

Random Forest for predicting the Success Rate Levels

Successful-Unsuccessful

All Data

```
##
## Successful Unsuccessful
##          113          241
```

Train Data

```
##
## Successful Unsuccessful
##          91          192
```

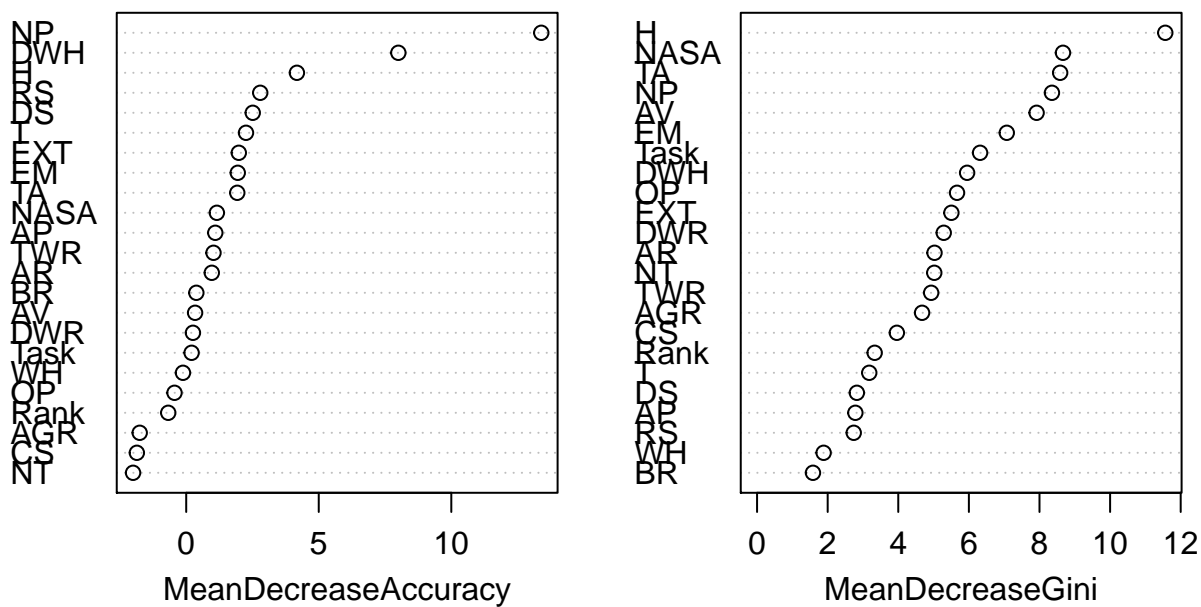
Test Data

```
##
## Successful Unsuccessful
##          22          49
```

Randomforest base model

```
##
## Call:
## randomForest(formula = SR ~ ., data = train, proximity = TRUE,      importance = TRUE)
##           Type of random forest: classification
##           Number of trees: 500
## No. of variables tried at each split: 4
##
##           OOB estimate of  error rate: 28.27%
## Confusion matrix:
##           Successful Unsuccessful class.error
## Successful          25           66 0.72527473
## Unsuccessful        14          178 0.07291667
```

base_model



Prediction on test data

```
## Confusion Matrix and Statistics
##
##               Reference
## Prediction    Successful Unsuccessful
##   Successful           7           2
##   Unsuccessful        15          47
##
##               Accuracy : 0.7606
##               95% CI  : (0.6446, 0.8539)
##   No Information Rate : 0.6901
##   P-Value [Acc > NIR] : 0.122722
##
##               Kappa  : 0.3313
##
##   McNemar's Test P-Value : 0.003609
##
##               Sensitivity : 0.31818
##               Specificity : 0.95918
##               Pos Pred Value : 0.77778
##               Neg Pred Value : 0.75806
##               Prevalence : 0.30986
##               Detection Rate : 0.09859
##   Detection Prevalence : 0.12676
##   Balanced Accuracy : 0.63868
##
##   'Positive' Class : Successful
##
```

Sensitivity-Specificity-Precision-Recall-F1

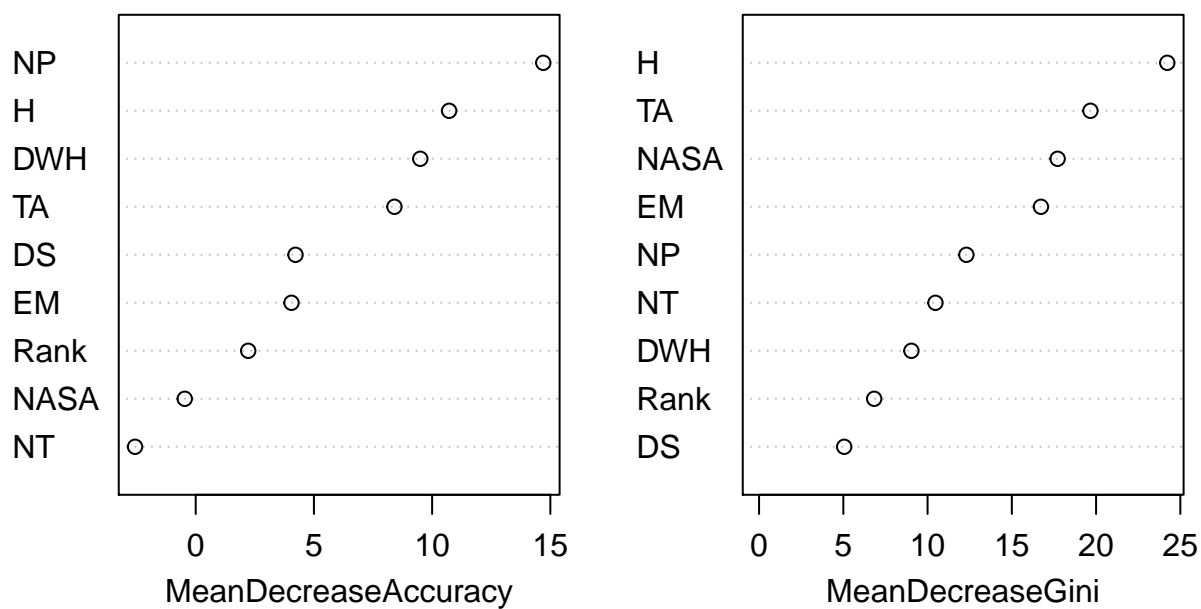
##	Sensitivity	Specificity	Pos Pred Value
##	0.31818182	0.95918367	0.77777778
##	Neg Pred Value	Precision	Recall
##	0.75806452	0.77777778	0.31818182
##	F1	Prevalence	Detection Rate
##	0.45161290	0.30985915	0.09859155
##	Detection Prevalence	Balanced Accuracy	
##	0.12676056	0.63868275	

Multi-class area under the curve: 0.7113

Randomforest extended model

```
##
## Call:
##  randomForest(formula = SR ~ NASA + H + NP + NT + TA + EM + DWH +      DS + Rank, data = train, prox
##              Type of random forest: classification
##              Number of trees: 500
## No. of variables tried at each split: 3
##
##      OOB estimate of  error rate: 26.5%
## Confusion matrix:
##           Successful Unsuccessful class.error
## Successful      38         53  0.5824176
## Unsuccessful    22        170  0.1145833
```

model



Prediction on test data

```
## Confusion Matrix and Statistics
##
##               Reference
## Prediction    Successful Unsuccessful
##   Successful           9           4
##   Unsuccessful        13          45
##
##               Accuracy : 0.7606
##               95% CI  : (0.6446, 0.8539)
##   No Information Rate : 0.6901
##   P-Value [Acc > NIR] : 0.12272
##
##               Kappa : 0.3691
##
##   McNemar's Test P-Value : 0.05235
##
##               Sensitivity : 0.4091
##               Specificity : 0.9184
##               Pos Pred Value : 0.6923
##               Neg Pred Value : 0.7759
##               Prevalence : 0.3099
##               Detection Rate : 0.1268
##   Detection Prevalence : 0.1831
##   Balanced Accuracy : 0.6637
##
##   'Positive' Class : Successful
##
```

Sensitivity-Specificity-Precision-Recall-F1

##	Sensitivity	Specificity	Pos Pred Value
##	0.4090909	0.9183673	0.6923077
##	Neg Pred Value	Precision	Recall
##	0.7758621	0.6923077	0.4090909
##	F1	Prevalence	Detection Rate
##	0.5142857	0.3098592	0.1267606
##	Detection Prevalence	Balanced Accuracy	
##	0.1830986	0.6637291	

Multi-class area under the curve: 0.701