

Random Trees Implementation

Model Achieved with an error margin of 0.02%

```
> model_1 <- randomForest(as.factor(Category) ~ ., data = training_set, importance = TRUE)
> model_1

Call:
randomForest(formula = as.factor(Category) ~ ., data = training_set, importance = TRUE)
Type of random forest: classification
Number of trees: 500
No. of variables tried at each split: 6

OOB estimate of error rate: 1.52%

Confusion matrix:
      bicycling conditioning exercise dancing fishing and hunting home activities home repair inactivity quiet/light lawn and garden miscellaneous music playing occupation
bicycling      363      0      0      0      0      0      0      0      0      0      0
conditioning exercise      0      1149      0      3      2      0      0      0      0      0      0
dancing      0      1      480      10      0      1      0      0      0      0      0
fishing and hunting      0      0      0      489      5      0      0      0      2      0      0
home activities      0      0      0      2      962      0      0      0      1      0      0
home repair      0      0      3      0      0      709      0      3      0      0      0
inactivity quiet/light      0      0      0      0      1      5      107      3      10      0      1
lawn and garden      0      0      0      0      0      7      1      763      15      4      0
miscellaneous      0      0      0      0      0      2      0      15      483      5      0
music playing      0      0      0      0      0      2      0      0      15      358      2
occupation      0      0      0      0      0      0      0      0      0      0      1642
religious activities      0      0      0      0      0      0      0      0      0      0      7
running      0      0      0      0      0      0      0      0      0      0      8
self care      0      0      0      0      0      0      0      0      0      0      5
sports      0      0      0      0      0      0      0      0      0      0      0
transportation      0      0      0      0      0      0      0      0      0      0      0
volunteer activities      0      0      0      0      0      0      0      0      0      0      0
walking      0      0      0      0      0      0      0      0      0      0      1
water activities      0      0      0      0      0      0      0      0      0      0      0
winter activities      0      0      0      0      0      0      0      0      0      0      1

      bicycling conditioning exercise dancing fishing and hunting home activities home repair inactivity quiet/light lawn and garden miscellaneous music playing occupation class.error
bicycling      0      0      0      0      0      0      0      0      0      0      0      0.008196721
conditioning exercise      0      0      0      0      0      0      0      0      0      0      0.004332756
dancing      0      0      0      0      0      0      0      0      0      0.024390244
fishing and hunting      0      0      0      0      0      0      0      0      0.014112903
home activities      0      0      0      0      0      0      0      0.003108808
home repair      0      0      0      0      0      0      0      0.008391608
inactivity quiet/light      0      0      0      0      0      0      0.0157480315
lawn and garden      0      0      0      0      0      0      0.015483871
miscellaneous      0      0      0      0      0      0.043564356
music playing      0      0      0      0      0      0.050397878
occupation      0.000000000
religious activities      0.080459770
running      0.037735849
self care      0.107692308
sports      0.000415110
transportation      0.298507463
winter activities      0.363636364
```

```
> model_2 <- randomForest(as.factor(Category) ~ ., data = training_set, ntree = 500, mtry = 37, importance = TRUE)
> model_2

Call:
randomForest(formula = as.factor(Category) ~ ., data = training_set, ntree = 500, mtry = 37, importance = TRUE)
Type of random forest: classification
Number of trees: 500
No. of variables tried at each split: 37

OOB estimate of error rate: 0.02%

Confusion matrix:
      bicycling conditioning exercise dancing fishing and hunting home activities home repair inactivity quiet/light lawn and garden miscellaneous music playing occupation
bicycling      366      0      0      0      0      0      0      0      0      0      0
conditioning exercise      0      1154      0      0      0      0      0      0      0      0      0
dancing      0      0      492      0      0      0      0      0      0      0      0
fishing and hunting      0      0      0      496      0      0      0      0      0      0      0
home activities      0      0      0      0      965      0      0      0      0      0      0
home repair      0      0      0      0      0      715      0      0      0      0      0
inactivity quiet/light      0      0      0      0      0      0      127      0      0      0      0
lawn and garden      0      0      0      0      0      0      0      775      0      0      0
miscellaneous      0      0      0      0      0      0      0      0      505      0      0
music playing      0      0      0      0      0      0      0      0      0      377      0
occupation      0      0      0      0      0      0      0      0      0      0      1642
religious activities      0      0      0      0      0      0      0      0      0      0      0
running      0      0      0      0      0      0      0      0      0      0      0
self care      0      0      0      0      0      0      0      0      0      0      0
sports      0      0      0      0      0      0      0      0      0      0      0
transportation      0      0      0      0      0      0      0      0      0      0      0
volunteer activities      0      0      0      0      0      0      0      0      0      0      0
walking      0      0      0      0      0      0      0      0      0      0      0
water activities      0      0      0      0      0      0      0      0      0      0      0
winter activities      0      0      0      0      0      0      0      0      0      0      0

      bicycling conditioning exercise dancing fishing and hunting home activities home repair inactivity quiet/light lawn and garden miscellaneous music playing occupation class.error
bicycling      0      0      0      0      0      0      0      0      0      0.000000000
conditioning exercise      0      0      0      0      0      0      0      0      0.000000000
dancing      0      0      0      0      0      0      0      0.000000000
fishing and hunting      0      0      0      0      0      0      0.000000000
home activities      0      0      0      0      0.000000000
home repair      0      0      0      0      0.000000000
inactivity quiet/light      0      0      0      0      0.000000000
lawn and garden      0      0      0      0      0.000000000
miscellaneous      0      0      0      0      0.000000000
music playing      0.000000000
religious activities      0.000000000
running      0.000000000
self care      0.212      0.000000000
sports      0.1      0.000000000
transportation      0.000000000
winter activities      0.000000000
```

Trained & Tested By: Mahima Nimbalkar

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walking      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
water activities 0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
winter activities 0      0      0      0      0      0      0      0      0      0      0      0      0      0      0
      religious activities running self care sports transportation volunteer activities walking water activities winter activities class.error
bicycling      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0.00000000
conditioning exercise 0      0      0      0      0      0      0      0      0      0      0      0      0      0      0.00000000
dancing      0      0      0      0      0      0      0      0      0      0      0      0      0      0      0.00000000
fishing and hunting 0      0      0      0      0      0      0      0      0      0      0      0      0      0      0.00000000
home activities 0      0      0      0      0      0      0      0      0      0      0      0      0      0      0.00000000
home repair    0      0      0      0      0      0      0      0      0      0      0      0      0      0      0.00000000
inactivity quiet/light 0      0      0      0      0      0      0      0      0      0      0      0      0      0      0.00000000
lawn and garden 0      0      0      0      0      0      0      0      0      0      0      0      0      0      0.00000000
miscellaneous  0      0      0      0      0      0      0      0      0      0      0      0      0      0      0.00000000
music playing  0      0      0      0      0      0      0      0      0      0      0      0      0      0      0.00000000
occupation     0      0      0      0      0      0      0      0      0      0      0      0      0      0      0.00000000
religious activities 87      0      0      0      0      0      0      0      0      0      0      0      0      0      0.00000000
running        0      212      0      0      0      0      0      0      0      0      0      0      0      0      0.00000000
self care      0      1      64      0      0      0      0      0      0      0      0      0      0      0      0.01538462
sports         0      0      0      2409      0      0      0      0      0      0      0      0      0      0      0.00000000
transportation 0      0      0      0      67      0      0      0      0      0      0      0      0      0      0.00000000
volunteer activities 0      0      0      0      1      32      0      0      0      0      0      0      0      0      0.03030303
walking        0      0      0      0      0      1      409      0      0      0      0      0      0      0      0.00000000
water activities 0      0      0      0      0      0      0      718      0      0      0      0      0      0      0.00000000
winter activities 0      0      0      0      0      0      0      0      517      0.00000000
> validation_prediction <- predict(model2, validation_set)
> table(validation_prediction, validation_set$Category1)

validation_prediction 1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20
bicycling      150  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
conditioning exercise 528 0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
dancing        0  0 205 0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
fishing and hunting 0  0  0 209 0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
home activities 0  0  0  0 412 0  0  0  0  0  0  0  0  0  0  0  0  0  0  0
home repair    0  0  0  0  0 350 0  0  0  0  0  0  0  0  0  0  0  0  0  0
inactivity quiet/light 0  0  0  0  0 58 0  0  0  0  0  0  0  0  0  0  0  0  0  0
lawn and garden 0  0  0  0  0  0 317 0  0  0  0  0  0  0  0  0  0  0  0  0
miscellaneous  0  0  0  0  0  0  0 236 0  0  0  0  0  0  0  0  0  0  0  0
music playing  0  0  0  0  0  0  0  0 157 0  0  0  0  0  0  0  0  0  0  0
occupation     0  0  0  0  0  0  0  0  0 687 0  0  0  0  0  0  0  0  0  0
religious activities 0  0  0  0  0  0  0  0  0  0 33 0  0  0  0  0  0  0  0  0
running        0  0  0  0  0  0  0  0  0  0  0 79 0  0  0  0  0  0  0  0
self care      0  0  0  0  0  0  0  0  0  0  0  0 24 0  0  0  0  0  0  0
sports         0  0  0  0  0  0  0  0  0  0  0  0  0 1041 0  0  0  0  0  0
transportation 0  0  0  0  0  0  0  0  0  0  0  0  0  0 20 0  0  0  0  0
volunteer activities 0  0  0  0  0  0  0  0  0  0  0  0  0  0  0 13 0  0  0  0
walking        0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0 168 0  0  0
water activities 0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0 290 0  0
winter activities 0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0  0 223 0

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