Lending Club Case Study

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Problem Statement

-**Lending Club** specialises 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

Business Objective

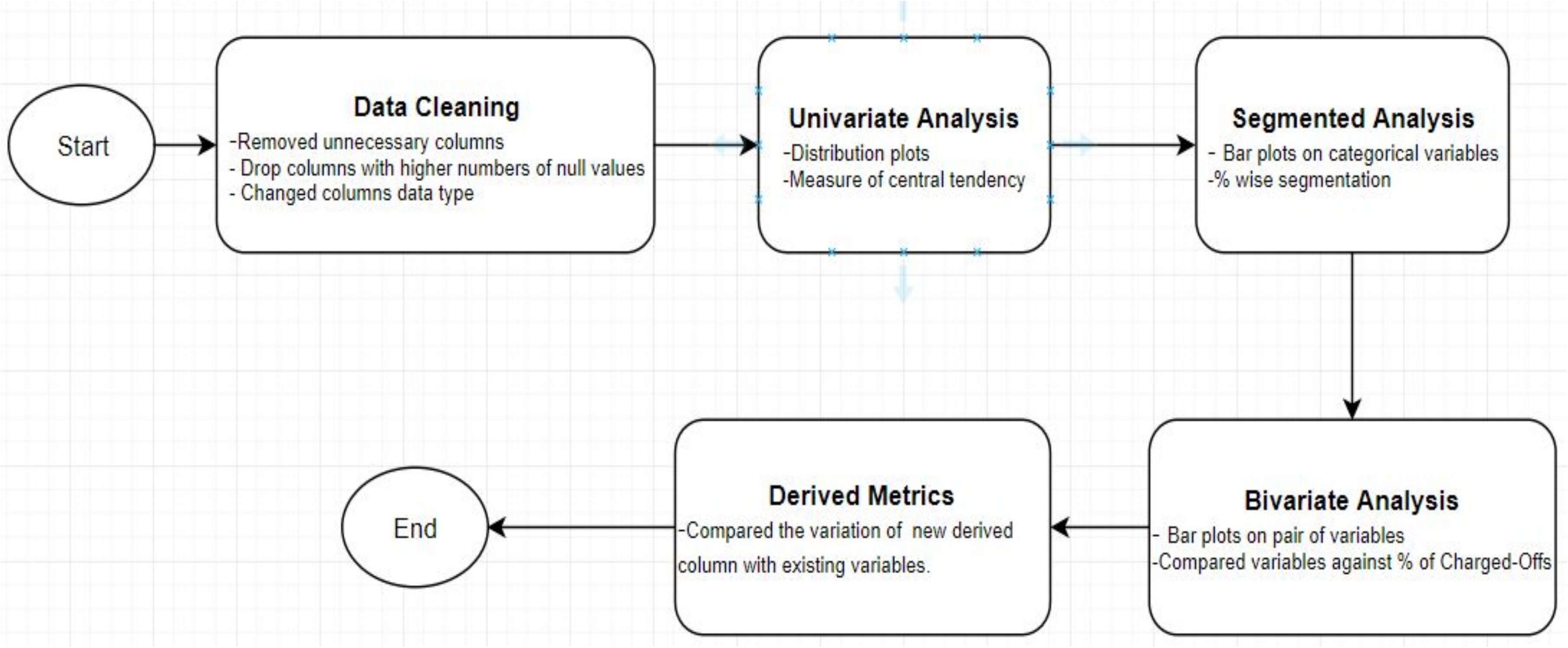
If the company approves the loan, there are 3 possible scenarios described below:

- **Fully paid**: Applicant has fully paid the loan (the principal and the interest rate)
- **Current**: Applicant is in the process of paying the instalments, i.e. the tenure of the loan is not yet completed. These candidates are not labelled as 'defaulted'.
- **Charged-off**: Applicant has not paid the instalments in due time for a long period of time, i.e. he/she has **defaulted** on the loan

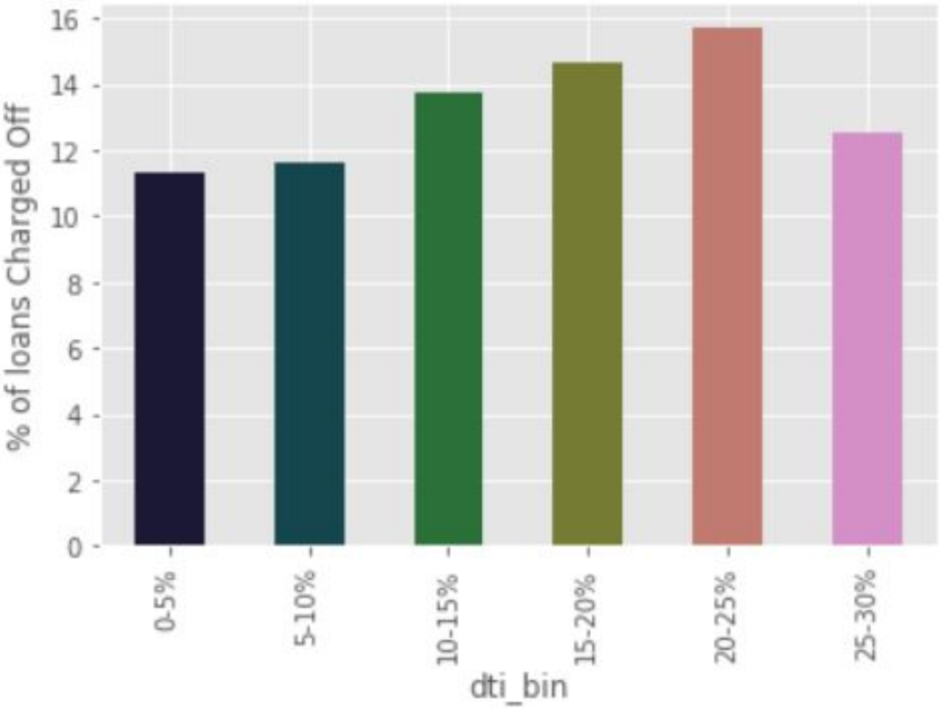
-Like most other lending companies, lending loans to 'risky' applicants is the largest source of financial loss (called credit loss). The credit loss is the amount of money lost by the lender when the borrower refuses to pay or runs away with the money owed. In other words, borrowers who **default** cause the largest amount of loss to the lenders. In this case, the customers labelled as 'charged-off' are the 'defaulters'.

-Company wants to understand the **driving factors** 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.

Analysis approach



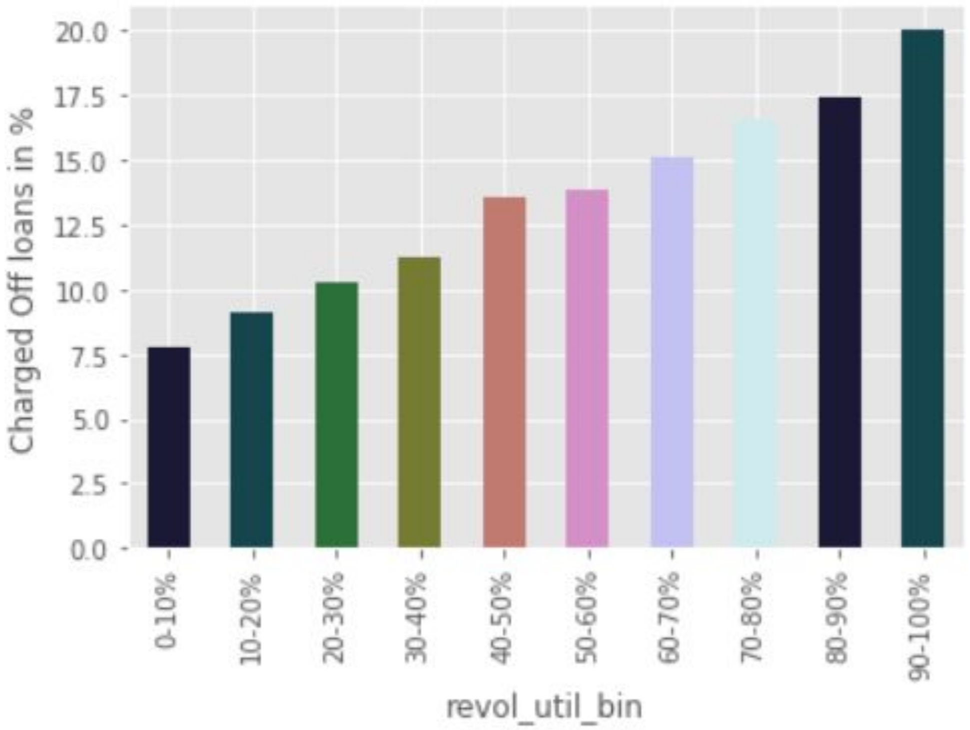
Analysis - DTI(Debt to Income ratio)



- Charge-Offs percentage is increasing as DTI increases that means it is risky to provide loans to customer whose DTI percentage is high. Charge-Offs percentage is more than 14% in DTI range 15-25% but decreases after that which is due to the very less number of customer in that range.

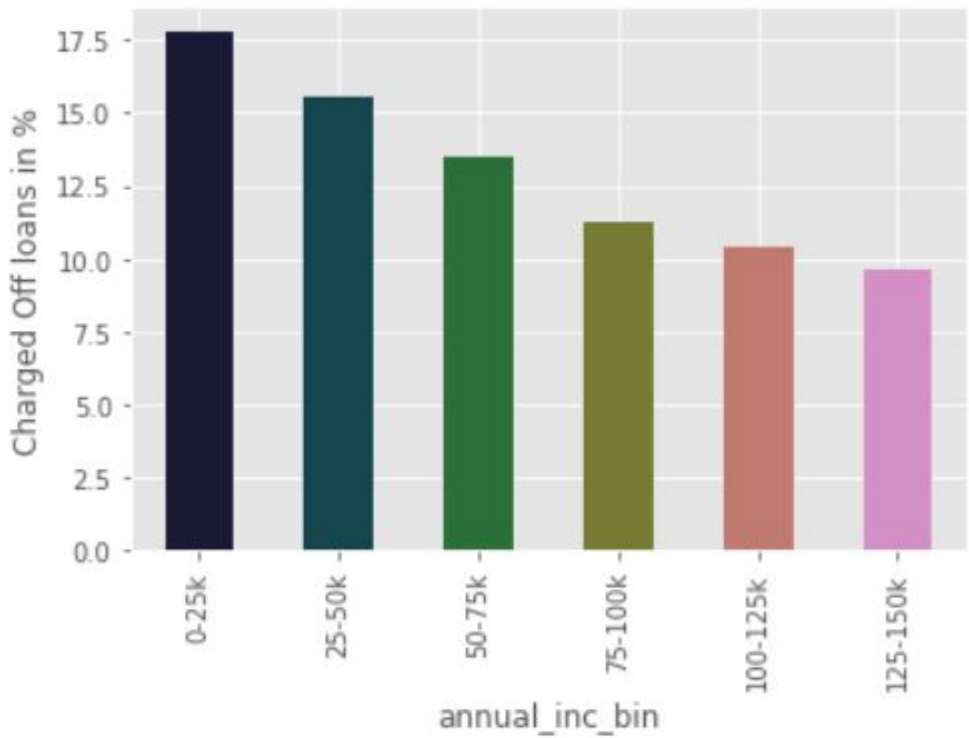
DTI Range	Count
0-5%	4376
5-10%	7314
10-15%	9152
15-20%	8428
20-25%	6394
25-30%	624

Analysis - Revolving Utilization rate



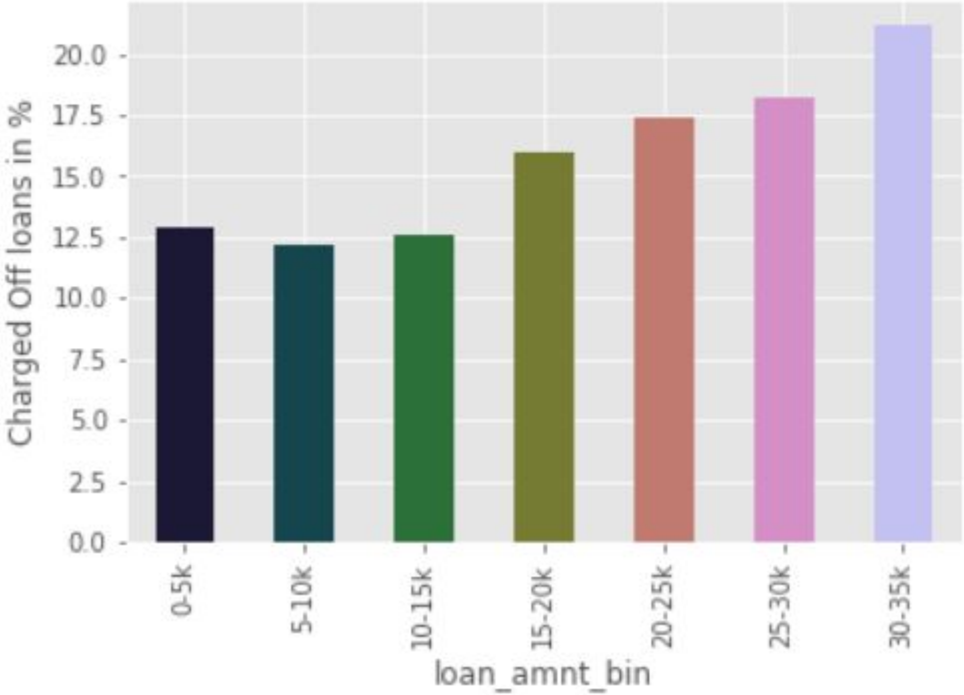
-Revolving credit utilization is a good indicator of borrowers defaulting on loan, we can see in plot charge-offs increases linearly with revol_util rate.

Analysis - Borrowers Annual Income



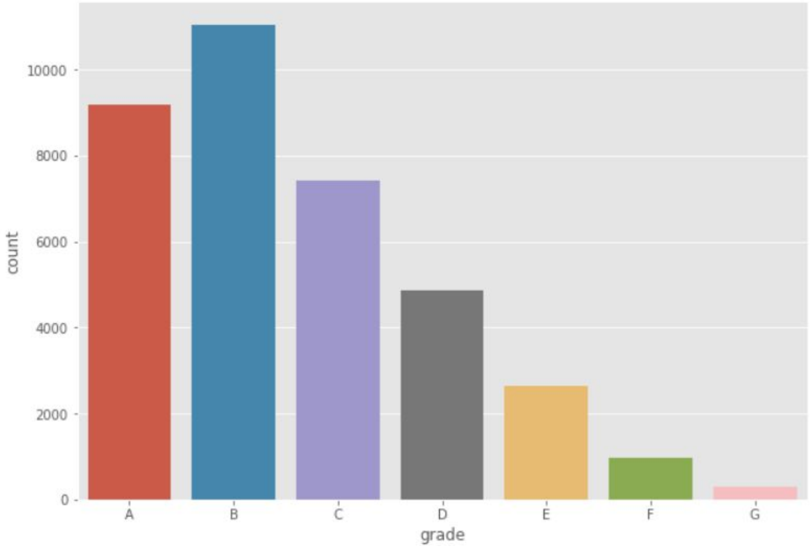
- Charge-Offs percentage are more for customer in lower income segment, Lending clubs should be more concious when providing loan in lower annual income segment.

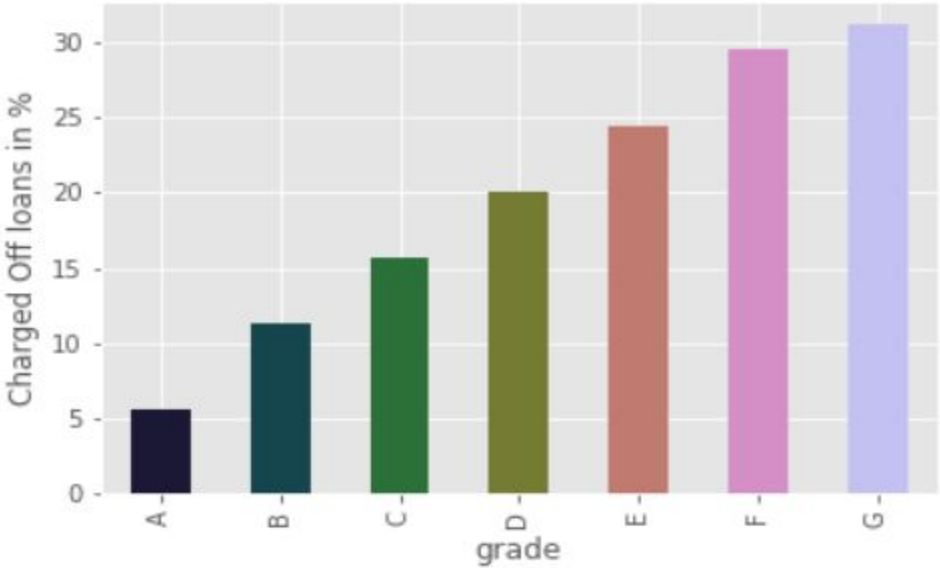
Analysis - Loan Amount



-This clearly depicts that instead most of the loan amount are in the lower range but charge-offs increases as the loan amount increases. Approving high amount of loans is always risky as it will have more than 20% chances of defaults.

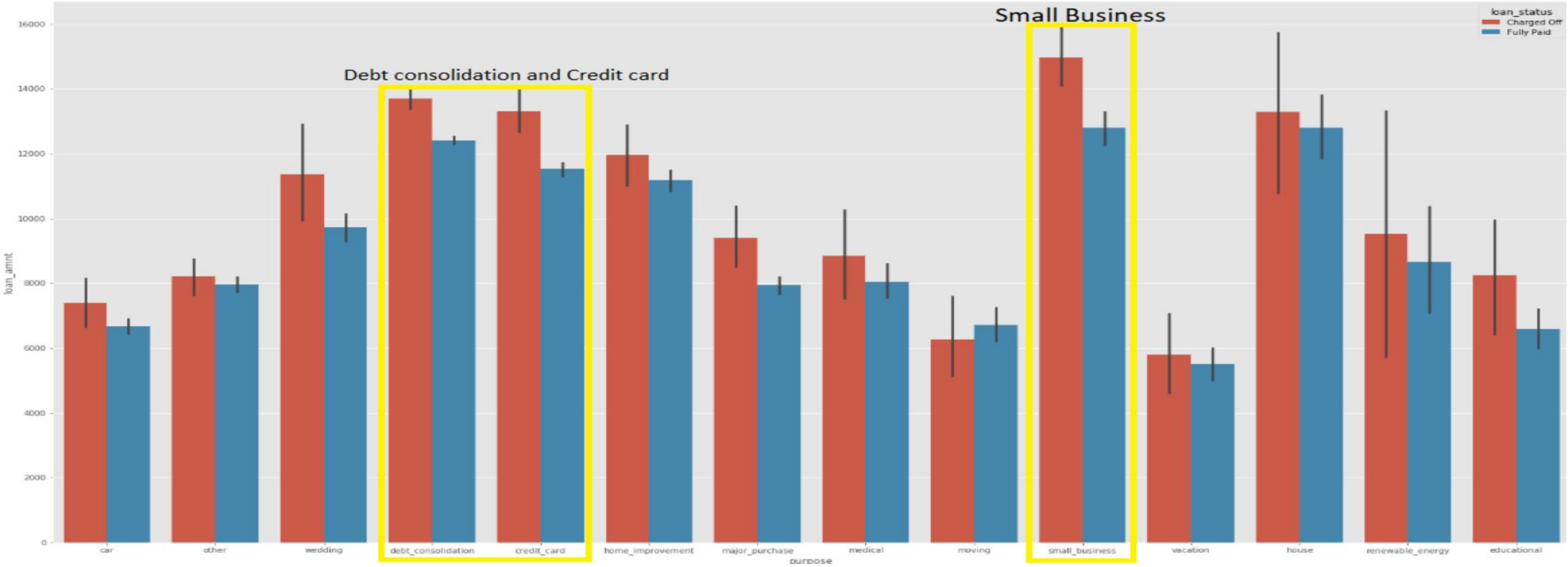
Analysis - Grades





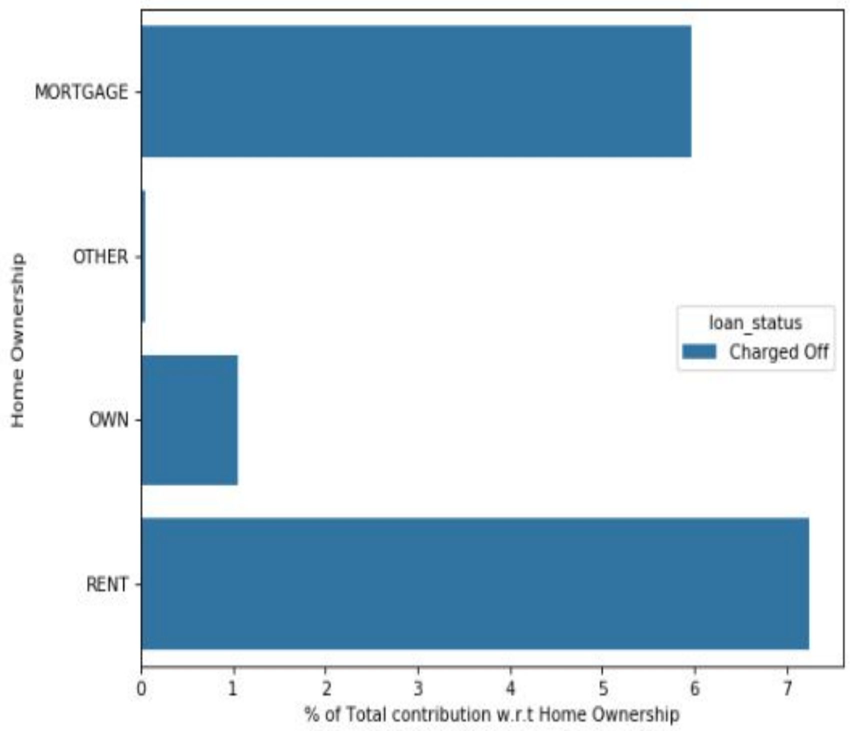
- As visually clear from first plot, company is approving most of the loans in high grades.
- And Charge-Offs are more in lower grade segment

Analysis - Purpose of loan



- Loans taken for the purpose of Small Business, Debt consolidation and credit card have higher number of charge-offs percentage.

Analysis - Home Ownership



-Home Ownership as Rent and Mortgage have higher percentages of defaults.
-Rent and Mortgage has more than 6% chances of the total charged off percentage.

Recommendations for approving loan to avoid defaults

- Lending Club before approving loan should take a look at the DTI(Debt to Income ratio) of the applicants. As DTI of borrowers increases their tendency of defaults also increases.
- Applicants with more revolving utilization rate tends to default more, borrowers having revolving credit utilization rate more than 80% has more than 20% chances of defaults.
- Lending club should be more concious when approving loans for applicants in the lower annual income segment, borrowers having annual income in range of 0-50k has more than 15% chances of defaults.
- High loan amounts has more chances of Charge-offs(more than 20% for loans amounts greater than 30k), Lending club should properly analyze the applicants demanding higher loan.
- Lending club is approving loan of applicants mostly in high grades which is good but they still need to be more cautious when approving loans for lower grade as lower grades has more than 25% chances of defaults and also we are charging high interest rates in lower grades which can also promote the chances of defaults in lower grades.
- Lending club should be more cautious when approving loan for the purpose of Small business, Debt consolidation and Credit card.
- Borrowers having home ownership as ‘Rent’ and ‘Mortgage’ has higher chances of defaults.