

LENDING CLUB - CASE STUDY

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Problem Statement

This company is the largest online loan marketplace, facilitating personal loans, business loans, and financing of medical procedures. Borrowers can easily access lower interest rate loans through a fast online interface.

Like most other lending companies, lending loans to 'risky' applicants is the largest source of financial loss (called credit loss). 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'.

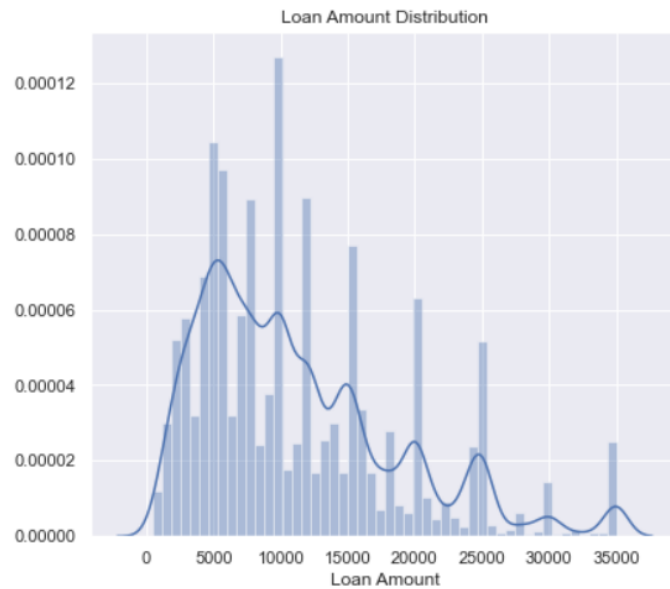
Goal is to identify these risky loan applicants, then such loans can be reduced thereby cutting down the amount of credit loss. Identification of such applicants using EDA is the aim of this case study.

In other words, 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 utilize this knowledge for its portfolio and risk assessment.

Observations made in EDA

The time series plot on the right shows a rising popularity of loan lending, there is drop after 2008 this could be due the U.S Recession (housing market crash in 2008), after 2009 there is a sharp increase in Loan issue. The distribution of loan amount is to the right. Most borrowers applied loan of around 10,000.

Laon distribution by Amount



Laon distribution by Year

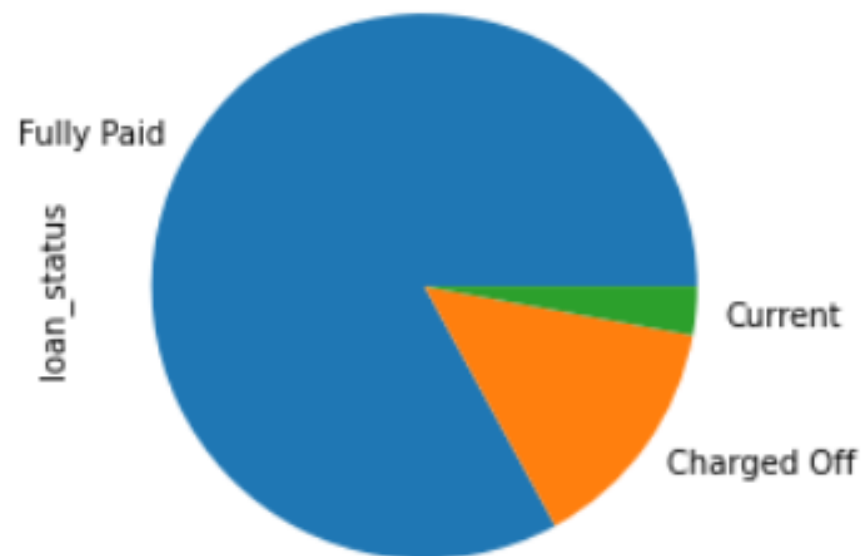


Observations made in EDA

Observations

- # 83 percent loans were fully paid.
- # Close to 14% loans were charged off
- # Currently on going loans are close to 3%

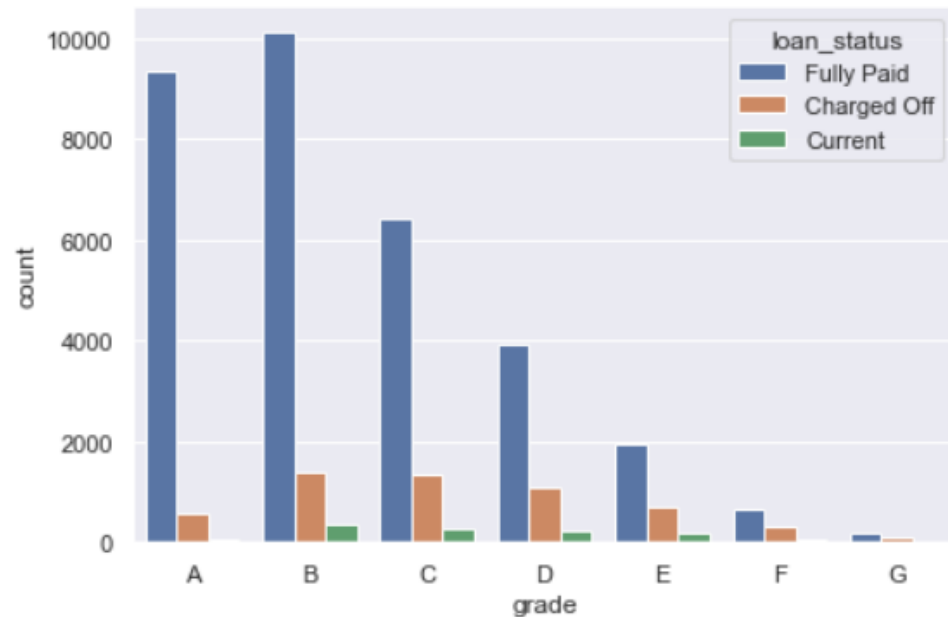
Distribution of Loan status in the Data Set



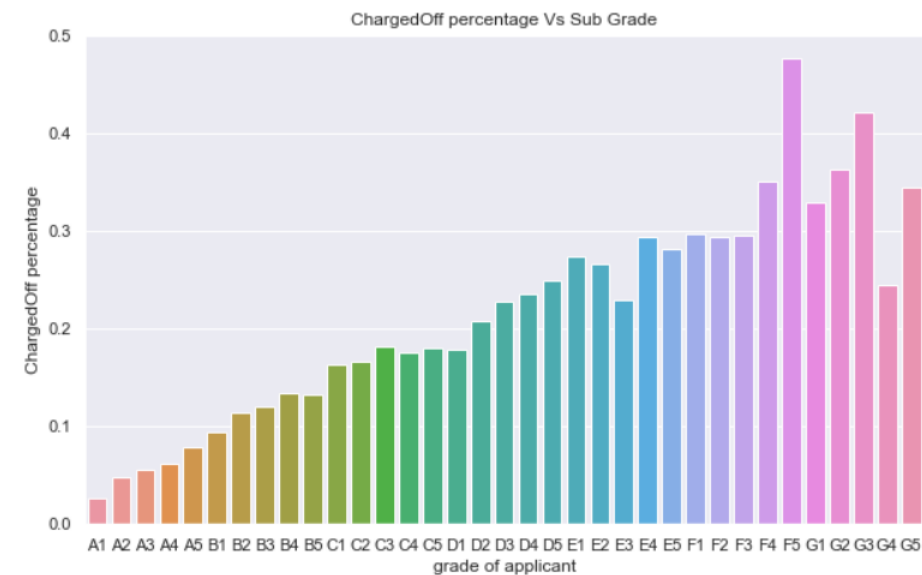
Observations made in EDA

From the following charts on grade and subgrade we can infer that among F and G, F5,G2,G3 are likely to charge off

Laon distribution by grade



Laon distribution by Subgrade



Observations made in EDA

Loans which fall under the small business purpose have the most risk involved, 27% default, the logical reason for this could be that small business and start ups tend to end up being profitable.
Also the maximum good loans seem to fall under wedding and car loans.

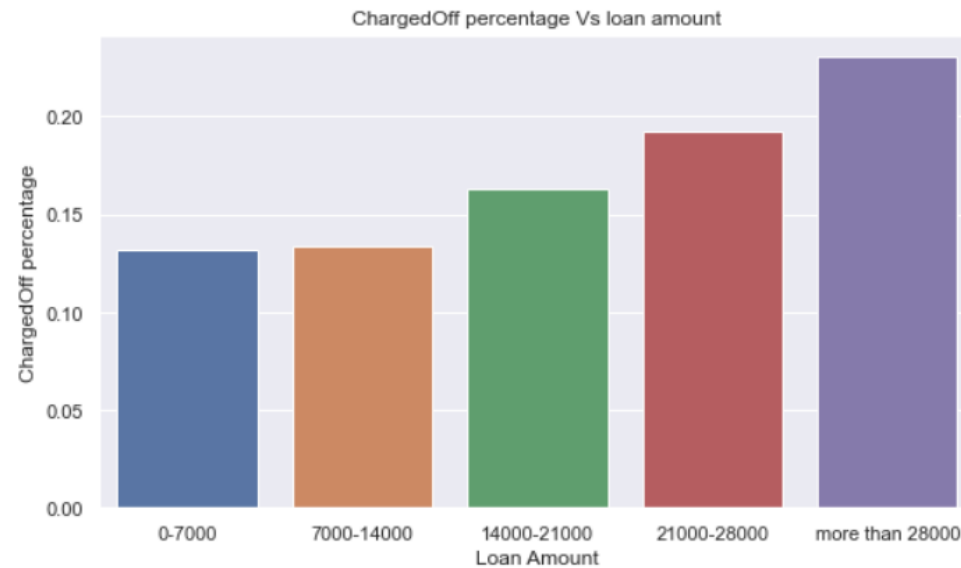
Loan Status against Charge off %

loan_status	Charged Off	Current	Fully Paid	Total	FullyPaid%	Default%
purpose						
car	157	50	1332	1489	89.460000	10.540000
credit_card	530	98	4406	4936	89.260000	10.740000
debt_consolidation	2723	575	15127	17850	84.750000	15.250000
educational	56	0	269	325	82.770000	17.230000
home_improvement	344	100	2517	2861	87.980000	12.020000
house	59	14	306	365	83.840000	16.160000
major_purchase	221	36	1922	2143	89.690000	10.310000
medical	106	12	570	676	84.320000	15.680000
moving	91	7	482	573	84.120000	15.880000
other	628	125	3217	3845	83.670000	16.330000
renewable_energy	19	1	83	102	81.370000	18.630000
small_business	470	74	1270	1740	72.990000	27.010000
vacation	52	6	318	370	85.950000	14.050000
wedding	96	21	829	925	89.620000	10.380000

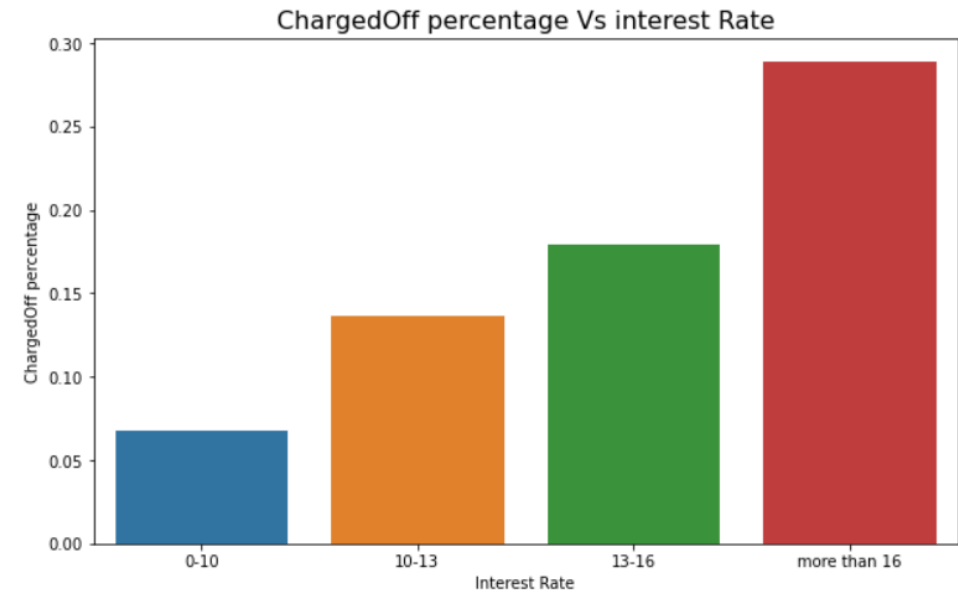
Observations made in EDA

From the following charts one could come to a conclusion that a higher loan amount coupled with higher interest rate tend to become risky loans

Charge off % against Loan Amount



Charge off % against interest rate

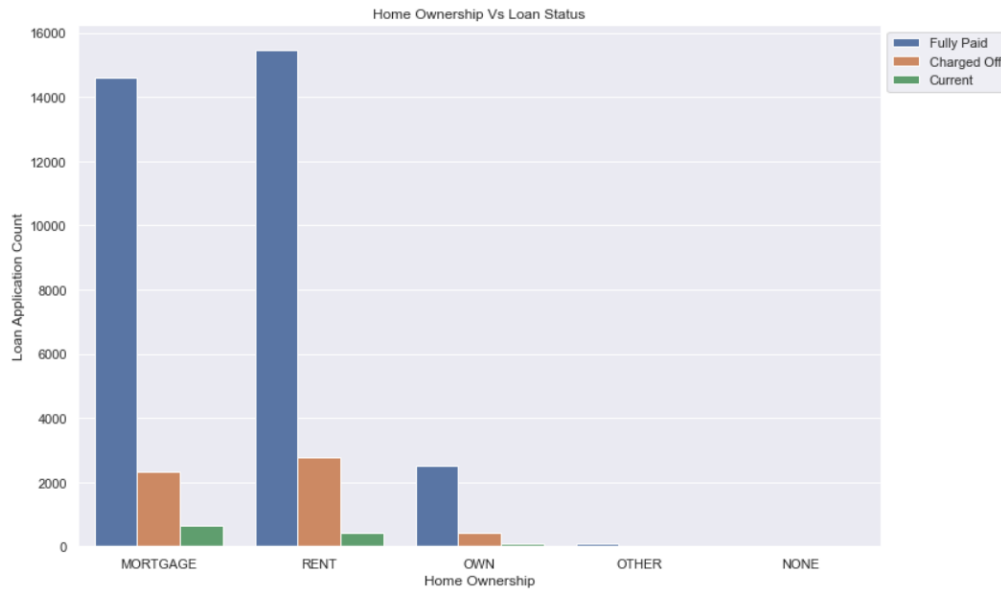


Observations made in EDA

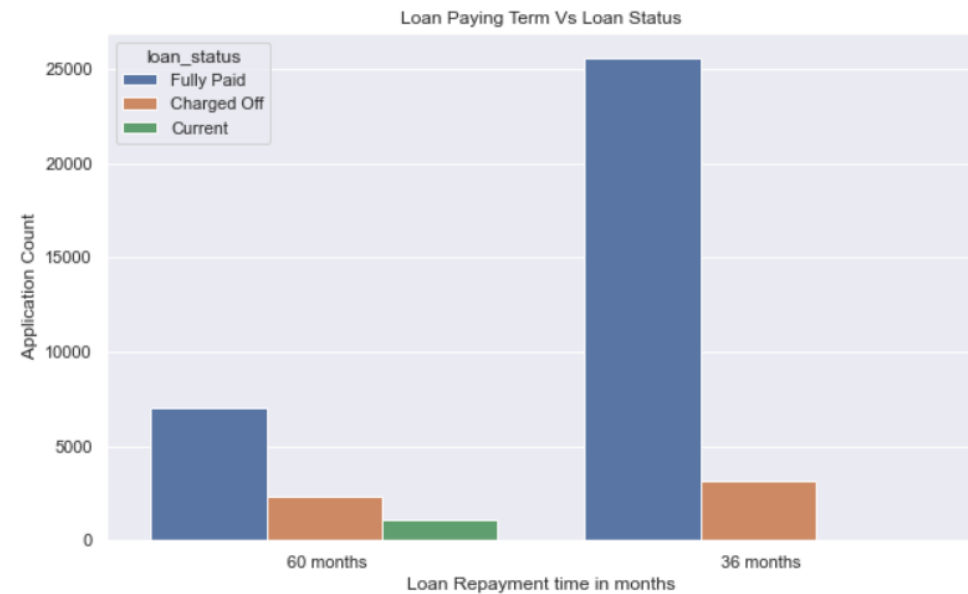
Loan applicants who are living in a rented house or those paying mortgage are more likely to charge off.

Home owners seem to have the least charge off ratio and short term loans (36 months term) seem to have a higher Charge off rate as short term loans could have a higher amount required to paid monthly which could be a driving factor for a default leading to charge off

Home ownership against charge off %



Loan tenure vs charge off %



CONCLUSION AND RECOMMENDATION

WE HAVE SEEN THE DRIVING FACTORS IN THE PREVIOUS SLIDES, THE FINAL RECOMMENDATION ARE AS FOLLOWS

- ✓ LOAN APPLICANTS WHOSE ANNUAL INCOME FALLS BETWEEN 0 TO 20,000 AND IF THE SUBGRADE IS F5,G2 OR G3 THEN THERE IS HIGH CHANCE THAT THESE APPLICANTS COULD BECOME POTENTIAL CHARGE OFF'S
- ✓ WE SEE A RISK OF CHARGE OFF WHEN THE PURPOSE OF LOAN IS SMALL BUSINESS ALSO IF THE TIME HORIZON TO PAY THIS LOAN AMOUNT IS LESS THAN 36 MONTHS ON THE CONTRARY IF THE LOAN PURPOSE IS WEDDING OR VEHICLE LOAN (CAR) THEN THE THESE TEND TO BE GOOD LOANS.
- ✓ LOAN APPLICANTS WHO ARE LIVING IN A RENTED HOUSE OR THOSE PAYING MORTGAGE ARE MORE LIKELY TO BE CHARGE OFF. HOME OWNERS SEEM TO HAVE THE LEAST CHARGE OFF RATIO
- ✓ THE MOST RISKY LOANS TEND TO BE OF THOSE APPLICANTS WHO ARE PAYING MORTGAGE OR RENT AND THEIR LOAN PURPOSE IS LISTED AS SMALL BUSINESS AND THEIR SUB GRADES FALL UNDER F5, G2 OR G3, ALONG WITH THESE FACTORS IF THE INTEREST RATE IS ALSO HIGHER THEN THERE IS HIGH CHANCE OF CHARGE OFF.