



ASSESSMENT OF THE BORROWER'S CREDITWORTHINESS

Relevance of the Topic



- ❖ Modern banks and financial institutions face challenges in assessing risks when issuing loans.
- ❖ Traditional methods (such as manual application analysis) are slow and subjective.
- ❖ Machine learning enables the automation of creditworthiness assessment and improves the accuracy of predictions.

Data Exploration

#	Column	Non-Null	Count	Dtype
0	AnnualIncome	20000	non-null	float64
1	CreditScore	20000	non-null	float64
2	EducationLevel	20000	non-null	float64
3	Experience	20000	non-null	float64
4	LoanAmount	20000	non-null	float64
5	LoanDuration	20000	non-null	float64
6	MonthlyDebtPayments	20000	non-null	float64
7	CreditCardUtilizationRate	20000	non-null	float64
8	NumberOfOpenCreditLines	20000	non-null	float64
9	NumberOfCreditInquiries	20000	non-null	float64
10	BankruptcyHistory	20000	non-null	float64
11	PreviousLoanDefaults	20000	non-null	float64
12	PaymentHistory	20000	non-null	float64
13	LengthOfCreditHistory	20000	non-null	float64
14	TotalAssets	20000	non-null	float64
15	TotalLiabilities	20000	non-null	float64
16	MonthlyIncome	20000	non-null	float64
17	NetWorth	20000	non-null	float64
18	BaseInterestRate	20000	non-null	float64
19	InterestRate	20000	non-null	float64
20	MonthlyLoanPayment	20000	non-null	float64
21	TotalDebtToIncomeRatio	20000	non-null	float64
22	LoanApproved	20000	non-null	float64
23	RiskScore	20000	non-null	float64
24	LoanPurpose_Debt Consolidation	20000	non-null	bool
25	LoanPurpose_Education	20000	non-null	bool
26	LoanPurpose_Home	20000	non-null	bool
27	LoanPurpose_Other	20000	non-null	bool

- ✓ Financial Status
- ✓ Credit History
- ✓ Employment and Stability

```
df.isna().sum().sum()
```

✓ 0.0s

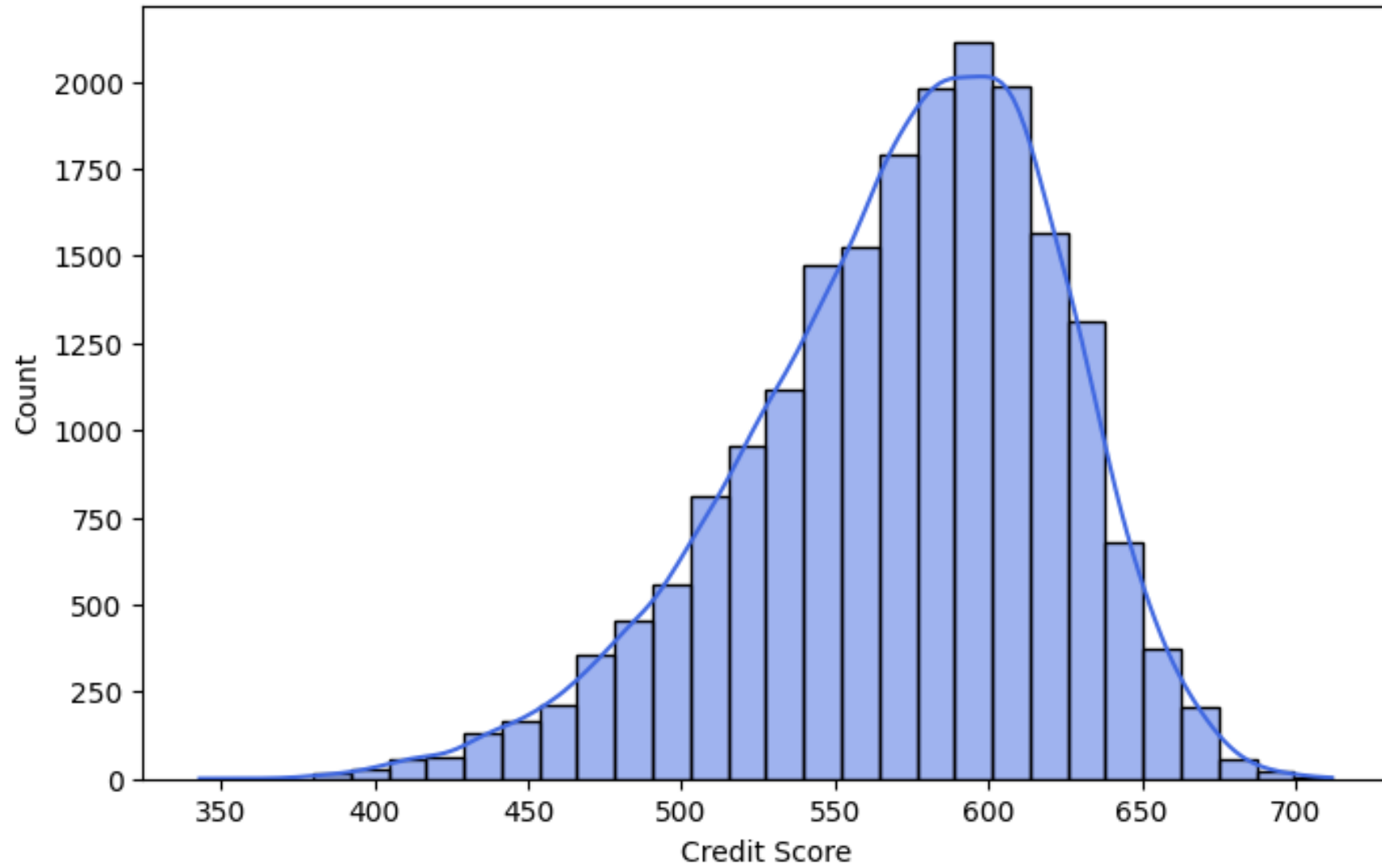
0

Maximum Correlation & Minimum Correlation

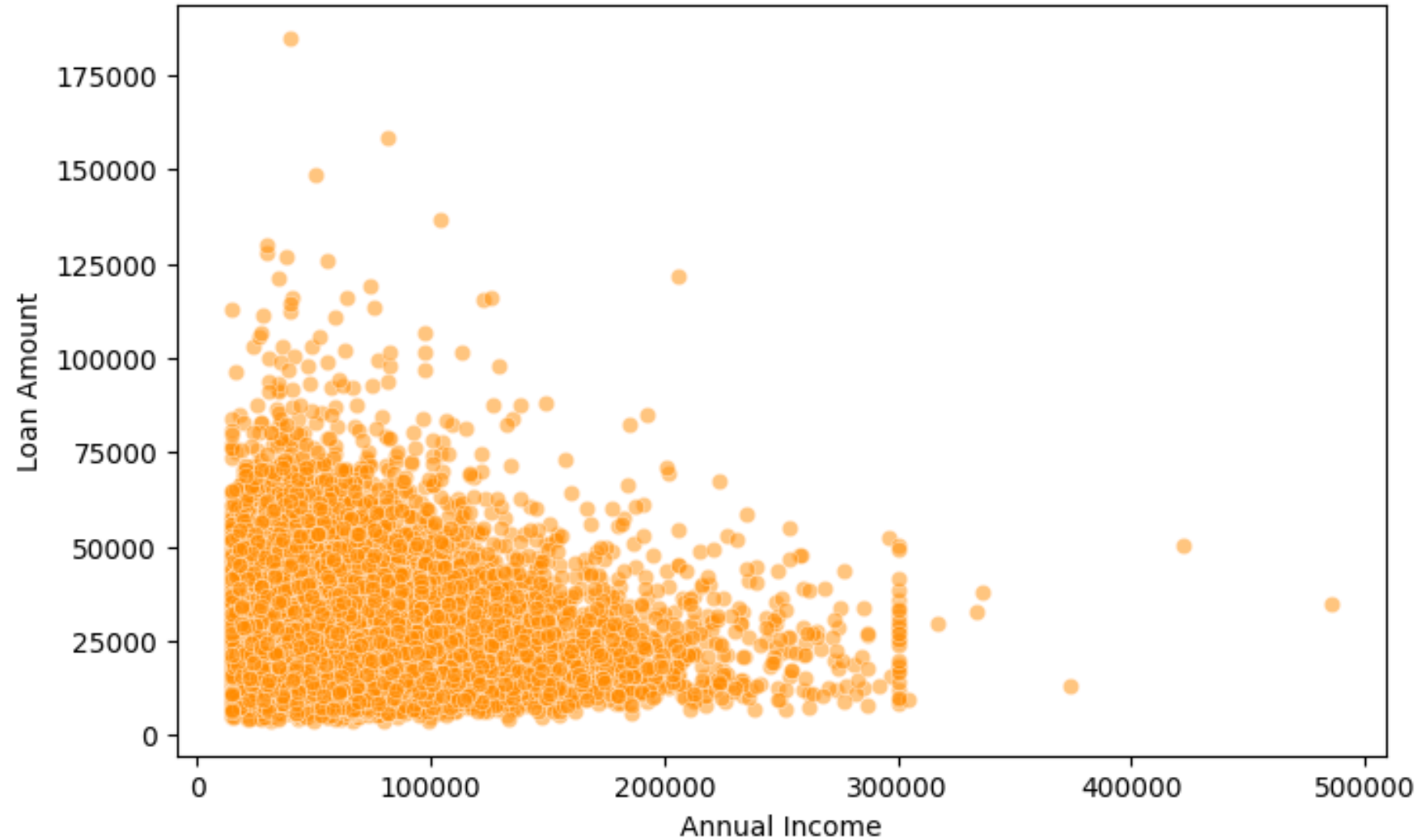
MonthlyIncome	LoanApproved	0.604101
AnnualIncome	LoanApproved	0.597900
EducationLevel	LoanApproved	0.194434
NetWorth	LoanApproved	0.187892
TotalAssets	LoanApproved	0.184011
CreditScore	LoanApproved	0.142000
Experience	LoanApproved	0.140755
LengthOfCreditHistory	LoanApproved	0.105949
PaymentHistory	LoanApproved	0.030804

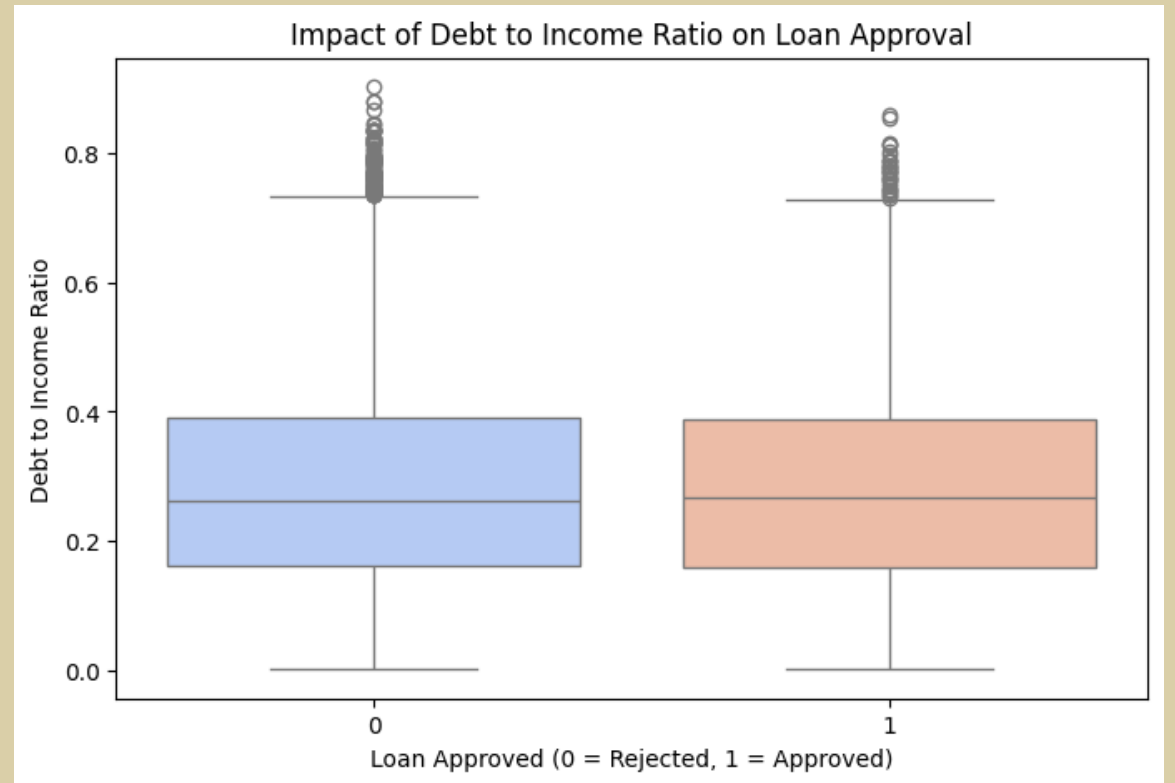
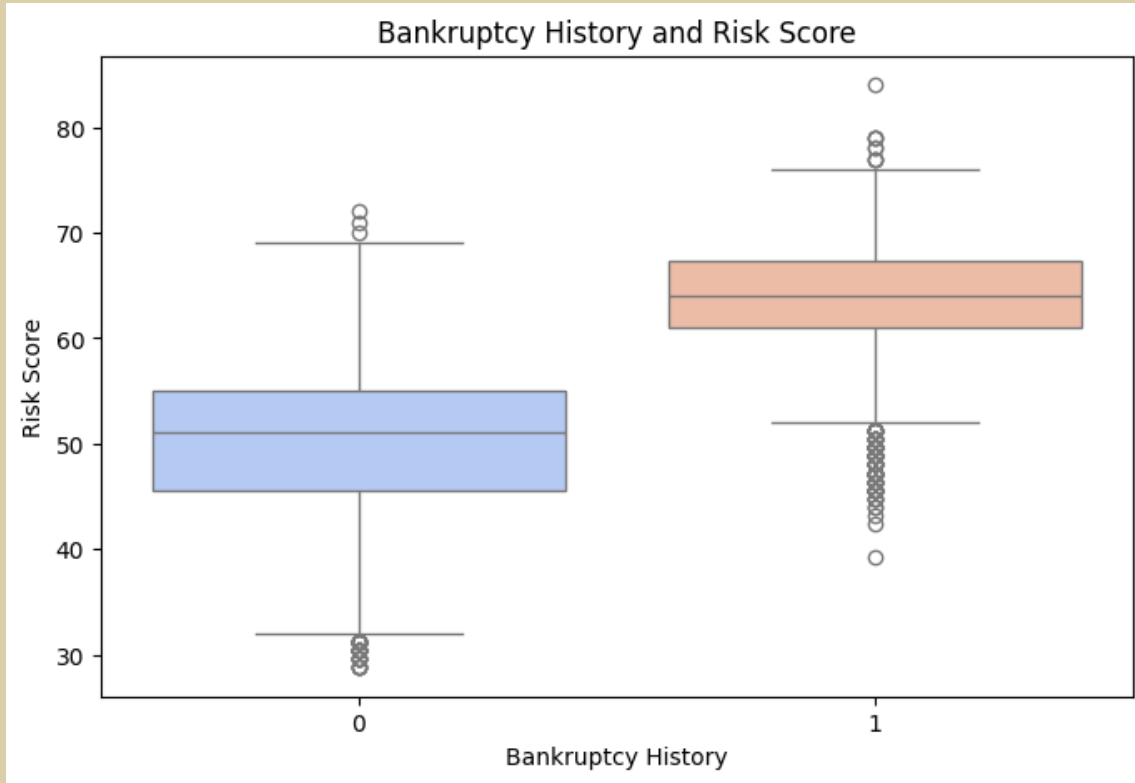
TotalDebtToIncomeRatio	LoanApproved	-0.410399
InterestRate	LoanApproved	-0.301646
BaseInterestRate	LoanApproved	-0.247263
LoanAmount	LoanApproved	-0.239496
MonthlyLoanPayment	LoanApproved	-0.184272
LoanDuration	LoanApproved	-0.094558
BankruptcyHistory	LoanApproved	-0.070751
MonthlyDebtPayments	LoanApproved	-0.070415
PreviousLoanDefaults	LoanApproved	-0.065343
TotalLiabilities	LoanApproved	-0.029434
CreditCardUtilizationRate	LoanApproved	-0.010466
NumberOfCreditInquiries	LoanApproved	-0.005885
NumberOfOpenCreditLines	LoanApproved	-0.004769

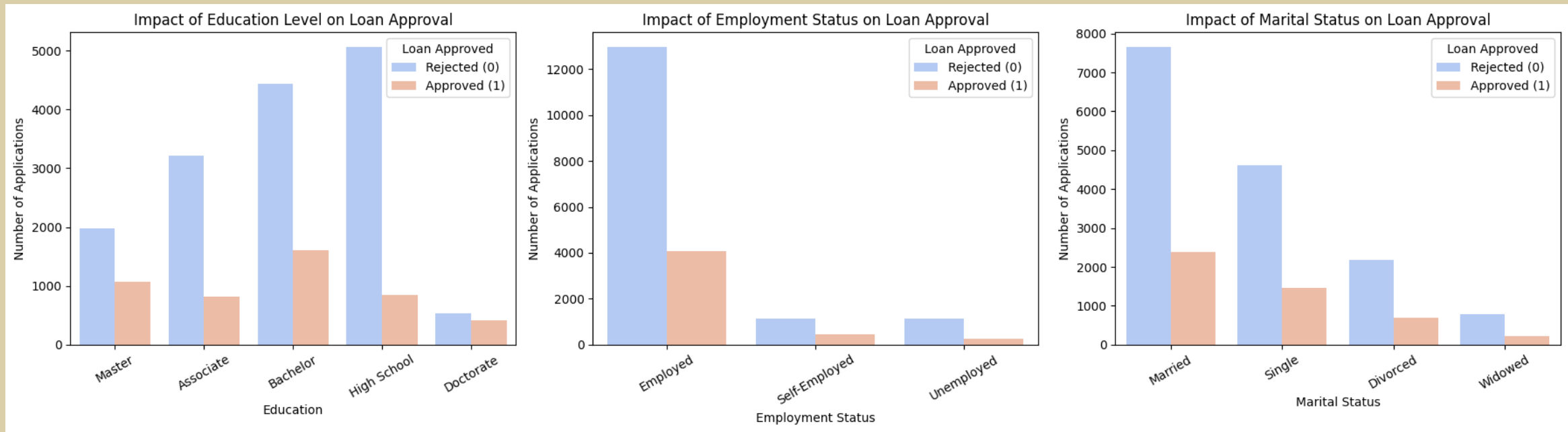
Credit Score Distribution



Relationship Between Income and Loan Amount



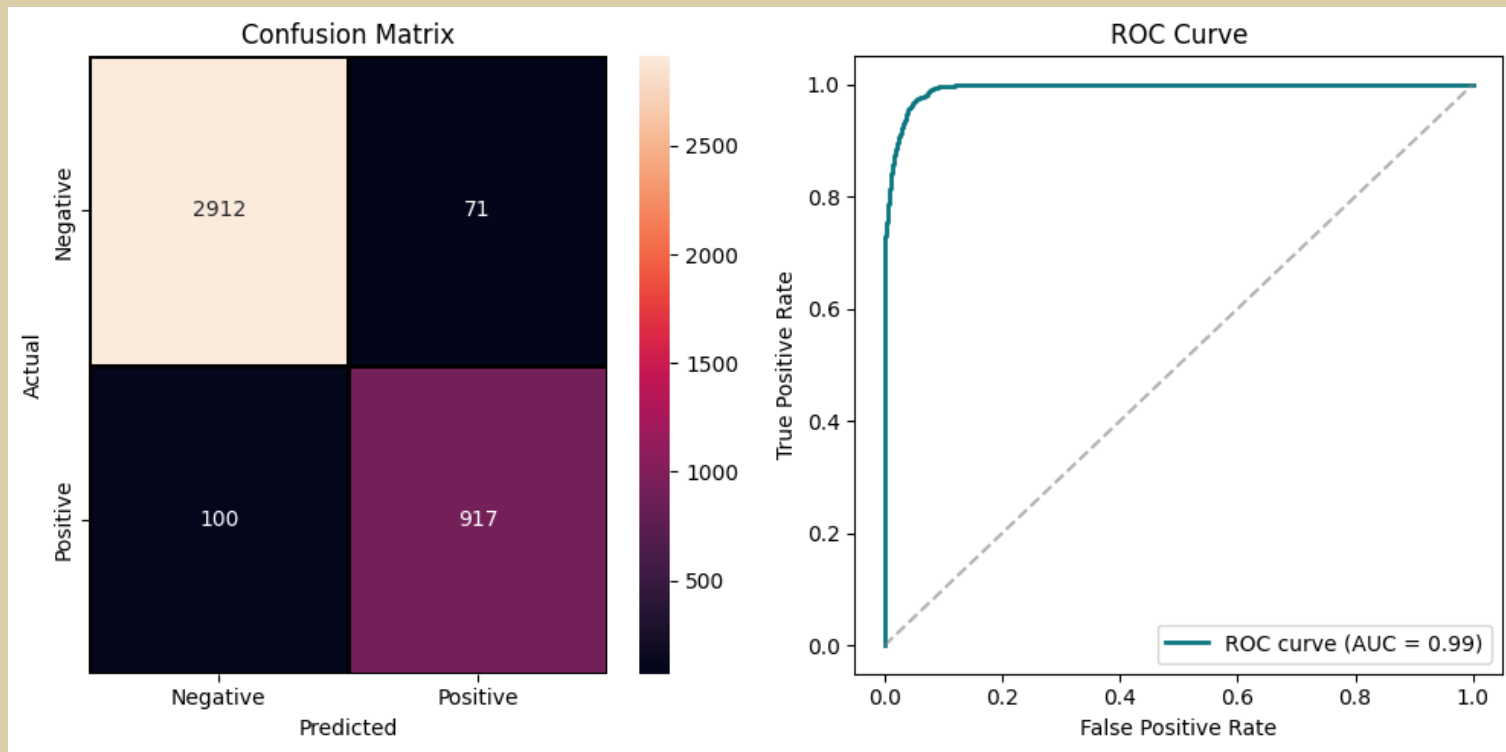




Choosing the Model

	Model	Score_train	Score_test	MSE	Accuracy
0	Logistic Regression	0.961875	0.95725	0.04275	0.95725
1	Decision Tree	0.950313	0.90025	0.09975	0.95725
5	Bagging Classifier	0.962250	0.95650	0.04350	0.95650
4	Stacking Classifier	0.975562	0.95625	0.04375	0.95625
3	XGBoost	0.999687	0.95025	0.04975	0.95025
2	Random Forest	1.000000	0.93150	0.06850	0.93150

Logistic Regression



Score_train: 0.961875

Score_test: 0.95725

MSE: 0.04275

	precision	recall	f1-score	support
0.0	0.97	0.98	0.97	2983
1.0	0.93	0.90	0.91	1017
accuracy			0.96	4000
macro avg	0.95	0.94	0.94	4000
weighted avg	0.96	0.96	0.96	4000



THANKS FOR ATTENTION!