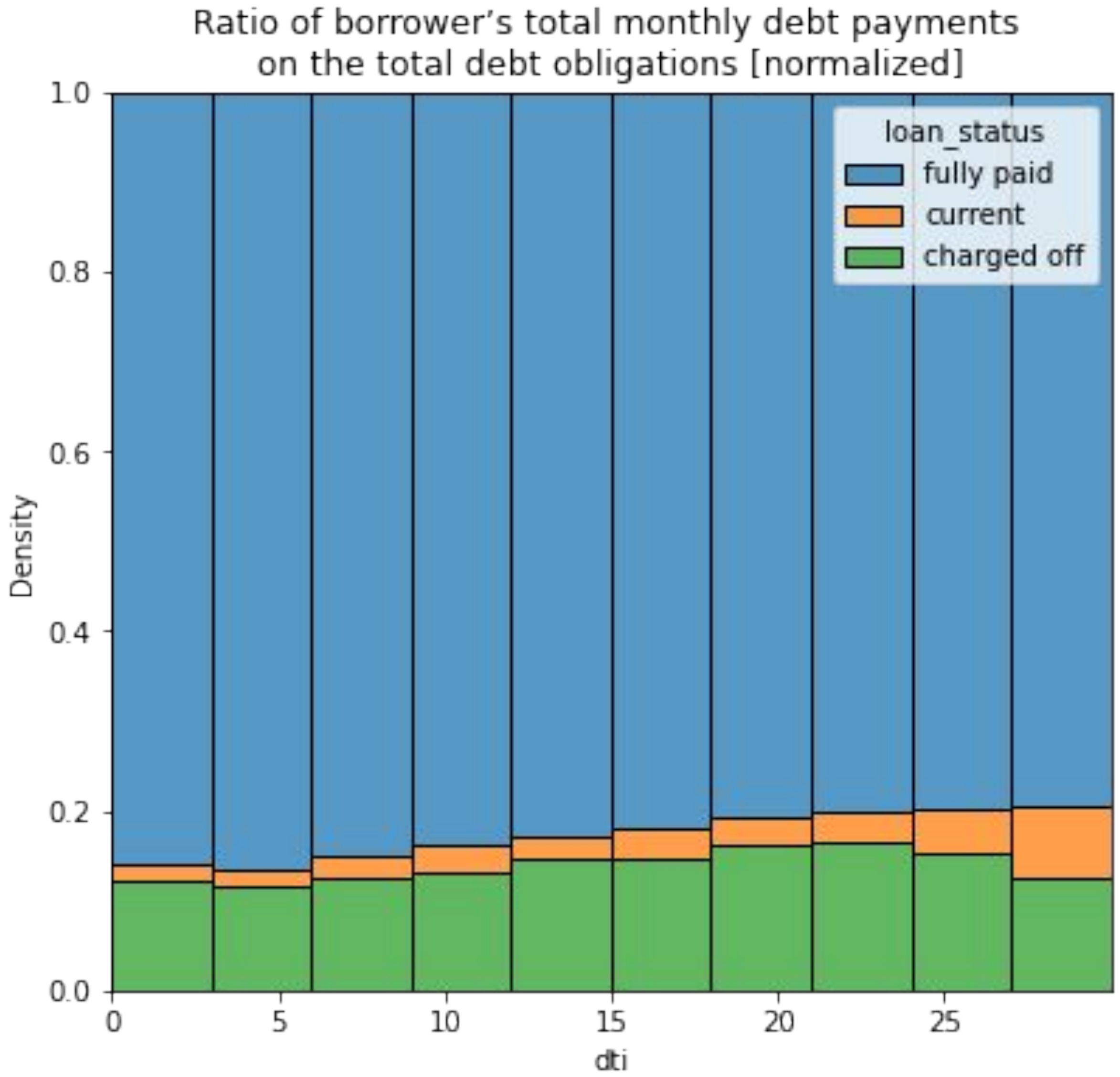
Observation:
- Most loans are borrowed by people who have to manage rent or mortgage.
- Chances of charge off if loan is lent for house ownership is other is 26%.
- Chances of charge off if loan is lent for house ownership is morgage category is 18%.



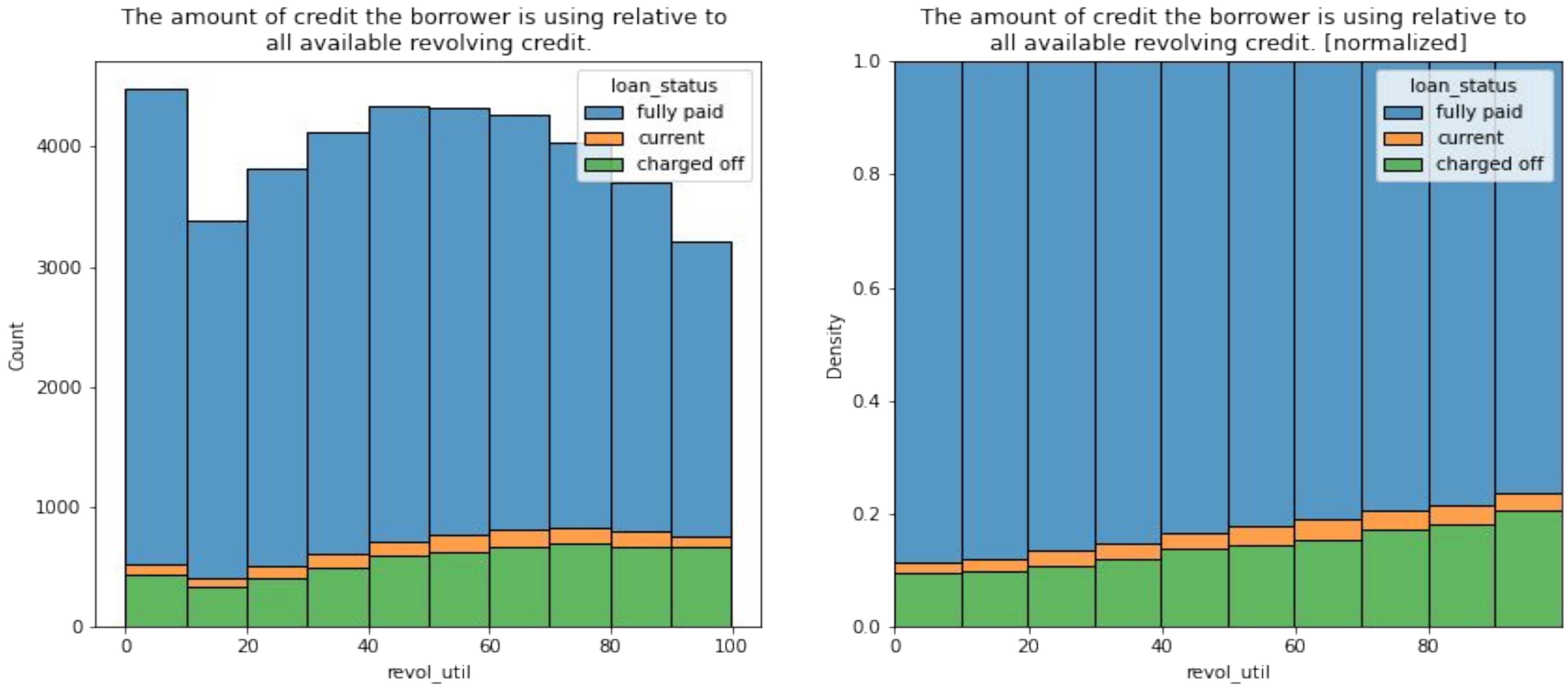


Observation:
After removing data above 90%
- Graph aproximates normal distribution.
- Most loans are borrowed by people
  having annual income between 30000 to 70000
- Less the annual income more are charged off by borrowers.
- For annual income between 0-40000, chances of charged off is 20%
- Charge off continously decreasing as increase in annual income after 40000





Observation:
- dti follows bell shape curve from 1 to 25 dti
- Loan lent to borrowers suddenly drops from 25 to 30 dti
- As dti increases, charge off also increases



Observation:
- As Revolving line utilization rate increases charged off also increases
- Loan lent to 0-20 revol util, chances of charged off is less then 10%
- Loan lent to 90-100 revol util, chances of charged off is more then 20%

Recommendations for approving loan to avoid charged off

Interest rate

- As company increases interest rate, chances of charge off also increases

Interest Rate	charged off
5-7	7%
15	20%
24	>40%

- Company should provide loan at lower interest rate whenever possible
  so that borrower can easily return payment and also business don't suffer from charged off.

Term

- Company should provide loan mostly for 36 month period since as we increase term from 36 to 60 chances of charged off increases significantly

Term	charged off
5-7	7%
15	20%
24	>40%

Company is already giving most loans for 36 months which is good for business.

Loan amount

- Company should incrementally increase amount for customers since with increase in loan amount, charge off also increases

Loan amount	charged off
0-15000	18%
30000-35000	>20%

Grade

- Company should try to give more A, B grade loans since in A, B grade loans there is only 10% chance of charged off
- Company should avoid giving loan to E, F, G grade

Grade	charged off
A, B	10%
C, D	20%
E, F, G	33-36%

Company is already giving more loan to A, B grade and avoiding F, G grade

Purpose

- Company should avoid giving loans to small businesses, renewable energy and for education without considering there potential to grow and return.
- Highest number of charged off loan is lent for small business.

Purpose	charged off
small business	10%
renewable energy	20%
education	33-36%

Annual income

- Company should avoid giving loan to customers who have low annual income than 40000.
- Less the annual income more are charged off by borrowers.
- For annual income between 0-40000, chances of charged off is 20%
- Charge off continuously decreases as increase in annual income after 40000

DTI

- Company should avoid giving loan to higher dti customers since as dti increases, charge off also increases.

Revolving line utilization

- Company should avoid giving loan to customer who have high revolving line utilization rate since as revolving line utilization rate increases charged off also increases

Revo util	charged off
0-20	10%
90-100	20%