

PS 10

Haocheng Yang

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1 Comparison Among ML Methods

Please see the attached two pictures that shows the prediction and performance for each machine learning model. As we can see, Neural Network could generate the highest estimate which is 0.92, and the logistic regression using roc auc metric generated a close result. All the estimates using roc auc metric show higher estimates than the estimate produced from accuracy metric. Overall, the Neural Network method relatively performs better than other methods. And the tree model performs relatively bad.

Table 1: Optimal tuning parameters for each algorithm

Model	Penalty	TreeDepth	Neighbors	Activation	Degree
Logistic Regression	0.01	-	-	-	-
Decision Tree	-	3	-	-	-
KNN	-	-	5	-	-
Neural Network	0.001	-	-	relu	-
SVM	1	-	-	-	2

Figure 1: table 1.

Table 2: Out-of-sample performance metrics for each algorithm

model	.metric	.estimate	.config
Logistic Regression	accuracy	0.84	
Logistic Regression	roc_auc	0.91	
Decision Tree	accuracy	0.80	
Decision Tree	roc_auc	0.87	
KNN	accuracy	0.82	
KNN	roc_auc	0.89	
Neural Network	accuracy	0.85	
Neural Network	roc_auc	0.92	
SVM	accuracy	0.83	
SVM	roc_auc	0.90	

Figure 2: table 2.