

Loan Approval Machine Learning Application

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Roadmap



Roadmap

What I'll be covering today



Business Problem

Dream Housing Financial



Selected Model

Random Forest



Data Process

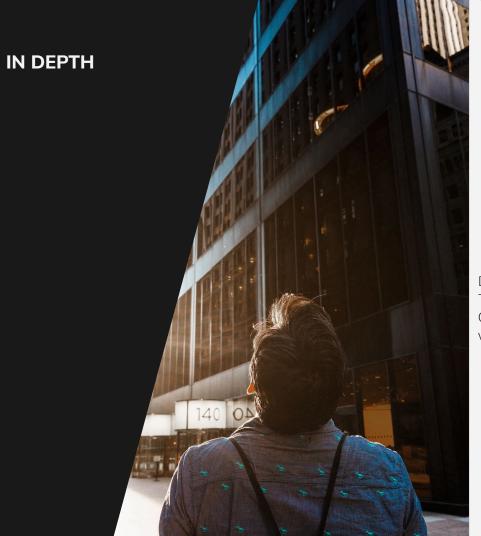
Cleaning, Analysis, Progress



Takeaways

Applying business use





Dream Housing Finance

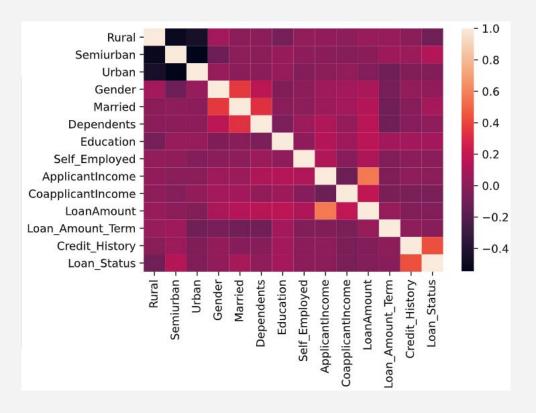
Dream Housing Finance company deals in all kinds of home loans. They have presence across all urban, semi urban and rural areas. Customer first applies for home loan and after that company validates the customer eligibility for loan.

IN DEPTH



Automating the Loan Approval Process

Dream Housing wants to automate the loan eligibility process (real time) based on customer detail provided while filling online application form. These details are Gender, Marital Status, Education, Number of Dependents, Income, Loan Amount, Credit History





Selected Model



Random Forest

Our selected model offering the best accuracy, minimal false positives



Decision Tree

Best recall when letting tree work without specifying max features or max depth



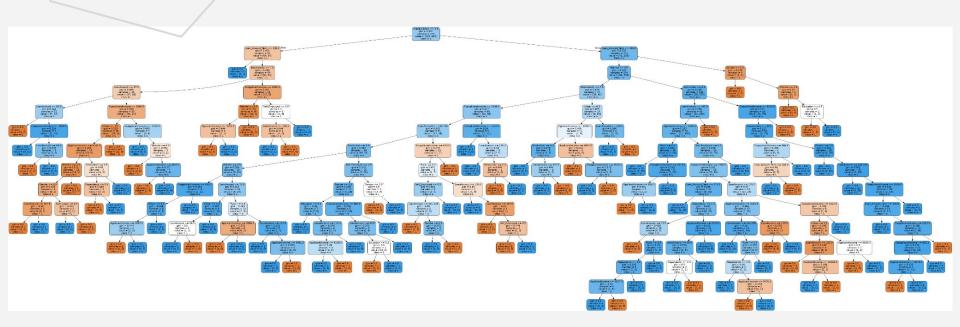
Randomized Search

Longer processing times to select an optimized mode, generate cross validation scores

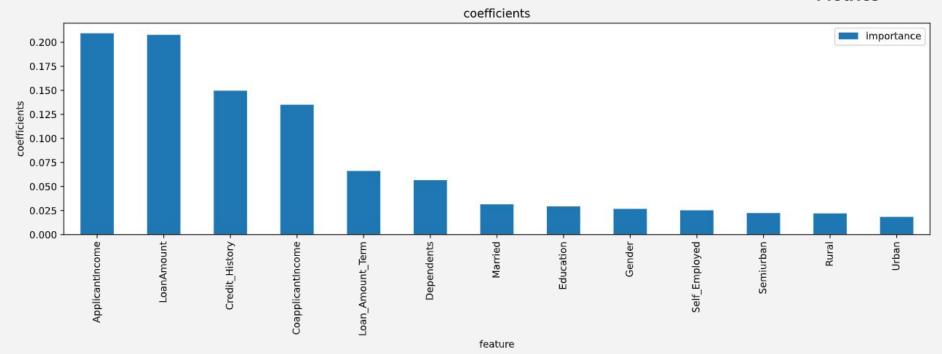
Random Forest Tree

Forest of Trees

This Random Forest model makes predictions based on 200 trees like this one



Random Forest Metrics

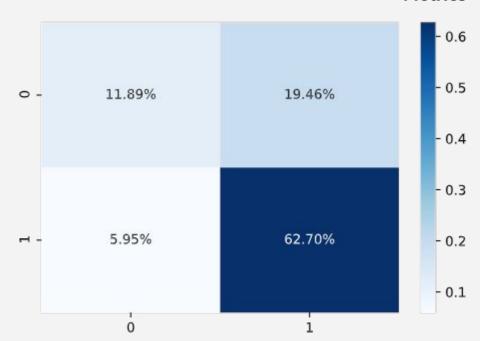


Random Forest Metrics

Accuracy: 75%

Precision for unapproved: 67%

Precision for approved: 76%

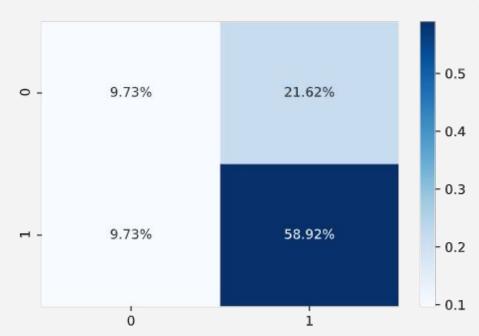


Decision Tree (optimized)

Accuracy: 69%

Precision for unapproved: 50%

Precision for approved: 73%



Decision Tree (unoptimized)

Accuracy: 68%

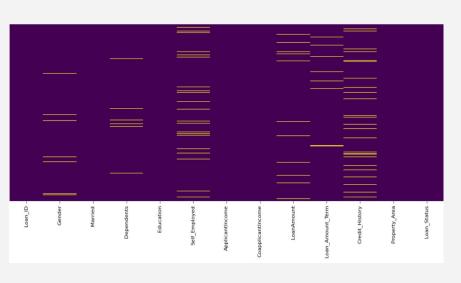
Precision for unapproved: 48%

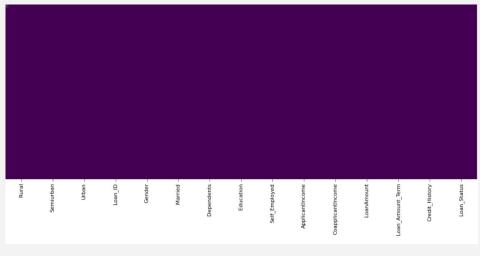
Precision for approved: 78%





Data Processing





Data Processing

614 data points, avoid dropping data

Self Employed: 32

Loan Amount: 22

Null Values for Gender: implications

Dependents: 15
Loan Term: 14

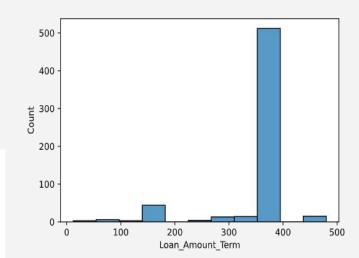
Utilize get dummies for categorical and binary data Gender: 13

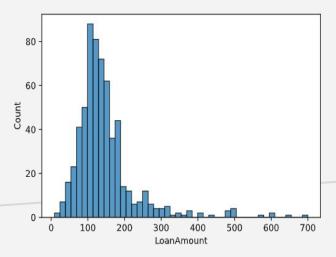
Total Rows: 614

Credit History: 50

About our Data

	ApplicantIncome	CoapplicantIncome	LoanAmount	Loan_Amount_Term	Credit_History
count	614.000000	614.000000	592.000000	600.00000	564.000000
mean	5403.459283	1621.245798	146.412162	342.00000	0.842199
std	6109.041673	2926.248369	85.587325	65.12041	0.364878
min	150.000000	0.000000	9.000000	12.00000	0.000000
25%	2877.500000	0.000000	100.000000	360.00000	1.000000
50%	3812.500000	1188.500000	128.000000	360.00000	1.000000
75%	5795.000000	2297.250000	168.000000	360.00000	1.000000
max	81000.000000	41667.000000	700.000000	480.00000	1.000000







Next Steps

Integrate serialized model to Flask based Rest API

Consume through internal web application

Dream Housing Financial Internal Loan Evaluation Tool [Prototype]				
Applicant Income:	Placeholder]		
Co - applicant Income:	Placeholder			
Loan Amount:	Placeholder			
Loan term:	Placeholder]		
Credit History:	Placeholder			
	Evaluate Loan Eligability	ľ		

Takeaways

Highly accurate model to be incorporated in internal tools

Data based on historical data of approvals, not ROI

Takeaways about Dream Housing Financial based on our data

