Two Step RF Results

I now test the performance of the random forest with the added *column* class. We also include some extra training data obtained from the verification app.

The first step random forest still predicts with 100% accuracy now that the column class has been added.

We now assess the performance of the second step random forest, predicting class based on parameters.

Before adding extra training data

.metric	.estimator	.estimate	.config
<chr>	<chr>	<dbl>	<chr>
accuracy	multiclass	0.897	Preprocessor1_Model1
roc_auc	hand_till	0.991	Preprocessor1_Model1

After extra training data

.metric	.estimator	.estimate	.config
<chr>	<chr>	<dbl>	<chr>
accuracy	multiclass	0.904	Preprocessor1_Model1
roc_auc	hand_till	0.993	Preprocessor1_Model1

Confusion Matrix

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Confusion Matrix and Statistics

          Reference
Prediction column comet compact fan other stream
   column     137     0      12   0    46      3
   comet        0   320       0   0    35      0
   compact      0     0     410   0    12      0
   fan          0     0       0 310    28      0
   other        8     5      25   3   439      5
   stream       2     0       0   0    20    341

Overall Statistics

               Accuracy : 0.9056
                 95% CI : (0.8925, 0.9176)
    No Information Rate : 0.2684
    P-Value [Acc > NIR] : < 2.2e-16

                  Kappa : 0.8847

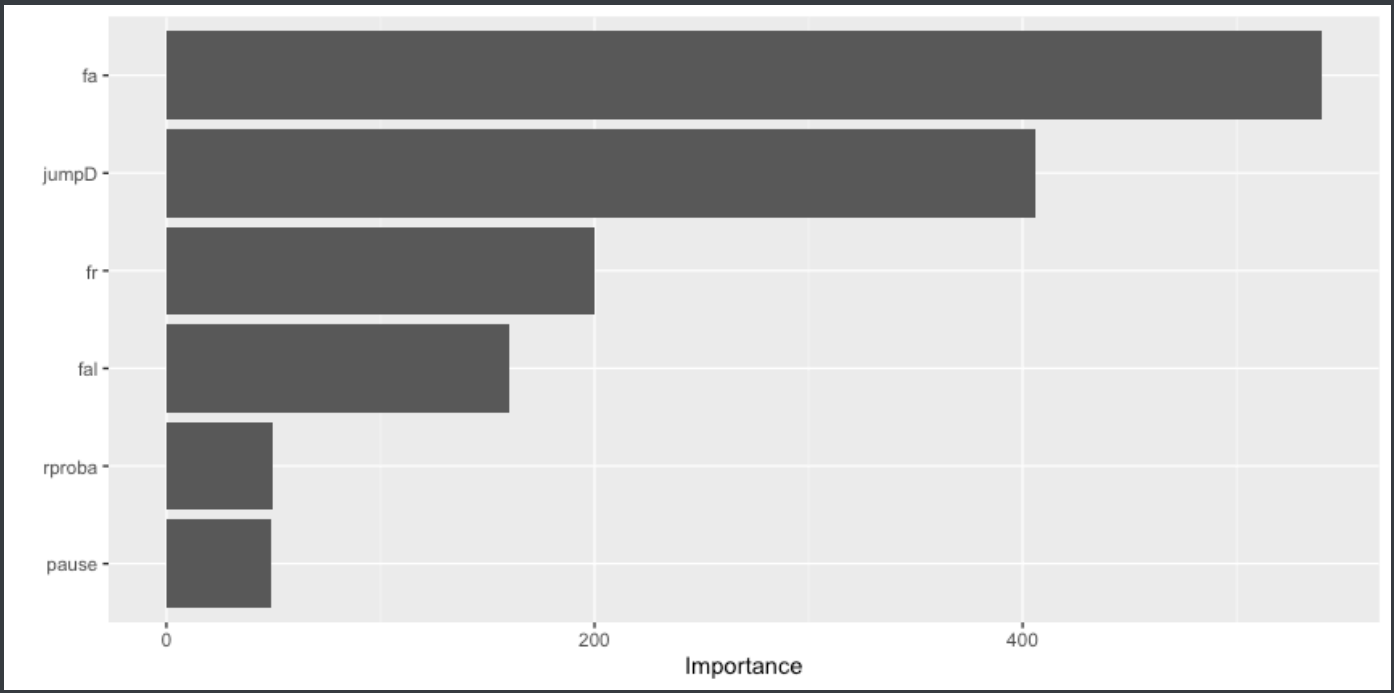
 Mcnemar's Test P-Value : NA

Statistics by Class:

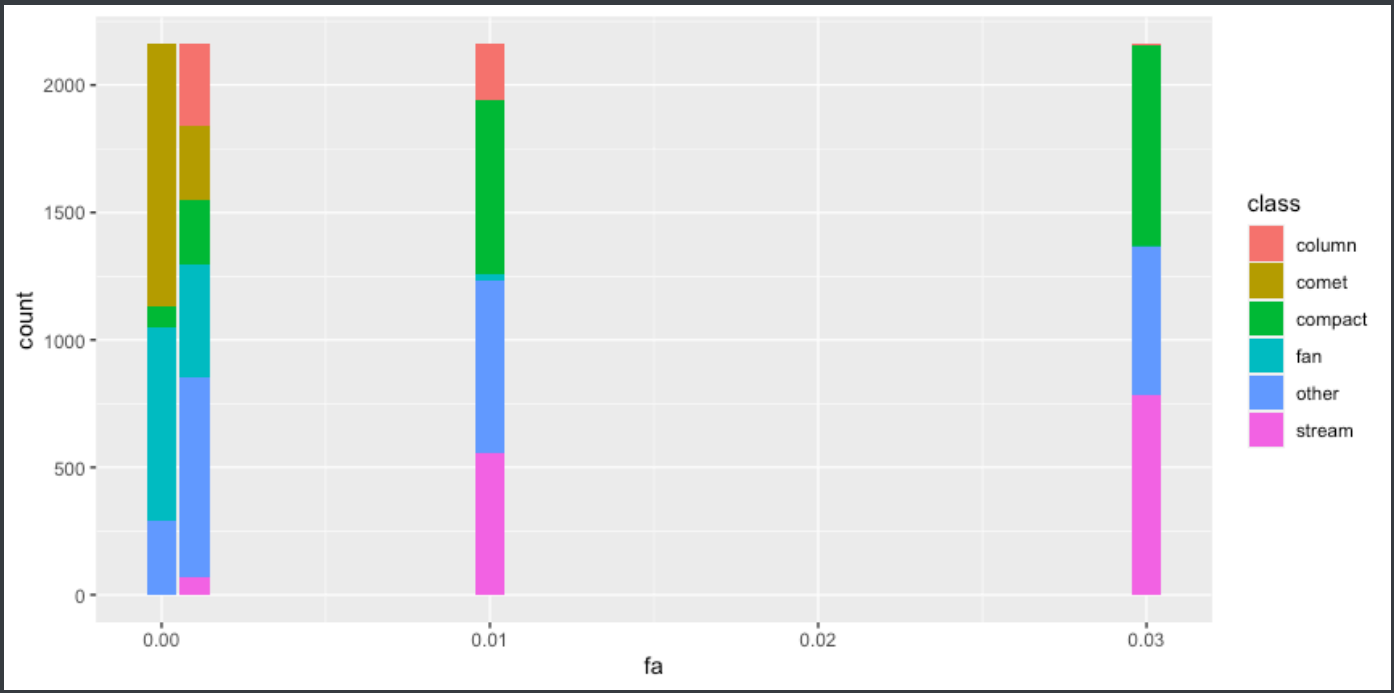
                     Class: column Class: comet Class: compact Class: fan Class: other Class: stream
Sensitivity                0.93197       0.9846         0.9172     0.9904       0.7569        0.9771
Specificity                0.96971       0.9809         0.9930     0.9848       0.9709        0.9879
Pos Pred Value             0.69192       0.9014         0.9716     0.9172       0.9052        0.9394
Neg Pred Value             0.99491       0.9972         0.9787     0.9984       0.9159        0.9956
Prevalence                 0.06802       0.1504         0.2068     0.1448       0.2684        0.1615
Detection Rate             0.06340       0.1481         0.1897     0.1435       0.2031        0.1578
Detection Prevalence       0.09162       0.1643         0.1953     0.1564       0.2244        0.1680
Balanced Accuracy          0.95084       0.9828         0.9551     0.9876       0.8639        0.9825
```

We see that the poorest performance is in the other class. In particular, the low sensitivity suggests a higher false negative rate, that is, true "other" swarms are classified into other classes.

Variable Importance

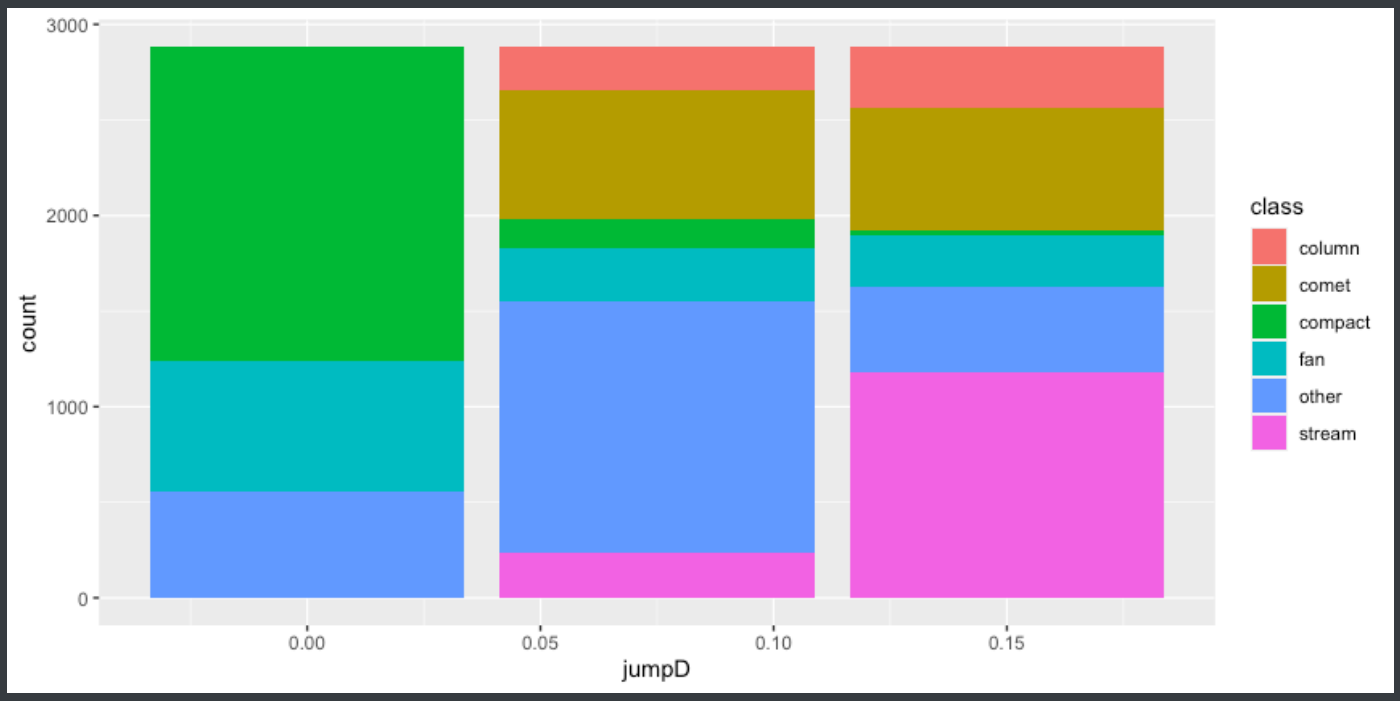


fa



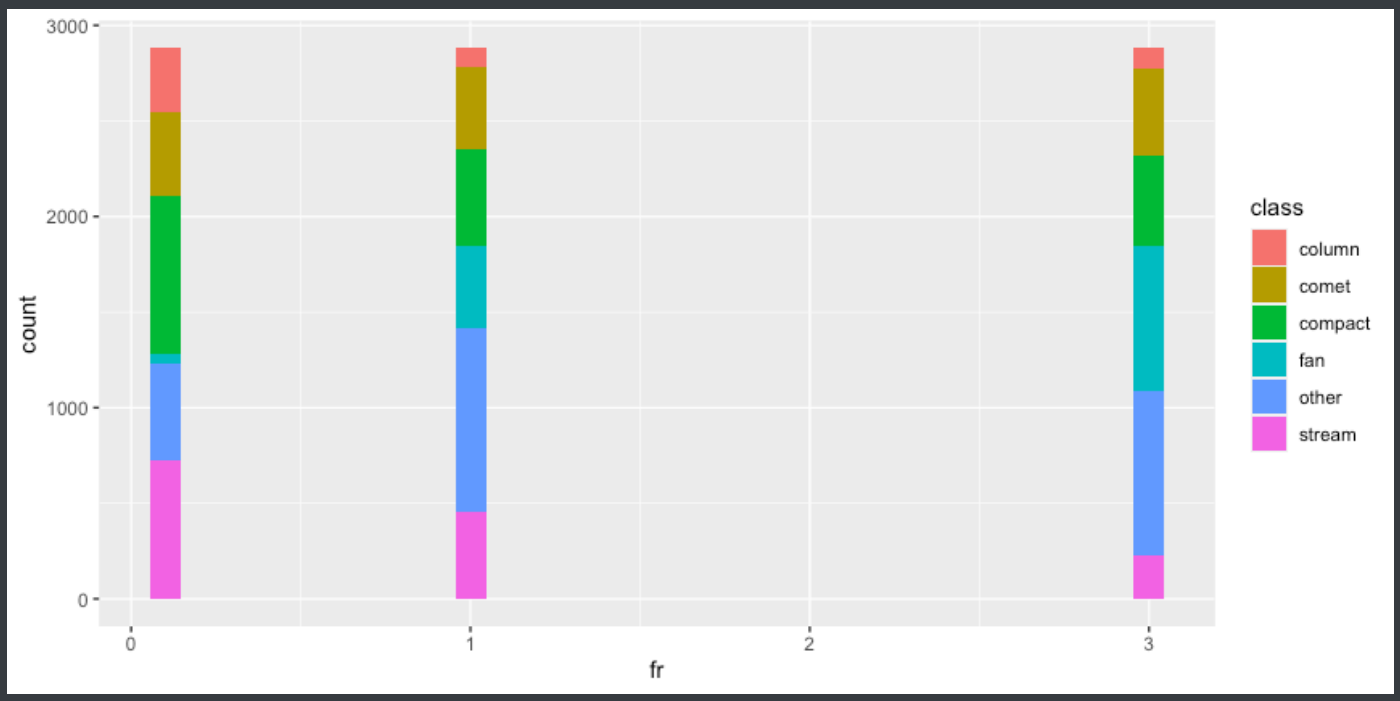
Small values of *fa* seem to result in fans and comets while large values result in streams and compacts. Small to medium values result in columns.

jumpD



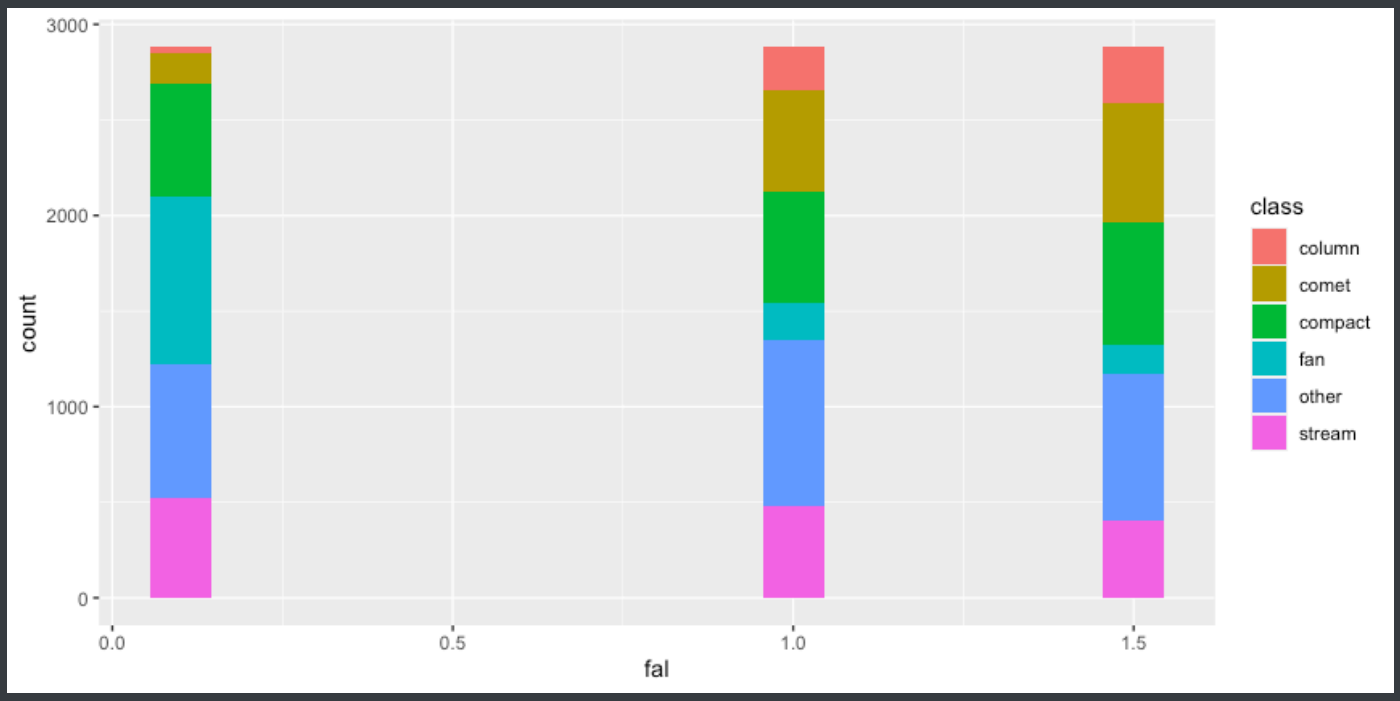
Small values of *jumpD* seem to result in compact and fan. Medium seems to result in comet and column. Large seems to result in streams.

fr

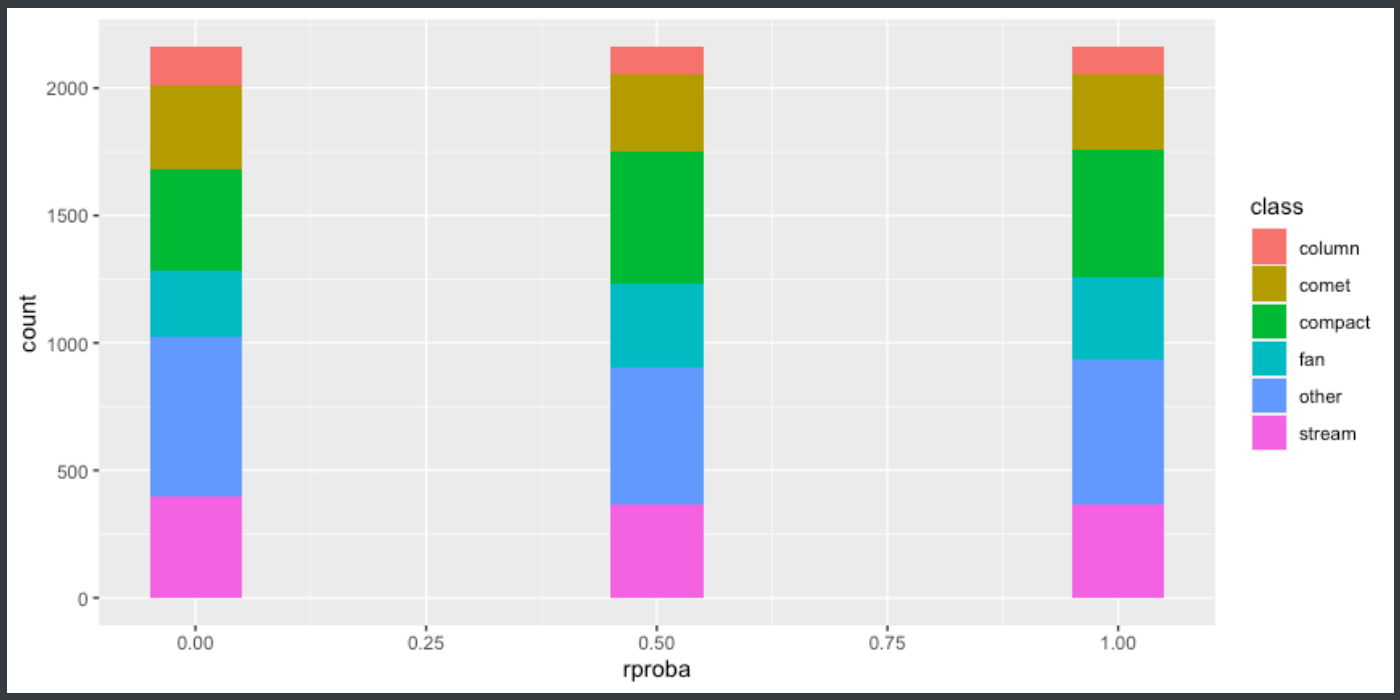


It is difficult to see a clear distinction between classes in *fr*.

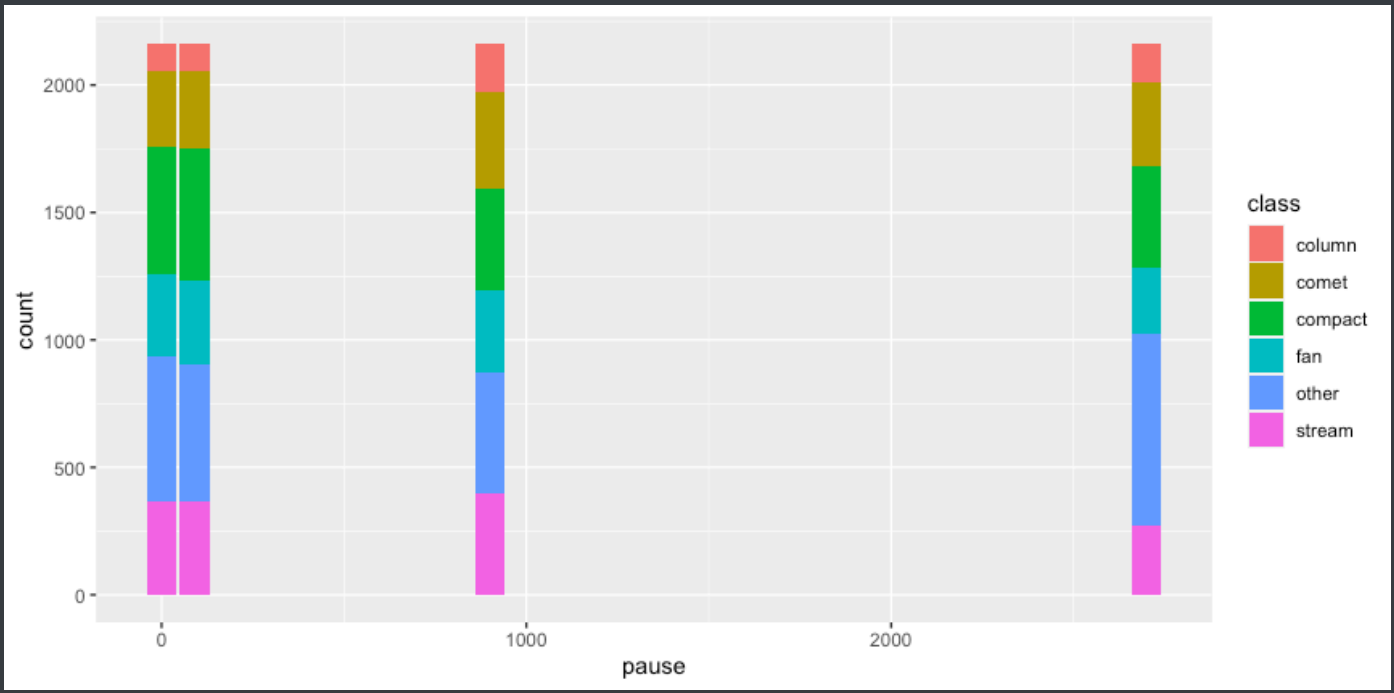
fal



rproba



pause



rproba and pause seem to have virtually no effect - at least on their own

jumpD and fa