

Lending Club Case Study

Group Members

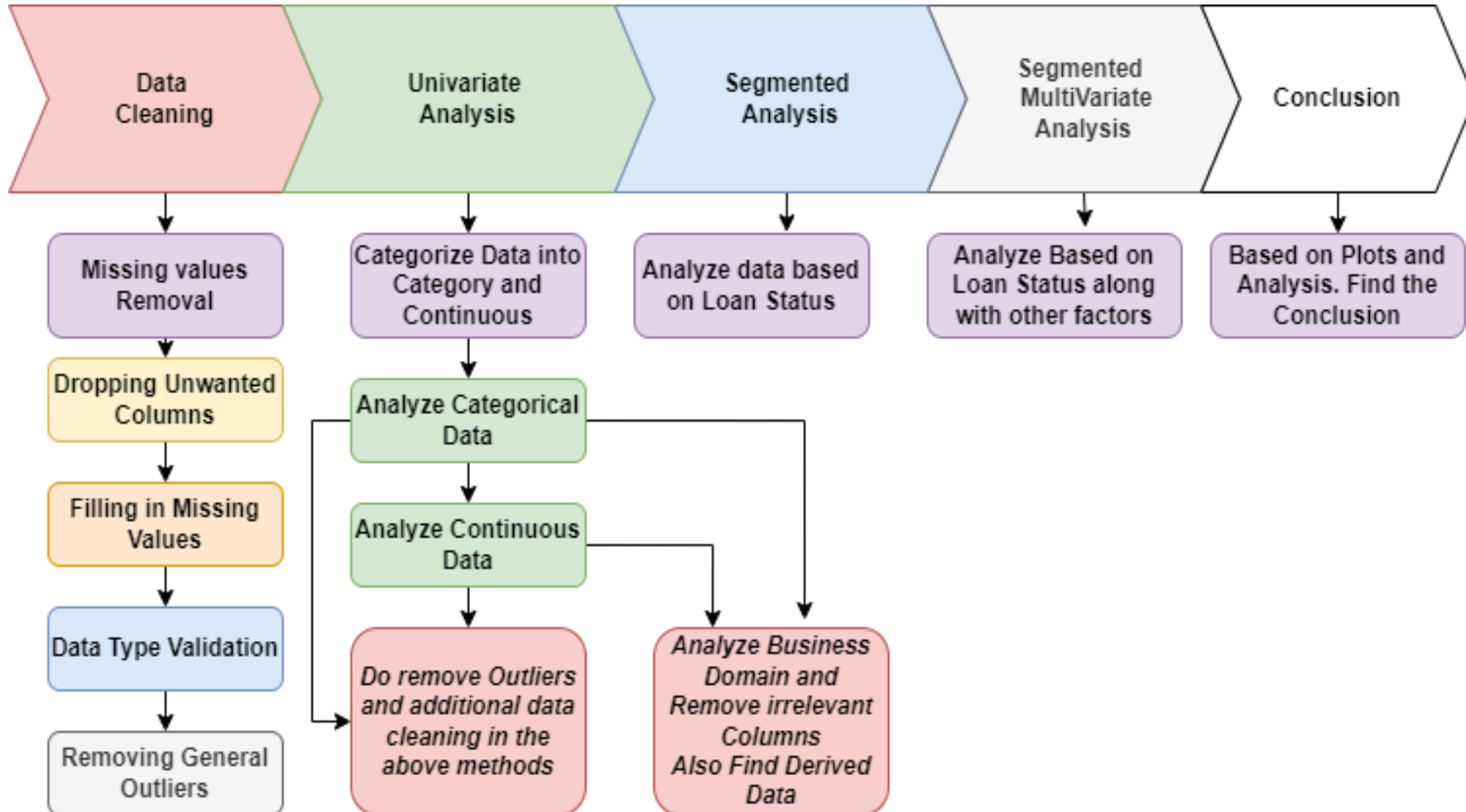
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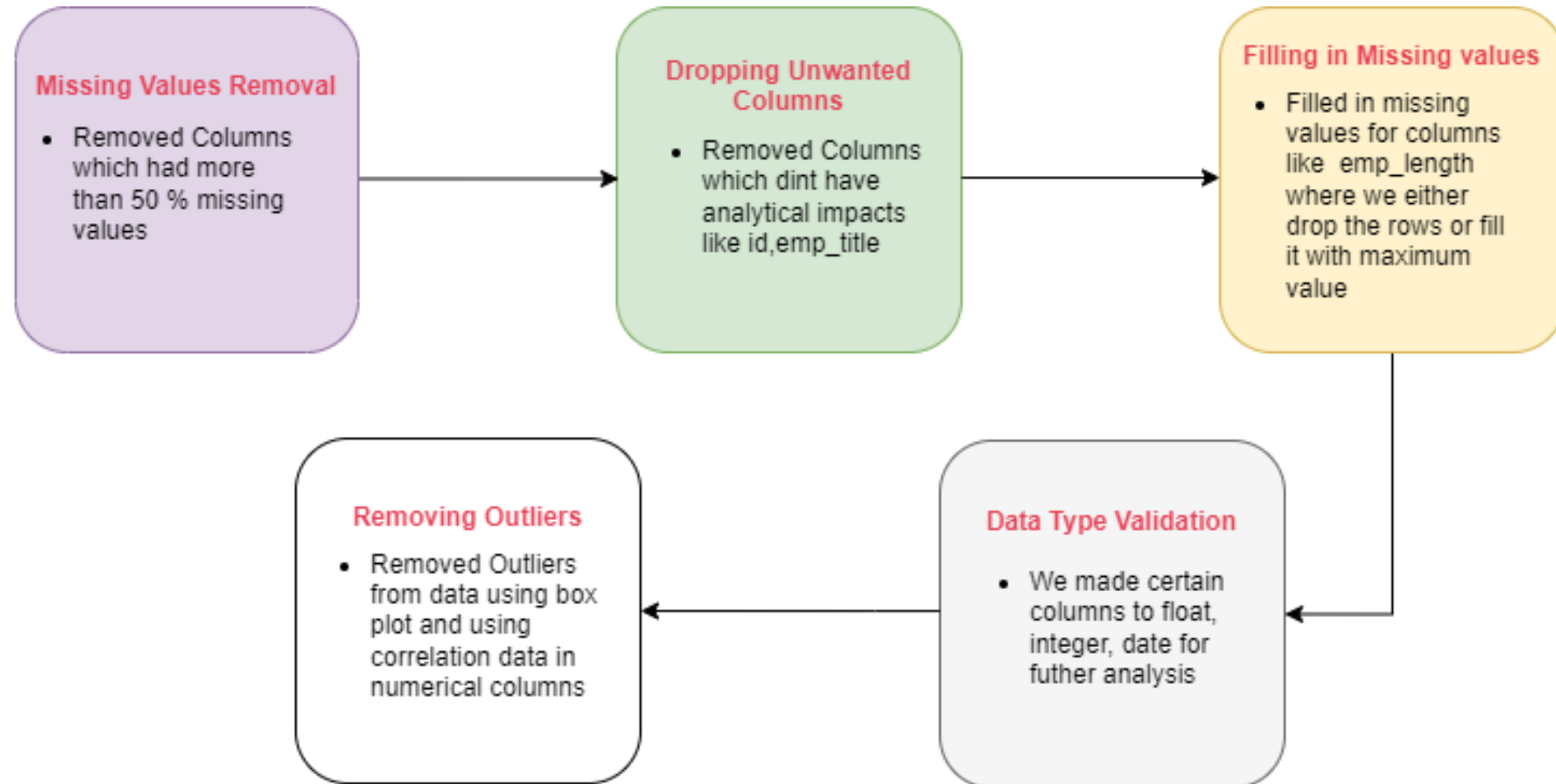
Abstract

- *Lending Club is a consumer finance company which specializes in lending various types of loans to urban customers.*
- *When company receives a loan application, it must make decision for loan approval based on the applicant's profile.*
- *Our objective here is to analyse and understand the driving factors (strong indicators) behind loan defaults.*

Approach to solve problem

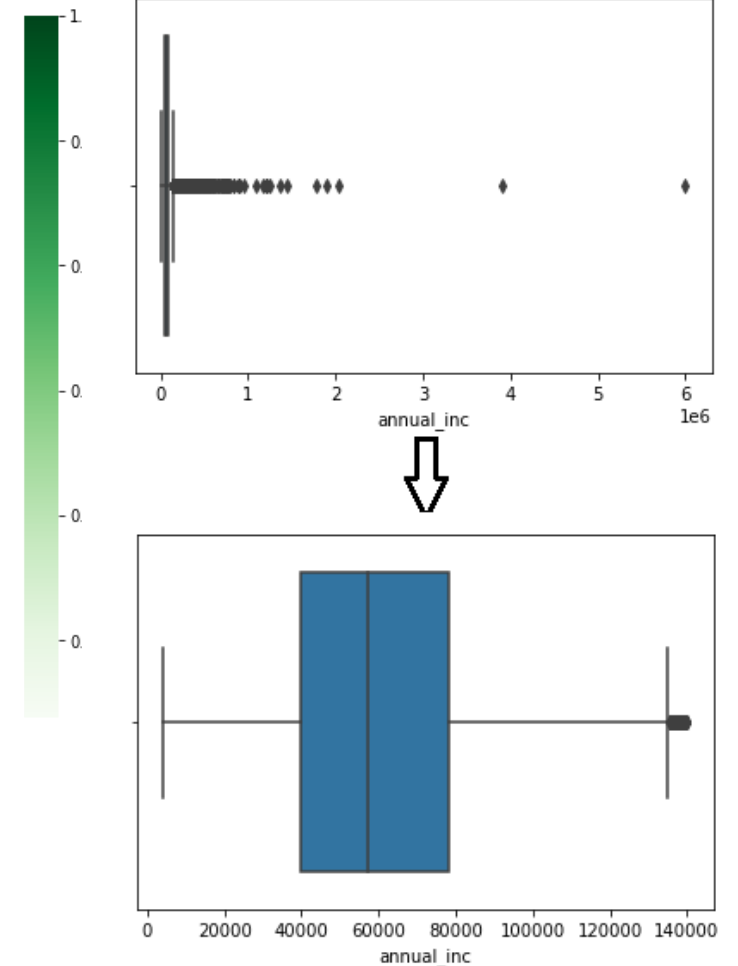


Data Cleaning Process

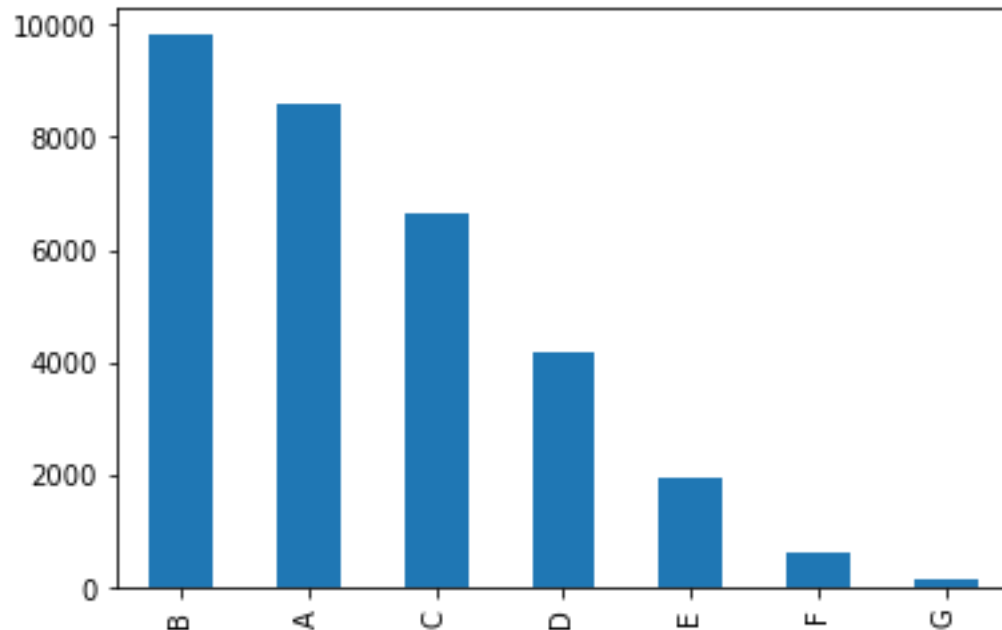


Correlation Based Outlier Removal

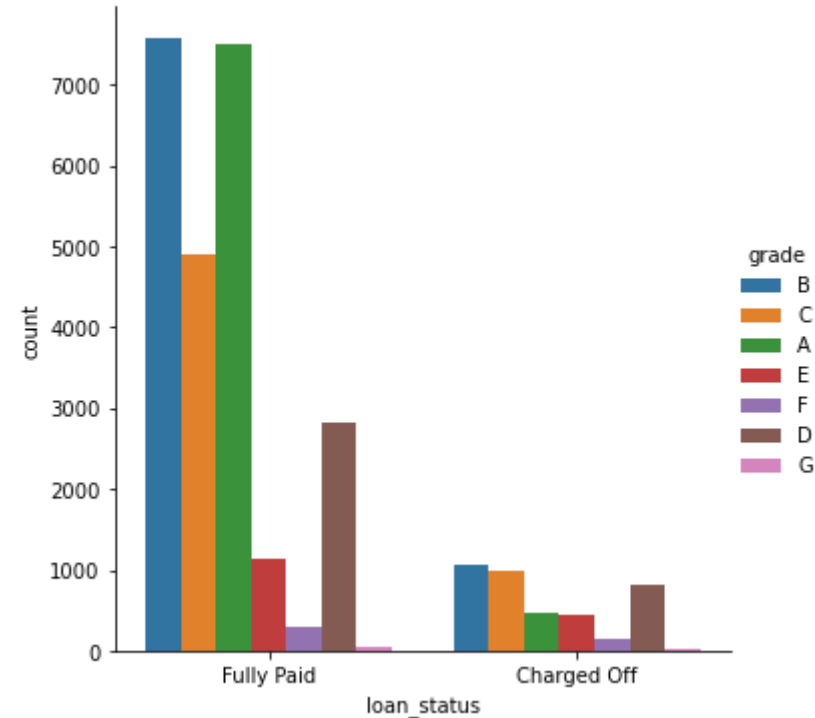
delinq_2yrs	1	0.0071	0.011	0.0096	0.067	0.0046	-0.033	-0.034	-0.04	-0.021	0.023	-0.035	-0.055	-0.0031	-0.0033	-0.024	-0.03	-0.04	0.022	0.031	0.012	0.014	-0.013	0.16	-0.043
inq_last_6mths	-0.0071	1	0.093	0.025	0.11	0.015	0.0092	0.0093	-0.0056	0.0097	0.035	-0.0004	0.023	-0.011	-0.01	-0.0095	-0.019	-0.022	0.022	0.031	0.018	0.012	0.029	0.13	-0.069
open_acc	-0.011	0.093	1	0.0032	0.69	0.0095	0.17	0.17	0.16	0.17	0.16	0.29	0.29	0.029	0.028	0.16	0.15	0.16	0.12	-0.019	0.017	0.0061	0.076	0.013	-0.085
pub_rec	-0.0096	0.025	0.0032	1	-0.02	0.84	-0.047	-0.048	-0.05	-0.043	-0.015	-0.0049	-0.059	-0.014	-0.014	-0.05	-0.051	-0.062	-0.0049	0.0032	0.0059	0.0069	-0.032	0.097	0.058
total_acc	-0.067	0.11	0.69	-0.02	1	-0.0064	0.26	0.25	0.24	0.23	0.23	0.31	0.31	0.031	0.031	0.22	0.22	0.23	0.15	-0.024	0.024	0.011	0.16	-0.042	-0.066
pub_rec_bankruptcies	-0.0046	0.015	0.0095	0.84	-0.0064	1	-0.032	-0.033	-0.034	-0.03	-0.013	0.0074	-0.046	-0.011	-0.011	-0.039	-0.039	-0.049	0.0043	0.0058	0.0051	0.0071	-0.021	0.083	0.061
loan_amnt	-0.033	0.0092	0.17	-0.047	0.26	-0.032	1	0.98	0.94	0.93	0.27	0.066	0.32	0.19	0.19	0.89	0.85	0.85	0.73	0.045	0.14	0.072	0.45	0.31	0.067
funded_amnt	-0.034	0.0093	0.17	-0.048	0.25	-0.033	0.98	1	0.96	0.96	0.26	0.066	0.31	0.19	0.19	0.9	0.87	0.87	0.74	0.047	0.14	0.074	0.45	0.31	0.071
funded_amnt_inv	-0.04	-0.0056	0.16	-0.05	0.24	-0.034	0.94	0.96	1	0.9	0.25	0.074	0.29	0.2	0.2	0.88	0.91	0.85	0.73	0.027	0.12	0.06	0.44	0.31	0.077
installment	-0.021	0.0097	0.17	-0.043	0.23	-0.03	0.93	0.96	0.9	1	0.27	0.053	0.31	0.12	0.12	0.86	0.82	0.85	0.63	0.056	0.12	0.075	0.4	0.28	0.096
annual_inc	-0.023	0.035	0.16	-0.015	0.23	-0.013	0.27	0.26	0.25	0.27	1	-0.12	0.28	0.033	0.033	0.25	0.24	0.26	0.18	0.0057	0.022	0.016	0.14	0.051	0.017
dti	-0.035	0.00047	0.29	-0.0049	0.23	0.0074	0.066	0.066	0.074	0.053	-0.12	1	0.23	0.036	0.036	0.064	0.071	0.041	0.11	-0.012	0.024	0.01	0.0059	0.11	0.28
revol_bal	-0.055	-0.023	0.29	-0.059	0.31	-0.046	0.32	0.31	0.29	0.31	0.28	0.23	1	0.061	0.061	0.29	0.28	0.28	0.24	0.0037	0.041	0.022	0.12	0.099	0.3
out_prmcp	-0.0031	-0.011	0.029	-0.014	0.031	-0.011	0.19	0.19	0.2	0.12	0.033	0.036	0.061	1	1	0.24	0.25	0.17	0.38	-0.0052	-0.019	-0.011	-0.067	0.14	0.04
out_prmcp_inv	-0.0033	-0.01	0.028	-0.014	0.031	-0.011	0.19	0.19	0.2	0.12	0.033	0.036	0.061	1	1	0.24	0.25	0.17	0.38	-0.0053	-0.019	-0.011	-0.067	0.14	0.04
total_pymnt	-0.024	-0.0095	0.16	-0.05	0.22	-0.039	0.89	0.9	0.88	0.86	0.25	0.064	0.29	0.24	0.24	1	0.97	0.97	0.83	0.013	0.025	0.025	0.47	0.31	0.081
total_pymnt_inv	-0.03	-0.019	0.15	-0.051	0.22	-0.039	0.85	0.87	0.91	0.82	0.24	0.071	0.28	0.25	0.25	0.97	1	0.94	0.81	-0.0013	0.019	0.016	0.46	0.3	0.085
total_rec_prmcp	-0.04	-0.022	0.16	-0.062	0.23	-0.049	0.85	0.87	0.85	0.85	0.26	0.041	0.28	0.17	0.17	0.97	0.94	1	0.68	-0.021	-0.094	-0.058	0.54	0.19	0.026
total_rec_int	-0.022	0.022	0.12	-0.0049	0.15	0.00043	0.73	0.74	0.73	0.63	0.18	0.11	0.24	0.38	0.38	0.83	0.81	0.68	1	0.069	0.077	0.034	0.19	0.53	0.2
total_rec_late_fee	-0.031	0.031	-0.019	-0.0032	-0.024	-0.0058	0.045	0.047	0.027	0.056	0.0057	-0.012	0.0037	-0.0052	0.0053	0.013	-0.0013	-0.021	0.069	1	0.1	0.095	-0.062	0.093	0.038
recoveries	-0.012	0.018	0.017	-0.0059	0.024	-0.0051	0.14	0.14	0.12	0.12	0.022	0.024	0.041	-0.019	-0.019	0.025	0.019	-0.094	0.077	0.1	1	0.8	-0.07	0.12	0.051
collection_recovery_fee	-0.014	0.012	0.0061	-0.0069	0.011	-0.0071	0.072	0.074	0.06	0.075	0.016	0.01	0.022	-0.011	-0.011	0.025	0.016	-0.058	0.034	0.095	0.8	1	-0.042	0.066	0.026
last_pymnt_amnt	-0.013	0.029	0.076	-0.032	0.16	-0.021	0.45	0.45	0.44	0.4	0.14	0.0059	0.12	-0.067	-0.067	0.47	0.46	0.54	0.19	-0.062	-0.07	-0.042	1	0.16	-0.017
int_rate	0.16	0.13	0.013	0.097	-0.042	0.083	0.31	0.31	0.31	0.28	0.051	0.11	0.099	0.14	0.14	0.31	0.3	0.19	0.53	0.093	0.12	0.066	0.16	1	0.46
revol_util	-0.043	-0.069	-0.085	0.058	-0.066	0.061	0.067	0.071	0.077	0.096	0.017	0.28	0.3	0.04	0.04	0.081	0.085	0.026	0.2	0.038	0.051	0.026	-0.017	0.46	1



Grade Level Analysis



- Most of the loans from **Grade A-D loans** comprising of nearly 76% of volume, with **B** being the highest.
- We can see that **Grade loans F and G** are least preferred.

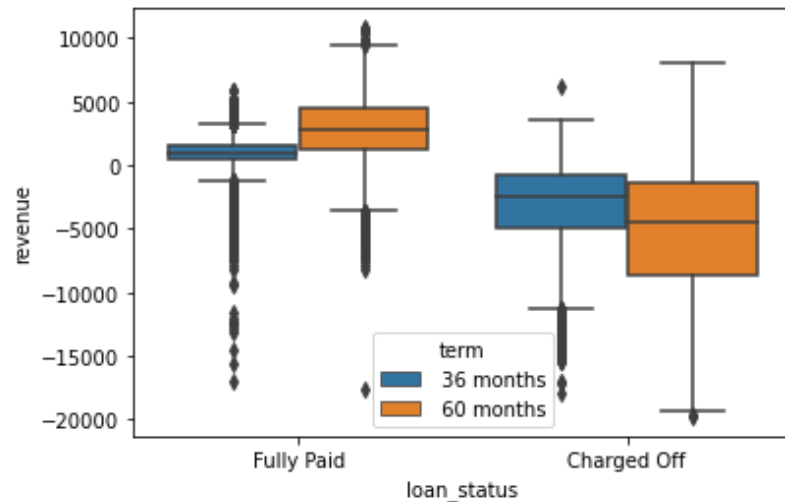


- In comparison to **Loan Status** we can see that **Grade D** loans have higher chances of getting defaulted.

Loan Term Analysis

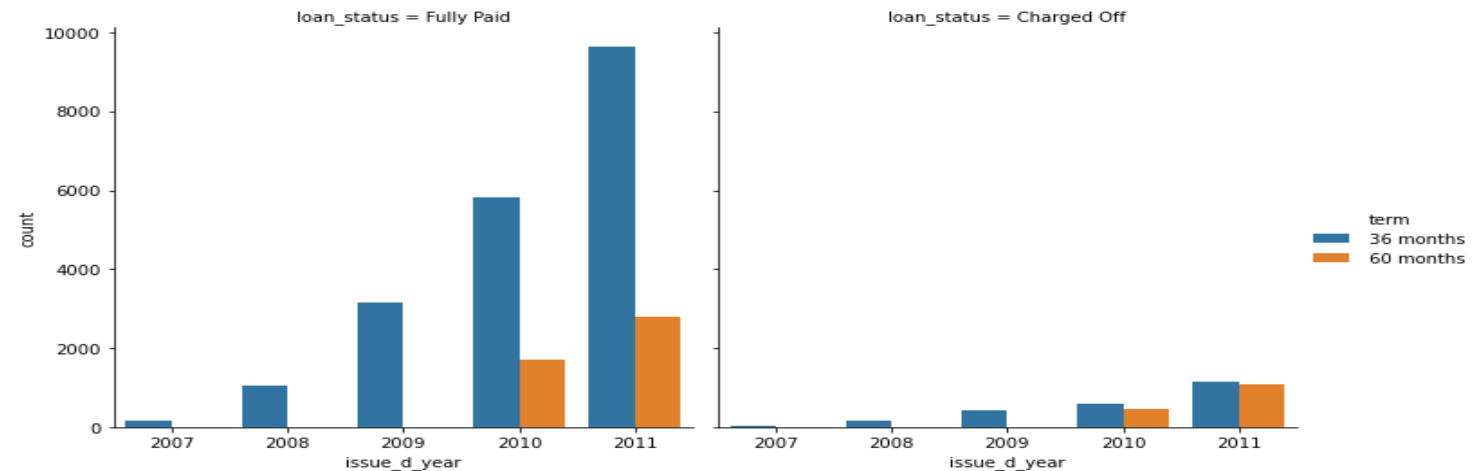
	Count	% of Data
36 months	22193	78.57
60 months	6053	21.43

- Majority of the **loan (78%)** were provided for **36 months**, and **21% loans** were provided for **60 months**

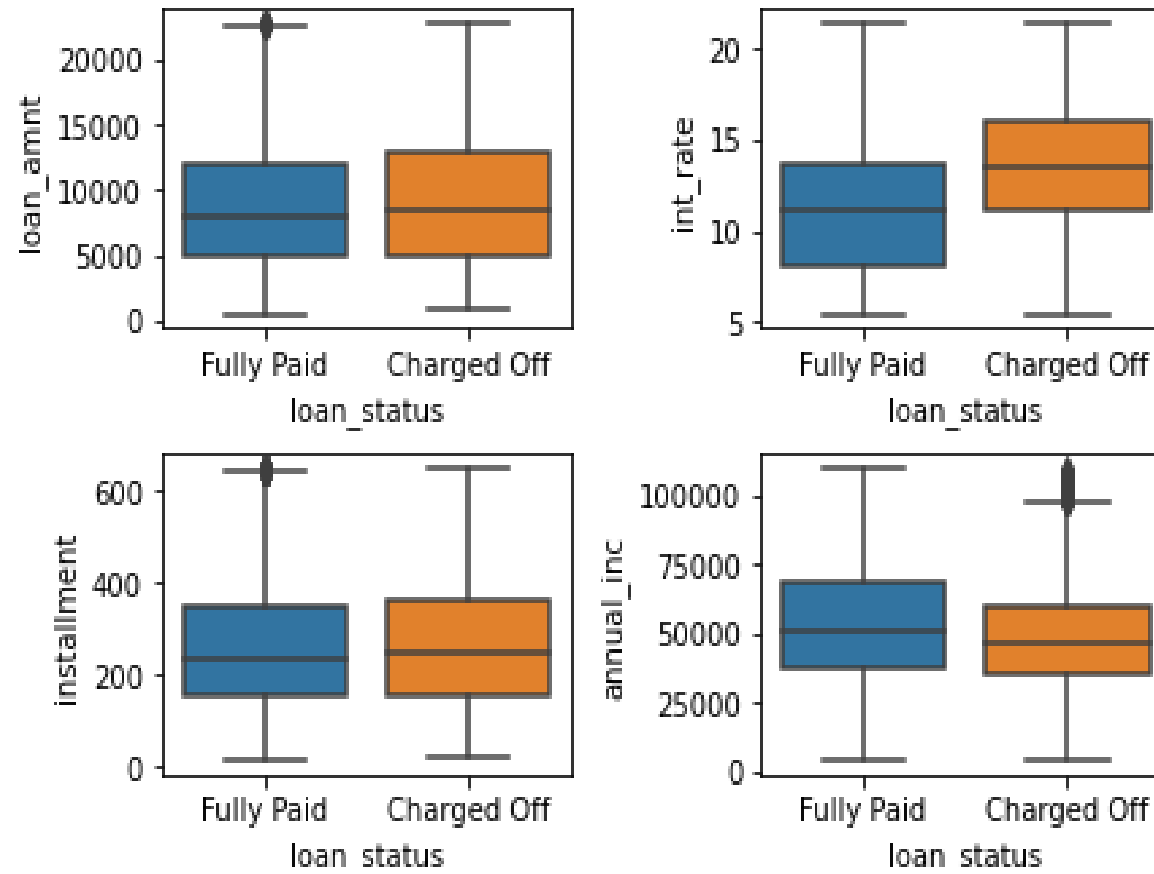


- Magnitude of Charge Off is more in the **60 months** scenario and has affects on the revenue.

- 60 months** loan that started in 2010 has **higher profits** as well as extreme losses compared to **36 months**.

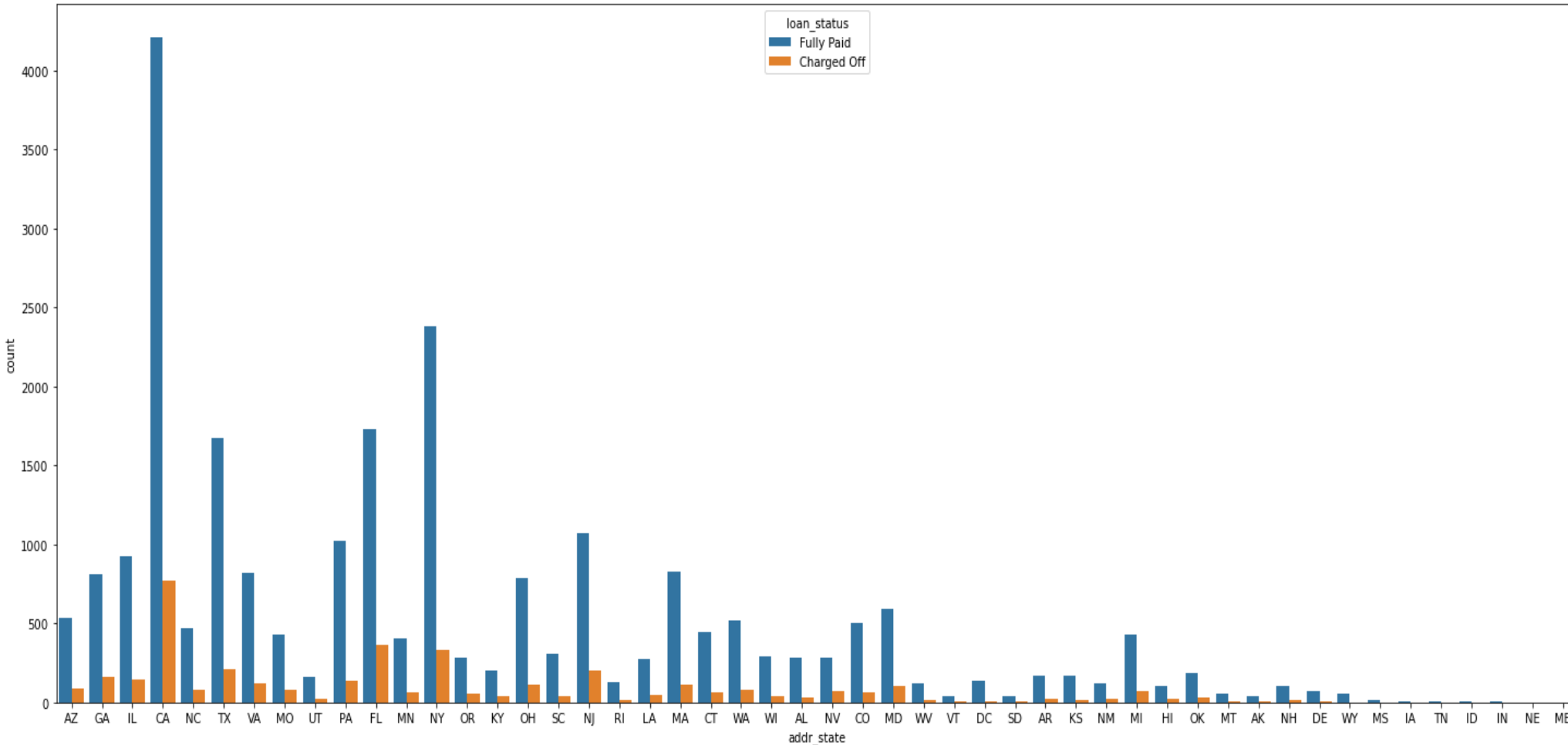


Loan Statistical Analysis



- Higher the **Interest rates** more the probability it will be **Charged off**.
- Higher the **Annual Income** more the chances it will be **Fully Paid**.
- **Loan Amount and Installments** doesn't seem to have major impact on **Loan being Defaulted**.

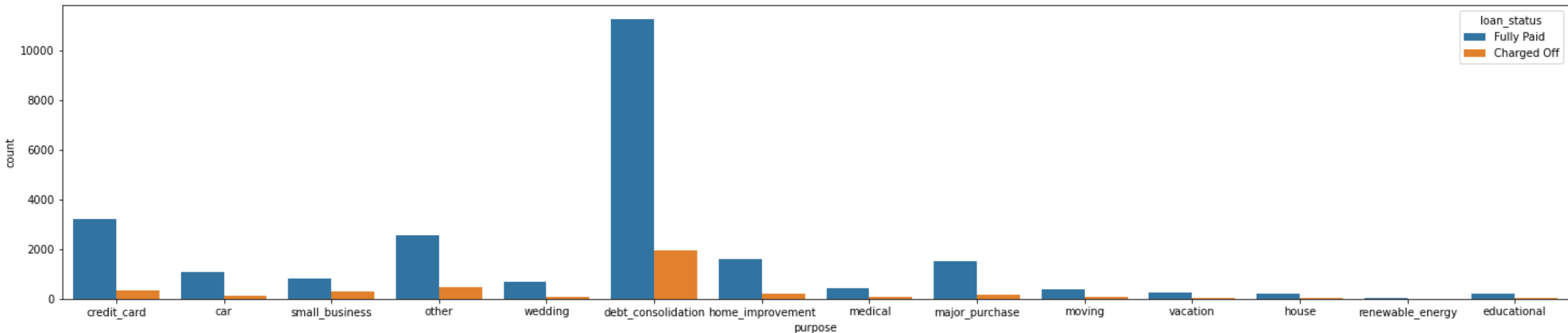
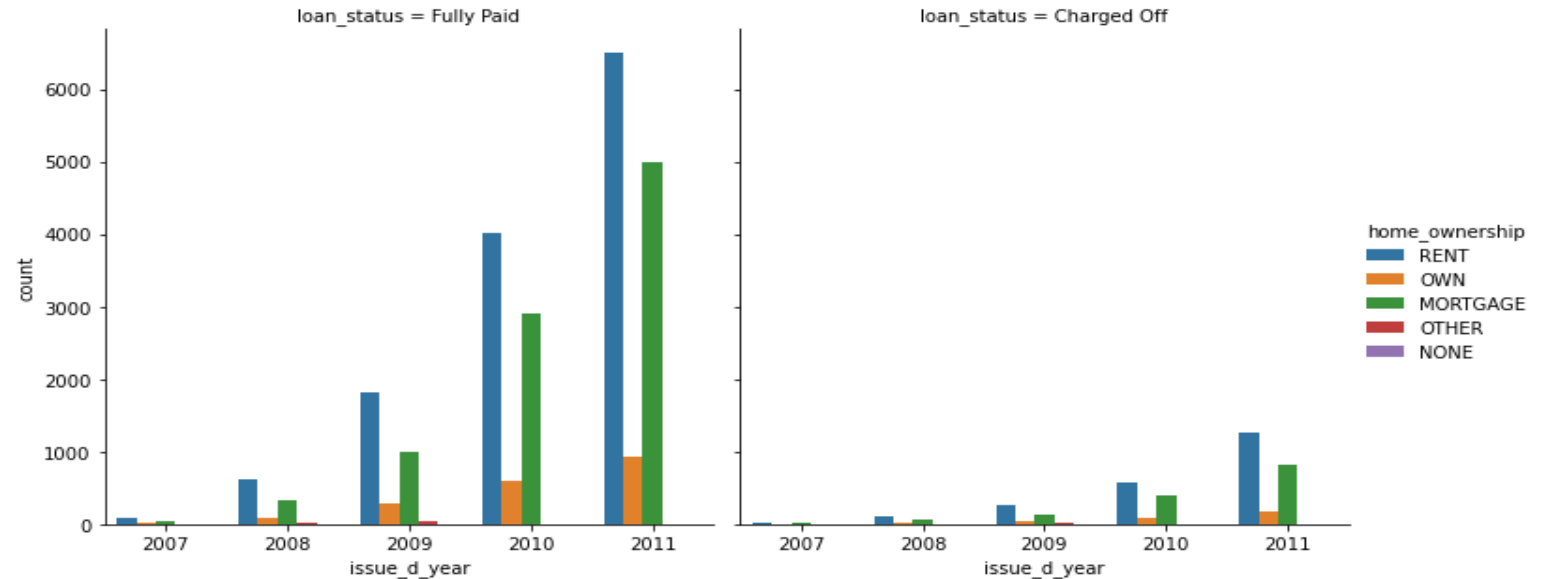
State Wise Analysis



- *Maximum **no of loans** are allocated to **California(CA)** with most being **Fully Paid**.*
- *Defaulter's count is also more in **CA**, so with better scrutiny it can be reduced.*

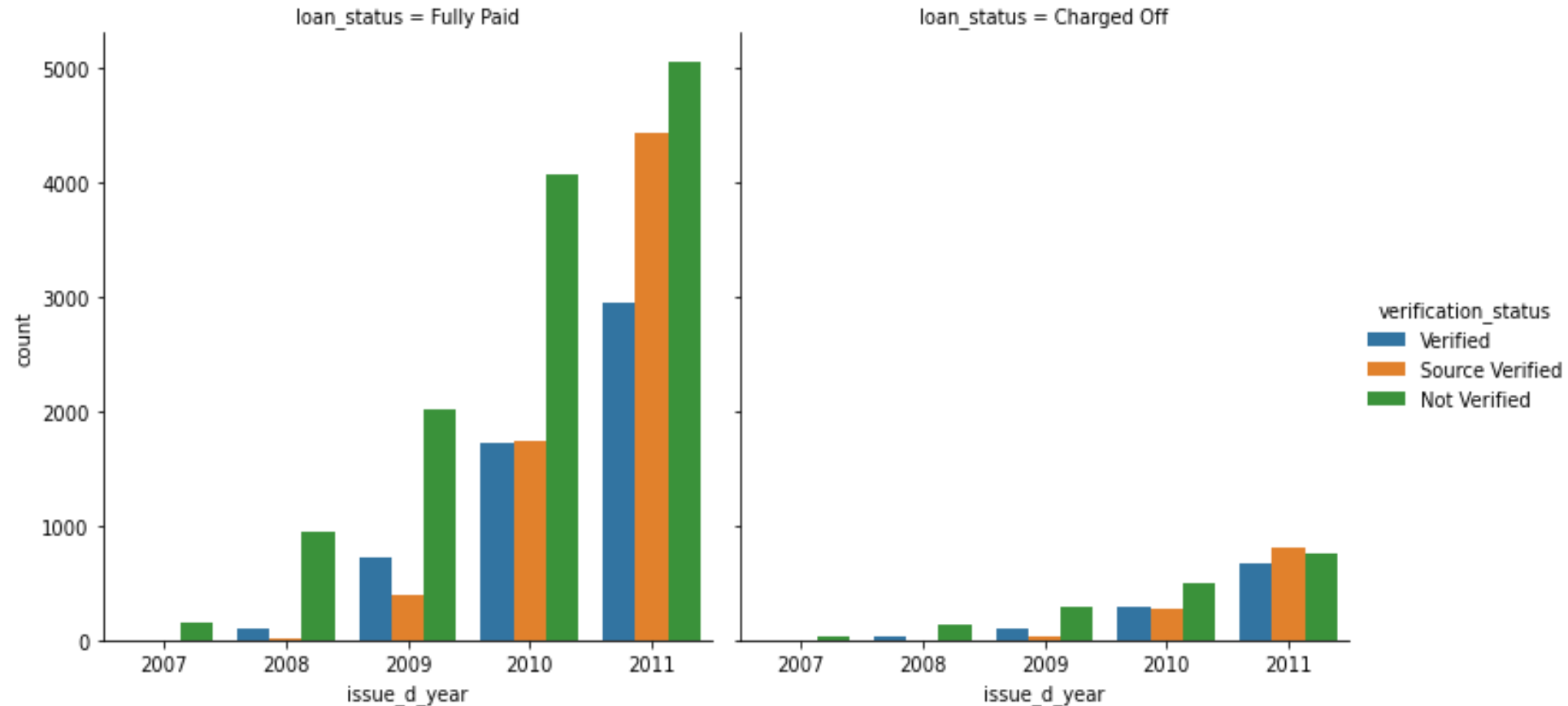
Lifestyle Analysis

- People on **Rent and Mortgage** apply for loans the most.
- People who **own a home** tend to Default lesser.
- Most of loans are for **debt consolidation**.

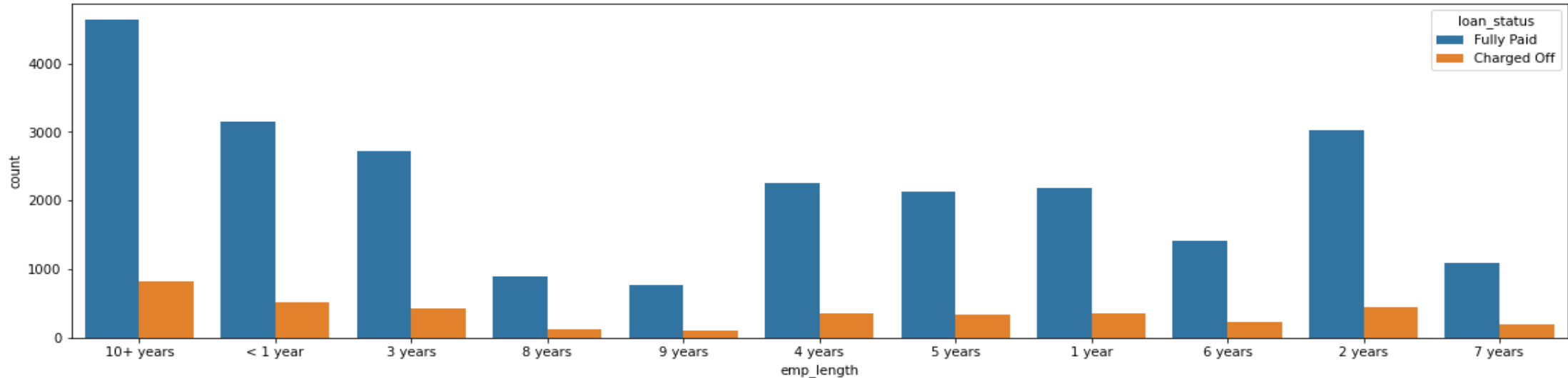


Verification Analysis

- During the starting days of the company, it dint focus on **Verification Status** which is reflected in the **Charged off** in Year 2008.
- As the company aged, significant improvements in **Verified** and **Source Verified** loan.



Employee Experience Analysis



- People after starting career till **5 years** apply for loans
- People with experience from **6 years – 9 years** have good chances to **Fully Pay** the loans.
- People after **10+ years** of experience apply for loans the most and they tend to fully pay back
- But this bracket, there is a caveat **10 years+** employees will also include exp of **15,20,25** years but others are individual.

Conclusions

- *More Loans need to be **verified** which will help **reduce the financial loss***
- *Lowering the **interest rates** can lead to **less number of defaulters***
- *Better **Annual Income** , more the chances that the person **does not default***
- *Persons who **own property** tend to pay back the loans, they should be given more priority*
- ***60 Term loans** have higher profits as well as losses. It can be reduced by*
 - *Giving **higher grade loans** like A,B,C,D*
 - *Doing more **verification** in this type of term loan*