

Lending Club



Lending Club



Problem Statement

Can we predict whether a loan application will be approved?

Goals and success criteria

- Given loan application details, predict whether Lending Club will reject or approve a loan application
- Determine which are the most important factors in the decision making process

Audience

- Lending Club
 - Is their approval process systematic
 - Can they improve it
- Lending Club customers
 - What is affecting their approval success rate
 - How can they improve their chances of obtaining a loan
- Other lenders
 - Can they learn from Lending Club's process and success rate

Data

- Provided by Lending Club on LINK
 - Includes data for rejected applications and approved applications
 - For approved applications, they also included other data relating to loan repayment

Variable	Label	Unit	Min	Q1	Median	Q3	Max	Mean	Std. Dev.	Skewness	Kurtosis
1. Age	Age	Years	21	25	28	30	45	27.5	5.5	-0.1	3.0
2. Term	Term	Months	12	12	12	12	12	12	0.0	0.0	0.0
3. Loan Amount	Loan Amount	Dollars	1000	1000	1000	1000	1000	1000	0.0	0.0	0.0
4. Loan Status	Loan Status	0 = Not Funded, 1 = Funded	0	0	0	0	0	0	0.0	0.0	0.0
5. Loan Grade	Loan Grade	A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z	A	A	A	A	A	A	0.0	0.0	0.0
6. Loan Delinquency Rate	Loan Delinquency Rate	Percentage	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7. Loan Origination Date	Loan Origination Date	YYYY-MM-DD	2007-01-01	2007-01-01	2007-01-01	2007-01-01	2007-01-01	2007-01-01	0.0	0.0	0.0
8. Loan First Payment Date	Loan First Payment Date	YYYY-MM-DD	2007-01-01	2007-01-01	2007-01-01	2007-01-01	2007-01-01	2007-01-01	0.0	0.0	0.0
9. Loan Last Payment Date	Loan Last Payment Date	YYYY-MM-DD	2007-01-01	2007-01-01	2007-01-01	2007-01-01	2007-01-01	2007-01-01	0.0	0.0	0.0
10. Loan Total Payments	Loan Total Payments	Number	0	0	0	0	0	0	0.0	0.0	0.0
11. Loan Total Payments Received	Loan Total Payments Received	Number	0	0	0	0	0	0	0.0	0.0	0.0
12. Loan Total Payments Missed	Loan Total Payments Missed	Number	0	0	0	0	0	0	0.0	0.0	0.0
13. Loan Total Payments Late	Loan Total Payments Late	Number	0	0	0	0	0	0	0.0	0.0	0.0
14. Loan Total Payments Overdue	Loan Total Payments Overdue	Number	0	0	0	0	0	0	0.0	0.0	0.0
15. Loan Total Payments In Default	Loan Total Payments In Default	Number	0	0	0	0	0	0	0.0	0.0	0.0
16. Loan Total Payments In Liquidation	Loan Total Payments In Liquidation	Number	0	0	0	0	0	0	0.0	0.0	0.0
17. Loan Total Payments In Foreclosure	Loan Total Payments In Foreclosure	Number	0	0	0	0	0	0	0.0	0.0	0.0
18. Loan Total Payments In Bankruptcy	Loan Total Payments In Bankruptcy	Number	0	0	0	0	0	0	0.0	0.0	0.0
19. Loan Total Payments In Other Status	Loan Total Payments In Other Status	Number	0	0	0	0	0	0	0.0	0.0	0.0
20. Loan Total Payments In Unknown Status	Loan Total Payments In Unknown Status	Number	0	0	0	0	0	0	0.0	0.0	0.0

```
reject_df = pd.read_csv('/Users/joce/learning/data_science/lending-club/RejectStatsA.csv',\
                        low_memory=False, skiprows=1)
```

Last executed 2016-10-26 10:23:14 in 1.92s

```
loan_df = pd.read_csv('/Users/joce/learning/data_science/lending-club/LoanStats3a.csv',\
                      low_memory=False, skiprows=1)
```

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	Amount Requested	Application Date	Loan Title	Risk_Score	Debt-To-Income Ratio	Zip Code	State	Employment Length	Policy Code
0	1000.0	2007-05-26	Wedding Covered but No Honeymoon	693.0	10%	481xx	NM	4 years	0
1	1000.0	2007-05-26	Consolidating Debt	703.0	10%	010xx	MA	< 1 year	0
2	11000.0	2007-05-27	Want to consolidate my debt	715.0	10%	212xx	MD	1 year	0
3	6000.0	2007-05-27	waksman	698.0	38.64%	017xx	MA	< 1 year	0
4	1500.0	2007-05-27	mdrigo	509.0	9.43%	209xx	MD	< 1 year	0

	id	member_id	loan_amnt	funded_amnt	funded_amnt_inv	term	int_rate	installment	grade	sub_grade	...
0	1077501	1296599.0	5000.0	5000.0	4975.0	36 months	10.65%	162.87	B	B2	...
1	1077430	1314167.0	2500.0	2500.0	2500.0	60 months	15.27%	59.83	C	C4	...
2	1077175	1313524.0	2400.0	2400.0	2400.0	36 months	15.96%	84.33	C	C5	...
3	1076863	1277178.0	10000.0	10000.0	10000.0	36 months	13.49%	339.31	C	C1	...
4	1075358	1311748.0	3000.0	3000.0	3000.0	60 months	12.69%	67.79	B	B5	...

	LoanStatNew	Description
0	acc_now_delinq	The number of accounts on which the borrower is now delinquent.
1	acc_open_past_24mths	Number of trades opened in past 24 months.
2	addr_state	The state provided by the borrower in the loan application
3	all_util	Balance to credit limit on all trades
4	annual_inc	The self-reported annual income provided by the borrower during registration.
5	annual_inc_joint	The combined self-reported annual income provided by the co-borrowers during registration
6	application_type	Indicates whether the loan is an individual application or a joint application with two co-borrowers
7	avg_cur_bal	Average current balance of all accounts
8	bc_open_to_buy	Total open to buy on revolving bankcards.
9	bc_util	Ratio of total current balance to high credit/credit limit for all bankcard accounts.
10	chargeoff_within_12_mths	Number of charge-offs within 12 months
11	collection_recovery_fee	post charge off collection fee
12	collections_12_mths_ex_med	Number of collections in 12 months excluding medical collections
13	delinq_2yrs	The number of 30+ days past-due incidences of delinquency in the borrower's credit file for the past 2 years
14	delinq_amnt	The past-due amount owed for the accounts on which the borrower is now delinquent.

Questions/
Suggestions?

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