

Model Performance Comparison

November 29, 2018

Statistical Model Comparison

Testing for Normality

```
##  
## Shapiro-Wilk normality test  
##  
## data: model_results$F1  
## W = 0.9299, p-value = 0.005476  
  
##  
## Shapiro-Wilk normality test  
##  
## data: model_results$Accuracy  
## W = 0.91805, p-value = 0.002007  
  
##  
## Shapiro-Wilk normality test  
##  
## data: model_results$Precision  
## W = 0.89201, p-value = 0.0002646  
  
##  
## Shapiro-Wilk normality test  
##  
## data: model_results$Recall  
## W = 0.91805, p-value = 0.002007  
  
##  
## Shapiro-Wilk normality test  
##  
## data: model_results$Cohen_Kappa  
## W = 0.93898, p-value = 0.01228
```

Since all p-values are less than 0.05, we proceed with non-parametric statistical testing.

Friedman Test

H_0 : the k population treatments are identical. [1]

H_a : at least two of the k populations differ. [1]

```
##  
## Friedman rank sum test  
##
```

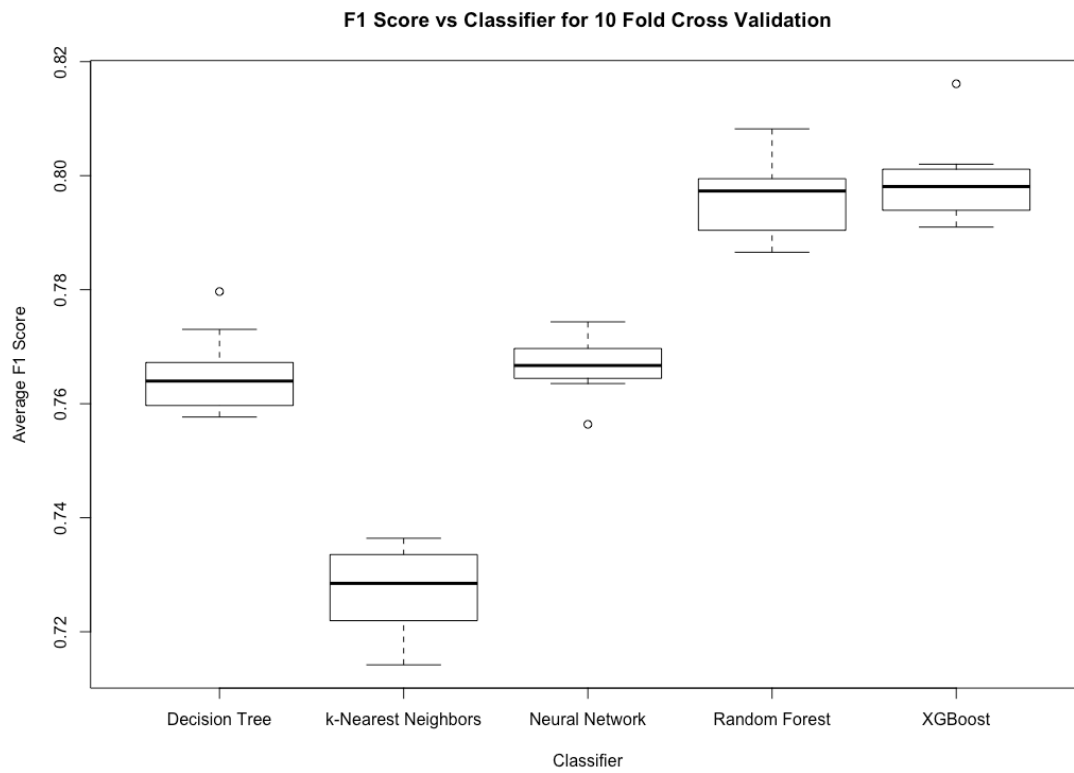
```
## data: F1 and Model and Trial
## Friedman chi-squared = 36.8, df = 4, p-value = 1.981e-07
```

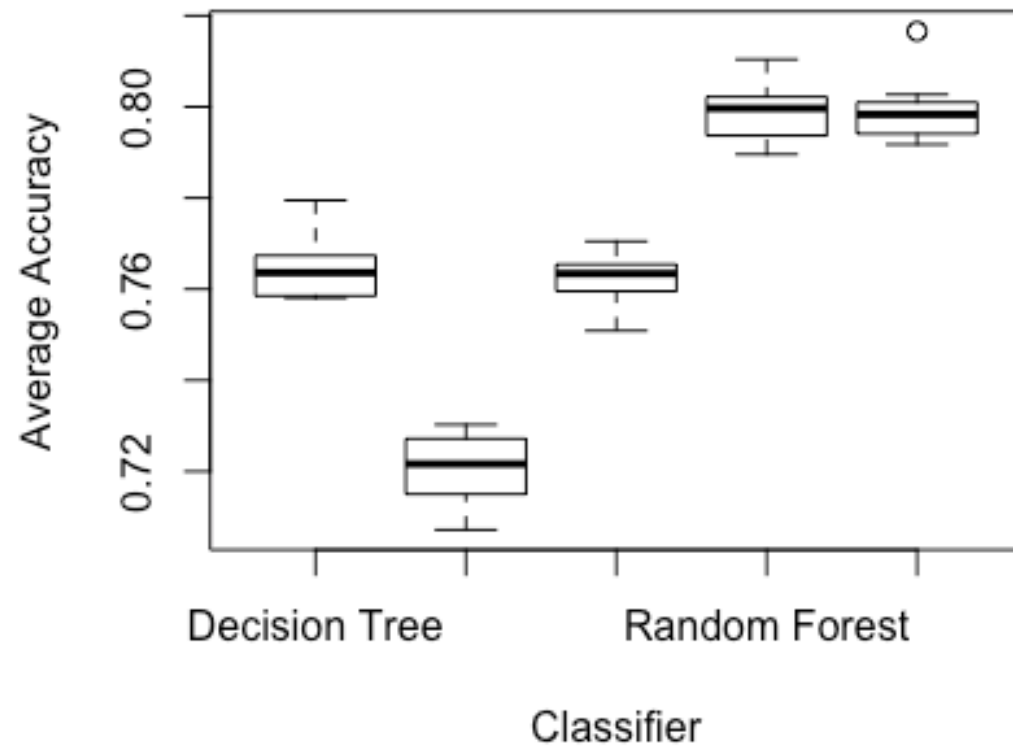
The p-value indicates the results of the Friedman Test are statistically significant. As such, we can move on to the post-hoc test, Nemenyi, to explain the results in more detail.

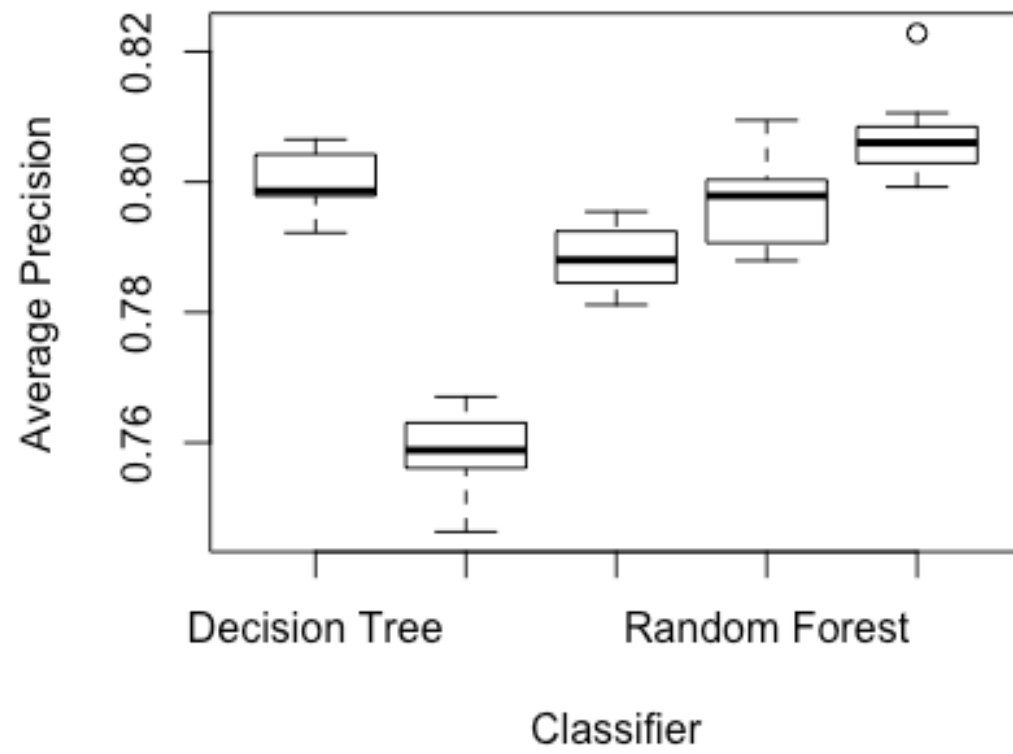
Nemenyi Test

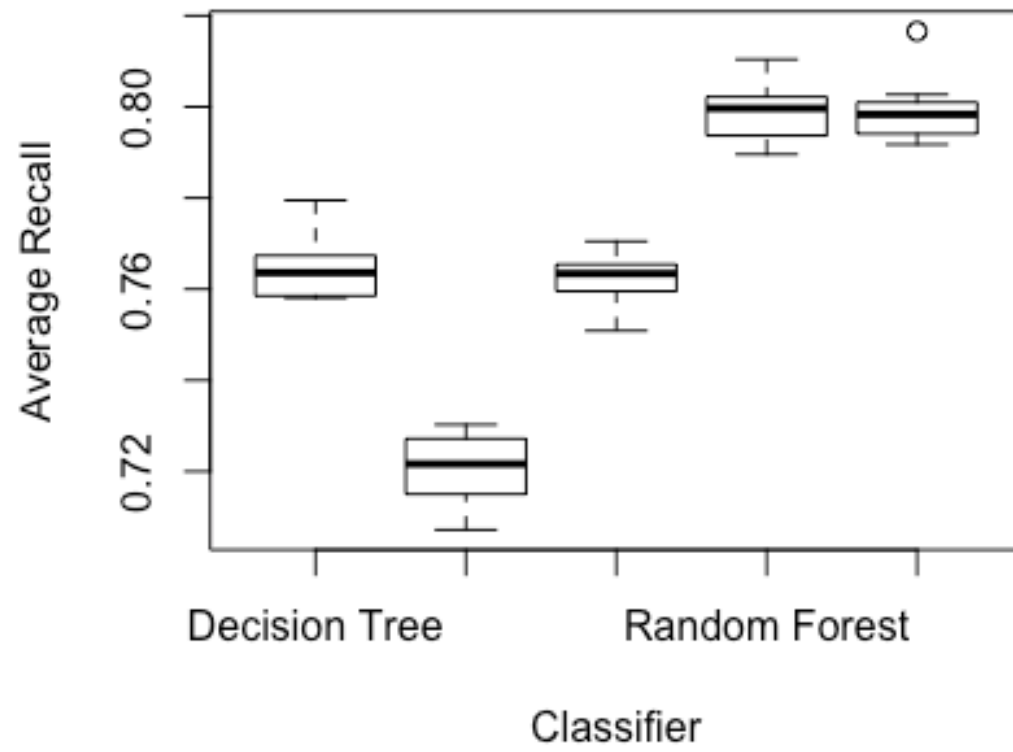
```
##
## Pairwise comparisons using Nemenyi multiple comparison test
## with q approximation for unreplicated blocked data
##
## data: F1 and Model and Trial
##
##               Decision Tree k-Nearest Neighbors Neural Network
## k-Nearest Neighbors 0.2758      -                      -
## Neural Network      0.9986      0.1571                  -
## Random Forest       0.0808      5.9e-05                  0.1571
## XGBoost             0.0062      7.7e-07                  0.0160
##
##               Random Forest
## k-Nearest Neighbors -
## Neural Network      -
## Random Forest       -
## XGBoost             0.9153
##
## P value adjustment method: none
```

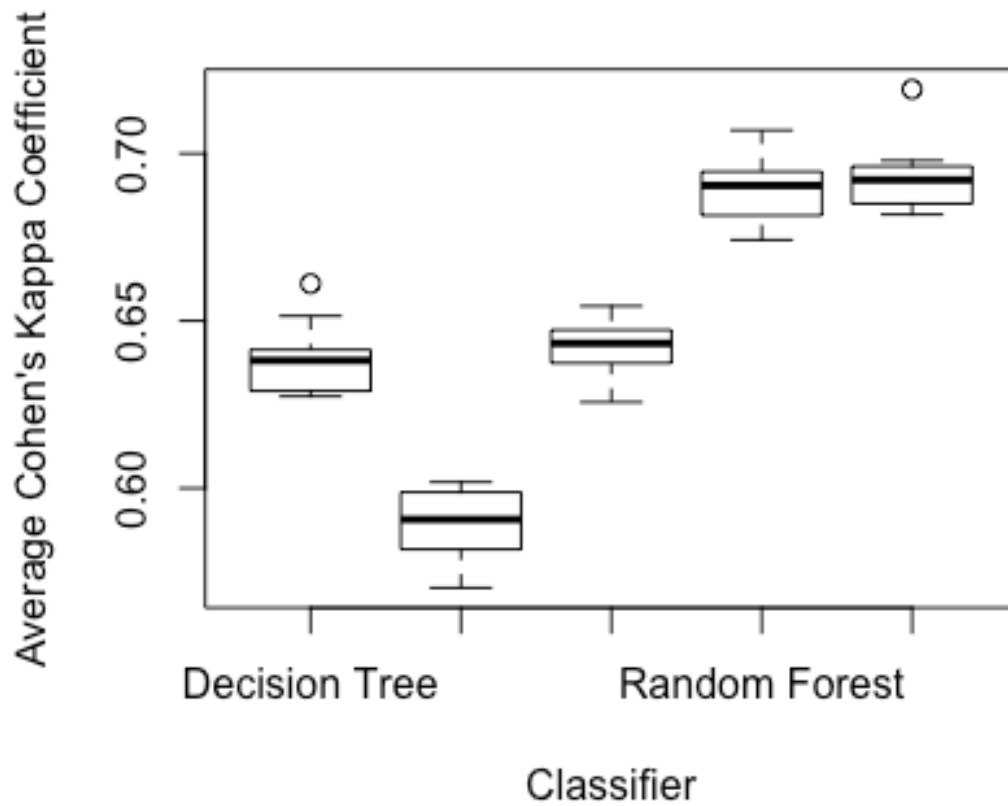
Graphical Model Comparison











Works Cited

[1] Babaoglu, Ceni. "The Friedman Test." Online lecture provided by Ryerson University, Toronto, ON, May 23, 2018.

[2] Pohlert, Thorsten. "The Pairwise Multiple Comparison of Mean Ranks Package (PMCMR)." Last Modified January 6, 2016. <https://cran.r-project.org/web/packages/PMCMR/vignettes/PMCMR.pdf>.