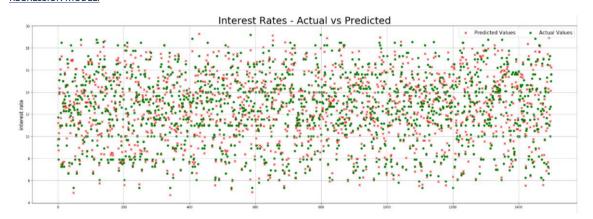
PURPOSE

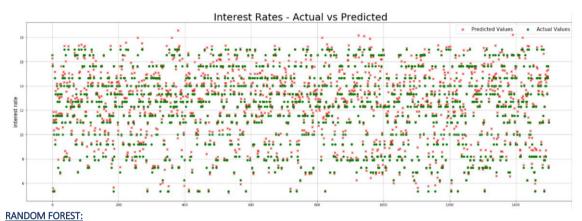
To test if the model is predicting the interest rate as per the requirement of the client, who is an investor and is not willing to take risk. To make the client know that why should he use our model to predict the interest rate.

REGRESSION MODEL:



Before Cross Validation					
	Mean absolute percentage error	Mean absolute percentage error			
MODEL	- Test	- Train	Mean absolute error		
Regression	4.698638583	4.698459428	0.57		
After 5 fold Cross Validation					
	Mean absolute percentage error	Mean absolute percentage error			
MODEL	- Test	- Train	Mean absolute error		
			Mean: 448432.3228657413		
	5017711.046	4.614891388	; Median :		
Regression			0.8342562420368367		

NEURAL NETWORK:



	Before Cross Valida	tion	
MODEL	Mean absolute percentage error - Test	Mean absolute percentage error - Train	Mean absolute error
Neural Networks	3.257460136	3.092385018	0.38
	After 5 fold Cross Validati	on	
MODEL	Mean absolute percentage error - Test	Mean absolute percentage error - Train	Mean absolute error
Neural Networks	4.03932434	2.945391243	0.488

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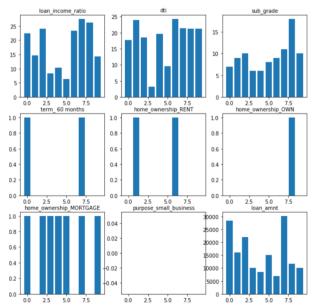
Before Cross Validation						
MODEL	Mean absolute percentage error - Test	Mean absolute percentage error - Train	Mean absolute error			
Random Forest	2.638090034	1.013020849	0.341			
After 5 fold Cross Validation						
MODEL	Mean absolute percentage error - Test	Mean absolute percentage error - Train	Mean absolute error			
Random Forest	3.990617695	0.973973909	0.508			

- As depicted in the above models, we observe that the MAPE for Random Forest is low as compared to Neural network and Regression Model. Since MAPE is a measure of prediction accuracy of a forecasting method in statistics, we can say that out client Rick should use the model to get the borrower with Grade A, B, C and D.
- So, for our model the features that the investor should have for application of the loan should be: addr_state application_type purpose loan_status, verification_status term sub_grade home_ownership, emp_length, dti revol_bal total_pymnt total_rec_int total_rec_late_fee, recoveries last_pymnt_amnt out_prncp loan_amnt int_rate, annual_inc acc_now_delinq_2yrs pub_rec_open_acc, inq_last_6mths, collections_12_mths_ex_med_revol_util
- For the risk averse model some of the criteria being considered are: Sub Grade should be A, B, C, D; Loan to income ratio > 0.3 and Home Ownership should be own

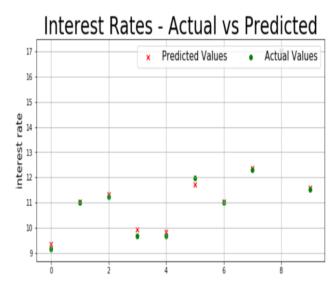
USE CASE:

Taking different values for the borrower and seeing how are model is predicting values vs the actual values. For the use case we have taken 10 randomly extracted records from the data set and seeing its value fluctuation with respect to the best model: Random Forest.

Below is the list of some of the features we have in the randomly selected data set. The pictorial representation also shows the actual and predicted values using random forest.



Profile	Actual interest rate	Predicated interest rate
Profile 1	9.17	9.355194
Profile 2	10.99	11.048431
Profile 3	11.22	11.314619
Profile 4	9.67	9.926072
Profile 5	9.67	9.821698
Profile 6	11.99	11.708390
Profile 7	10.99	11.020211
Profile 8	12.29	12.368595
Profile 9	16.99	17.031387
Profile 10	11.53	11.589946



MAPE SCORE FOR THE ABOVE DATASET: 1.1638, Since the MAPE score is very low we would suggest the client to use our model to predict interest rate of investor.