Prediction of exercise pattern using compression of different algorithms

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Abstract—In data science, the use of machine learning algorithms to predict values plays a major role. For prediction such as logistic regression, naive bays, linear regression, decision tree, various machine learning algorithms are used. We are therefore attempting to compare various machine learning algorithms in our work, such as the Gradient Boosting Classifier, the Bagging Classifier, the Decision Tree Classifier, and Random Forest Classifier using python.

***Keywords*— python, accuracy, gradient boost bagging classifier, random forest, decision tree.**

Introduction

Using the exercise data set I have to find the best possibilities of exercise patterns. In our data set, we are trying to apply different classifiers and compare the result for analysis. To implement successfully algorithms, we using Python on Kaggle. We have to describe [1-3] the user and his work out values in our first phase. Precision, Recall, Accuracy, and Error rate use these in our all algorithms. That purpose we use Gradient Boosting Classifier, Bagging Classifier, Decision Tree Classifier, Random Forest Classifier. We apply all 4 algorithms and compare the result through the matrix from in our exercise data set. [4-6]

Bagging Classifier works two different techniques "Bootstrap" and the other is "aggregation". For each of every model, they provide a sample of data set then row sample with replacement as the resultant of majority result take aggregation.

Gradient boosting is a technique for regression and classification problems in machine learning algorithms, which produces a prediction model in the form of an ensemble of weak prediction models, [7-10] typically decision trees.

The decision tree is nothing but a tree-structured by a classifier.

Random forest Classifier supervises the machine learning algorithm. Random selection of data and random selection variables on the bases of the decision tree.

Methods and methodology

I will use these algorithms as below to find the best possible predictor [4]

- Gradient Boosting Classifier
- Bagging Classifier
- Decision Tree Classifier
- Random Forest Classifier

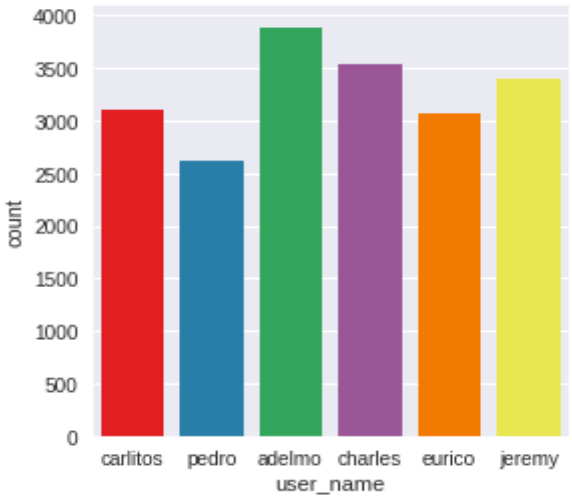


Figure 1 (Graph has shown all user and his values)

The highest exercise value is "adelmo" which is the nearest 4000 and lowest "pedro" which is above 2500.

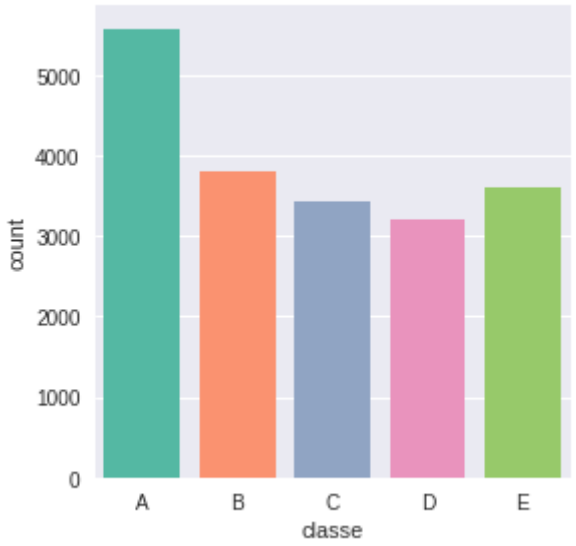


Figure 2 (All classes and his values of exercise)

Class A has high Values and D has low Values as shown in Figure 2.

Precision = $\frac{TP}{Predicted\ yes}$

Recall=$\frac{TP}{Actual\ yes}$

Accuracy= $\frac{TP+TN}{Total}$

Error rate =1-accuracy, $\frac{FP+FN}{Total}$

Bagging Classifier

Bagging Classifier report

	precision	recall	f1-score	support
A	1.00	1.00	1.00	562
B	1.00	0.99	1.00	387
C	1.00	1.00	1.00	343
D	0.99	1.00	1.00	307
E	1.00	1.00	1.00	364
avg / total	1.00	1.00	1.00	1963

Figure 3a (Bagging classifier precision and recall)

Total of precision value is 1.00 recall 1.00 out of 1963 values as shown in Figure 3a

Gradient Boosting Classifier report

Gradient Boosting Classifier report

	precision	recall	f1-score	support
A	1.00	1.00	1.00	561
B	0.99	0.99	0.99	386
C	0.99	0.97	0.98	349
D	0.98	0.99	0.98	308
E	0.99	1.00	0.99	359
avg / total	0.99	0.99	0.99	1963

Figure 3b (Gradient Boosting classifier precision and recall)

Total of precision value is **0.99** recall **0.99** out of 1963 values as shown in Figure 3b

Decision Tree Classifier

Decision Tree Classifier report

	precision	recall	f1-score	support
A	1.00	0.99	0.99	566
B	0.98	0.98	0.98	385
C	0.97	0.99	0.98	338
D	0.98	0.97	0.98	311
E	0.99	0.99	0.99	363
avg / total	0.98	0.98	0.98	1963

Figure 3c (Decision Tree classifier precision and recall)

Total of precision value is **0.98** recall **0.98** out of 1963 values as shown in Figure 3c

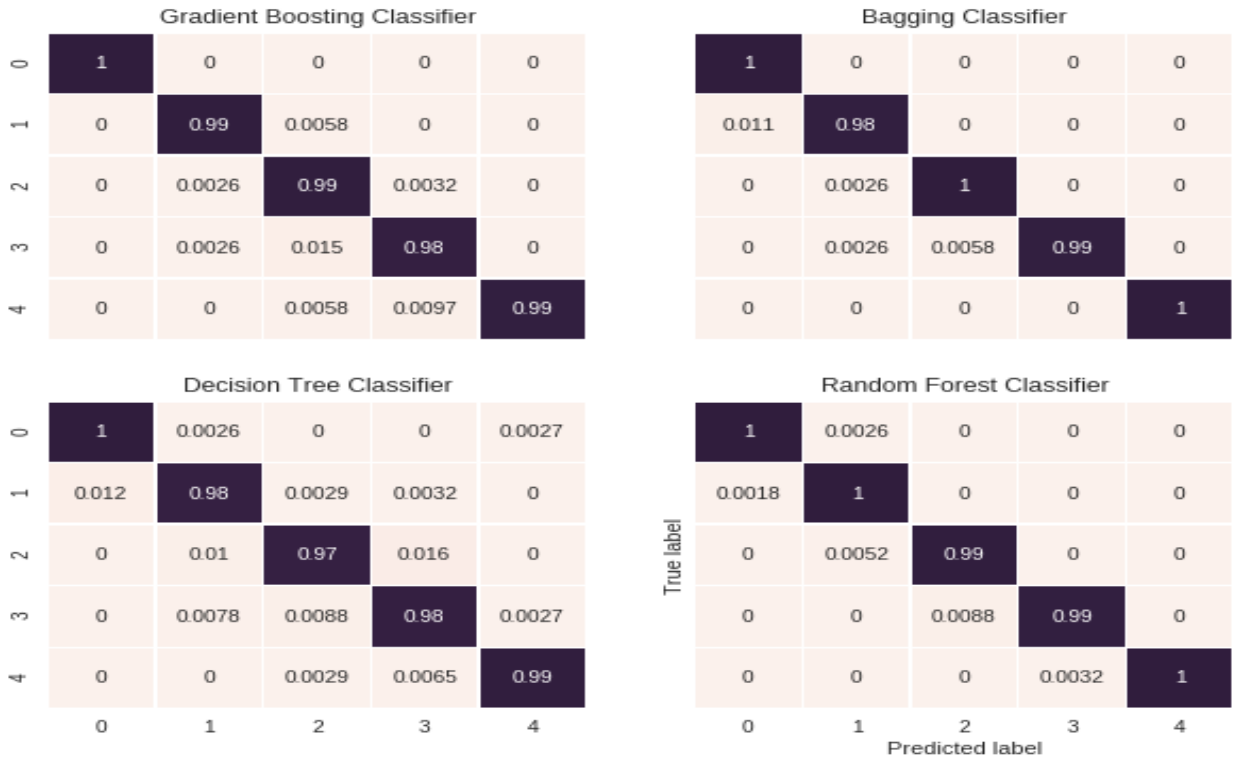
Random Forest Classifier

Random Forest Classifier report

	precision	recall	f1-score	support
A	1.00	1.00	1.00	562
B	1.00	1.00	1.00	385
C	1.00	0.99	1.00	344
D	0.99	1.00	1.00	308
E	1.00	1.00	1.00	364
avg / total	1.00	1.00	1.00	1963

Figure 3d (Random Forest classifier precision and recall)

Total of precision value is **1.00** recall **1.00** out of 1963 values as shown in Figure 3d



Random Forest Classifier

Figure4 (random forest classifier result compare with test data set result)

Random Forest and Bagging Classifier report

	precision	recall	f1-score	support
A	1.00	1.00	1.00	561
B	1.00	0.99	1.00	389
C	0.99	0.98	0.99	345
D	0.98	1.00	0.99	305
E	1.00	1.00	1.00	363
avg / total	0.99	0.99	0.99	1963

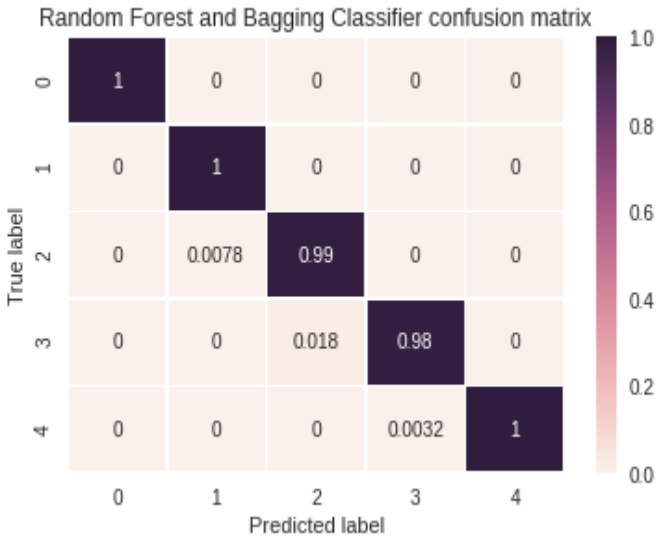


Figure 4a (random forest classifier matrix compare with test data set result)

Result and discussion

In this paper, we have used a dataset named Exercise data that predict patterns, and the used algorithms are Gradient Boosting Classifier, Bagging Classifier, Decision Tree Classifier, and Random Forest Classifier. The accuracy of all algorithms is good but random forest accuracy is best which is 99%.

Conclusion

In this paper we proposed an innovative approach, contributing to the understanding and compare the result of the different classifiers. Random forest classifier is the best classifier to show give result

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