Computer Aided Detection and Diagnosis of Breast Cancer

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## Data for analyze

library(data.table)  
library(dplyr)  
  
filePath <- "results-p03-full.csv"  
  
all\_dt <- fread(filePath, stringsAsFactors = TRUE, dec=".")  
  
tibble(all\_dt)

## # A tibble: 1,311 x 15  
## PatientId LeftOrRightBrest ImageView FullFilePath ROIFilePath TestOrTraining  
## <fct> <fct> <fct> <fct> <fct> <fct>   
## 1 P\_00038 LEFT CC ./data/CALC~ ./data/CAL~ test   
## 2 P\_00038 LEFT MLO ./data/CALC~ ./data/CAL~ test   
## 3 P\_00100 RIGHT CC ./data/CALC~ ./data/CAL~ test   
## 4 P\_00100 RIGHT MLO ./data/CALC~ ./data/CAL~ test   
## 5 P\_00132 LEFT MLO ./data/CALC~ ./data/CAL~ test   
## 6 P\_00127 RIGHT CC ./data/CALC~ ./data/CAL~ test   
## 7 P\_00127 RIGHT MLO ./data/CALC~ ./data/CAL~ test   
## 8 P\_00141 LEFT CC ./data/CALC~ ./data/CAL~ test   
## 9 P\_00150 RIGHT MLO ./data/CALC~ ./data/CAL~ test   
## 10 P\_00163 LEFT CC ./data/CALC~ ./data/CAL~ test   
## # ... with 1,301 more rows, and 9 more variables: BrestDensity <int>,  
## # CalcType <fct>, CalcDistribution <fct>, Patology <fct>, LesionVolume <dbl>,  
## # LesionArea <dbl>, SphericalDisproportion <dbl>, Sphericity <dbl>,  
## # SurfaceToVolumeRatio <dbl>

This dataset consists of 1333 instances with 15 features:

all\_dt$PatientId <- NULL  
all\_dt$FullFilePath <- NULL  
all\_dt$ROIFilePath <- NULL  
  
all\_dt$LeftOrRightBrest <- as.numeric(all\_dt$LeftOrRightBrest)  
all\_dt$LeftOrRightBrest <- NULL  
  
all\_dt$ImageView <- as.numeric(all\_dt$ImageView)  
all\_dt$ImageView <- NULL  
  
all\_dt$TestOrTraining <- as.numeric(all\_dt$TestOrTraining)  
all\_dt$TestOrTraining <- NULL  
  
all\_dt$BrestDensity <- NULL  
  
all\_dt$CalcType <- as.numeric(all\_dt$CalcType)  
all\_dt$CalcType <- NULL  
  
all\_dt$CalcDistribution <- as.numeric(all\_dt$CalcDistribution)  
all\_dt$CalcDistribution <- NULL  
  
all\_dt$Patology <- as.numeric(all\_dt$Patology)  
  
head(all\_dt)

## Patology LesionVolume LesionArea SphericalDisproportion Sphericity  
## 1: 1 95.4425 2.34285 0.002040456 490.0866  
## 2: 1 92.8025 2.29005 0.002015944 496.0455  
## 3: 1 97.5525 2.42505 0.002050132 487.7734  
## 4: 1 86.7525 2.16905 0.001900044 526.3037  
## 5: 1 608.0525 13.38705 0.003201888 312.3157  
## 6: 2 121.7725 2.96545 0.001938515 515.8589  
## SurfaceToVolumeRatio  
## 1: 0.02454724  
## 2: 0.02467660  
## 3: 0.02485892  
## 4: 0.02500274  
## 5: 0.02201627  
## 6: 0.02435238

### Preprocessing

Firstly, data should be set in adequate format.

all\_dt\_ex <- fread(filePath, stringsAsFactors = TRUE, dec=".")  
all\_dt\_ex$PatientId <- NULL  
all\_dt\_ex$FullFilePath <- NULL  
all\_dt\_ex$ROIFilePath <- NULL  
  
all\_dt\_ex$LeftOrRightBrest <- as.numeric(all\_dt\_ex$LeftOrRightBrest)  
all\_dt\_ex$LeftOrRightBrest <- cut(all\_dt\_ex$LeftOrRightBrest, 2, labels=c('LEFT', 'RIGHT'))  
all\_dt\_ex$LeftOrRightBrest <- NULL  
  
all\_dt\_ex$ImageView <- as.numeric(all\_dt\_ex$ImageView)  
all\_dt\_ex$ImageView <- cut(all\_dt\_ex$ImageView, 2, labels=c('CC', 'MLO'))  
all\_dt\_ex$ImageView <- NULL  
  
all\_dt\_ex$TestOrTraining <- NULL  
  
all\_dt\_ex$BrestDensity <- NULL  
  
all\_dt\_ex$CalcType <- NULL  
  
all\_dt\_ex$CalcDistribution <- NULL  
  
tibble(all\_dt\_ex)

## # A tibble: 1,311 x 6  
## Patology LesionVolume LesionArea SphericalDispro~ Sphericity SurfaceToVolume~  
## <fct> <dbl> <dbl> <dbl> <dbl> <dbl>  
## 1 BENIGN 95.4 2.34 0.00204 490. 0.0245  
## 2 BENIGN 92.8 2.29 0.00202 496. 0.0247  
## 3 BENIGN 97.6 2.43 0.00205 488. 0.0249  
## 4 BENIGN 86.8 2.17 0.00190 526. 0.0250  
## 5 BENIGN 608. 13.4 0.00320 312. 0.0220  
## 6 MALIGNA~ 122. 2.97 0.00194 516. 0.0244  
## 7 MALIGNA~ 106. 2.63 0.00188 532. 0.0249  
## 8 BENIGN 191. 4.44 0.00235 426. 0.0233  
## 9 MALIGNA~ 56.6 1.47 0.00173 577. 0.0260  
## 10 BENIGN 73.1 1.86 0.00178 561. 0.0254  
## # ... with 1,301 more rows

After that, it should be checked is there missing values in dataset.

## Patology LesionVolume LesionArea   
## 0 0 0   
## SphericalDisproportion Sphericity SurfaceToVolumeRatio   
## 0 0 0

Obtained result indicate that thete is no misisng values. Therefore, there is no need to correct existng data.

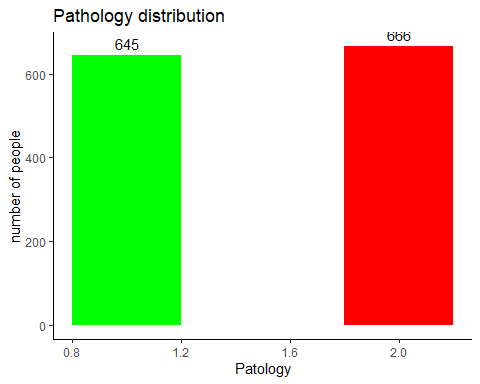
### Data exploration

Since the research question is to predict if the patient has malignant changes, so variable “pathology” to be the dependent variable in this analysis. That variable is treated as a discrete attribute and its prediction will be executed as classification process.

Firstly, distribution of “pathology” is examinated.

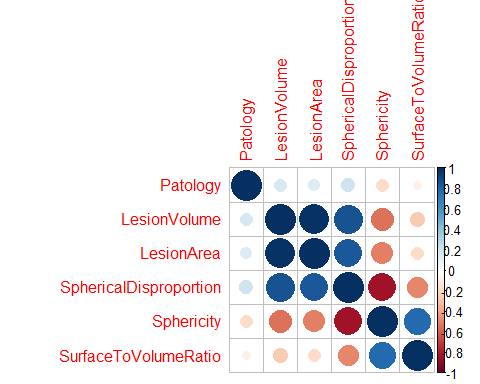
## [1] "pathology"

## .  
## 1 2   
## 645 666

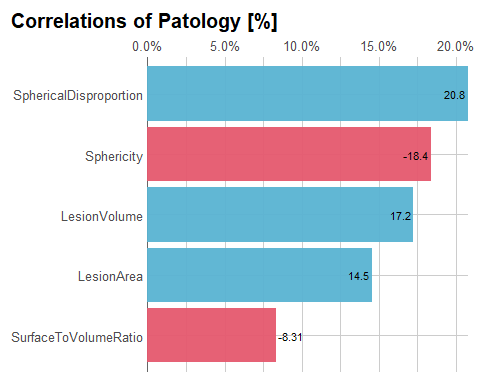


Corelation among variables in dataset is calculated and displayed on the following diagram.

## Patology LesionVolume LesionArea SphericalDisproportion  
## Patology 1.000 0.172 0.145 0.208  
## LesionVolume 0.172 1.000 0.983 0.861  
## LesionArea 0.145 0.983 1.000 0.848  
## SphericalDisproportion 0.208 0.861 0.848 1.000  
## Sphericity -0.184 -0.543 -0.503 -0.850  
## SurfaceToVolumeRatio -0.083 -0.251 -0.189 -0.485  
## Sphericity SurfaceToVolumeRatio  
## Patology -0.184 -0.083  
## LesionVolume -0.543 -0.251  
## LesionArea -0.503 -0.189  
## SphericalDisproportion -0.850 -0.485  
## Sphericity 1.000 0.777  
## SurfaceToVolumeRatio 0.777 1.000



In this diagram, positive corelation is marked with different shades of blue, while negative correlation is marked with different shades of red. More intesive color indicate that correlation is higher.



### Models

Different Machine Learning models were chosen for predicting the “target” variable. Here is the list of models that are used in this report:

* k Nearest Neihbours (**k-nn**), described in (Murphy [2012](#ref-murphy), 16–18). An object is classified by a plurality vote of its neighbors, with the object being assigned to the class most common among its k nearest neighbors (k is a positive integer, typically small). I
* Naive Bayes (**nb**), explained in (Murphy [2012](#ref-murphy), 82–95). It is simple “probabilistic classifier” based on applying Bayes’ theorem, with strong (e.g. naïve) assumptions of independence between the features. In other words, naive Bayes classifier assume that the value of a particular feature is independent of the value of any other feature, given the class variable.
* SVM with Linear Kernel (**svm-l**), described in (Murphy [2012](#ref-murphy), 482–86). Training algorithm of SVM builds a model that assigns new examples to one category or the other, making it a non-probabilistic binary linear classifier.
* SVM with Radial Kernel (**svm-r**), also described in (Murphy [2012](#ref-murphy), 498–505). It is using the kernel trick, which implicitly maps kernel inputs into high-dimensional feature spaces where features are linearly separable. In this case kernel is defined with Gaussian radial basis function, given by formula:
* Random Forest (**rf**), also described in (Murphy [2012](#ref-murphy), 550–53). Random forest operate by constructing a multitude of decision trees at training time and outputting the value that is mean/average prediction of the individual trees.

### Implementation and evaluation

It is clear that various different alternatives and experiments should be created during ML process implementation.

Because of its popularity, efficiency, simplicity and flexibility and because of author’s previous experience, R language and environment for statistical computing and graphics (R Core Team [2019](#ref-rfoundations)) is used to implement the ML process. A decision tree is a flowchart-like structure in which each internal node represents a “test” on an attribute, each branch represents the outcome of the test, and each leaf node represents a class label (decision taken after computing all attributes). It is clear that paths from root to leaf represent classification rules.

The following ML predictor models are developed with R functions:

* Function ‘knn’(R Documentation team, [n.d.](#ref-rfunknn)) in library ‘class’(B. Ripley [2020](#ref-rbibclass)) is used for k-nn model realization.
* Function ‘NaiveBayes’(R Documentation team, [n.d.](#ref-rfunnaivebayes)) in library ‘klaR’(C. Roever [2020](#ref-rbibklar)) is used for nb model realization.
* Function ‘ksvm’ (R Documentation team, [n.d.](#ref-rfunkvsm)) in library ‘kernlab’(A. Karatzoglou [2019](#ref-rbibkernlab)) with parameter kernel = vanilladot() that represents linear kernel, is used for svm-l model realization.
* Function ‘ksvm’in library ’kernlab’ with parameter kernel = “rbfdot” - which represents radial kernel, is used for svm-r model realization.
* Function ‘randomForest’(R Documentation team, [n.d.](#ref-rfunrandomforest)) in library ‘randomForest’(L. Breiman [2018](#ref-rbibrandomforest)) is used for rf model realization.

Last, but not the least, R function ‘train’ (R Documentation team, [n.d.](#ref-rfuntrain)) in library ‘caret’ (M. Kuhn [2020](#ref-rbibcaret)) is used as umbrella that covers all the previously mentioned R functions and libraries for ML. They enables handling of a various learning models and functions in a uniform manner. In this moment, more than 230 classification and regression models are ‘out-of-a-box’ available for use with ‘caret’ and all of them are enlisted in (Kuhn, [n.d.](#ref-kuhnam)).

Developed models are compared using k-fold validation (Murphy [2012](#ref-murphy), 201–10), with value of parameter k is set to 10. Selected 10-fold validation is realized with caret R functions. In order to achieve exactly the same conditions for comparison among developed ML methods, in all 10-fold validation scenarios, random generator is set on predefined value 155294099.

In order to evaluate quality of the selected ML regression methods, various measures (Murphy [2012](#ref-murphy), 176–94) are used.

The following overall measures are calculated for ML models:

For measuring the performance of algorithms, sensitivity (or recall), specificity and accuracy were used because these three criteria are used more in the medical field.

For calculation of sensitivity, specificity and accuracy confusion matrix is required. In the following table, a confusion matrix is shown:

|  |  |  |
| --- | --- | --- |
|  | Actual class is C1 | Actual class is C2 |
| Predicted class is *C1* | True positive () | False positive () |
| Predicted class is *C2* | False negative () | True negative () |

Cells in confusion matrix have the following meaning (R. Alizadehsani [2019](#ref-alizedah2019)): - Actual class is the class which determined by angiography and it is existed in dataset. - Predicted class is the one which is predicted by algorithms. - is number of samples of class C1 which has been correctly classified. - is number of samples of class C2 which has been correctly classified. - is number of samples of class C1 which has been falsely classified as C2. - is number of samples of class C2 which has been falsely classified as C1.

According to confusion matrix, sensitivity, specificity and accuracy are calculated as follows:

Quality of the classification algorithm is often displayed by ROC (receiver operating characteristic) curve. It is a diagram showing the performance of a classification model at all classification thresholds. This curve plots two parameters true positive rate () and false positive rate ().

True Positive Rate () is a synonym for recall and is defined as follows:

False Positive Rate () is defined as follows:

An ROC curve plots vs. at different classification thresholds. Lowering the classification threshold classifies more items as positive, thus increasing both false positives and true positives.

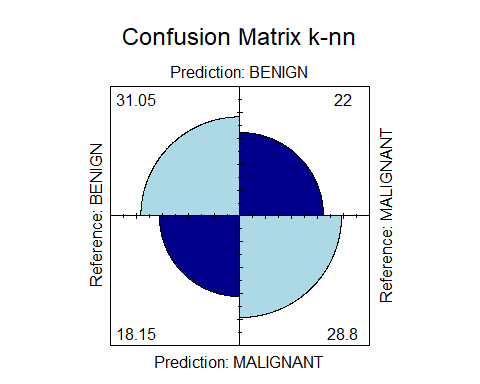
Area Under the ROC Curve (AUC) measures the entire two-dimensional area underneath the entire ROC curve (think integral calculus) from (0,0) to (1,1).

Display info about k-nn model after 10-fold validation:

## 9-nearest neighbor model  
## Training set outcome distribution:  
##   
## BENIGN MALIGNANT   
## 645 666

## [1] 0.6142365 0.6216783 0.6003444 0.6723414 0.6383759 0.7206157 0.6819030  
## [8] 0.5736597 0.6094406 0.6028451 0.6832377 0.6230177 0.6596737 0.7074627  
## [15] 0.6783217 0.6605644 0.5741004 0.6735322 0.5957520 0.5370802 0.6350816  
## [22] 0.5625000 0.6046620 0.6610723 0.5987371 0.7826493 0.6520522 0.6427239  
## [29] 0.6048220 0.6568312 0.6833022 0.6019814 0.6355350 0.6531469 0.5345644  
## [36] 0.6019176 0.6879735 0.6898967 0.6343823 0.6041332 0.5966651 0.6280317  
## [43] 0.6455798 0.5715951 0.6667049 0.6309468 0.6258741 0.6424799 0.5645989  
## [50] 0.6245336 0.6512360 0.5798368 0.6286713 0.6360505 0.6549674 0.5754025  
## [57] 0.6629162 0.7103456 0.6435132 0.6131629 0.6281286 0.6026406 0.5775058  
## [64] 0.6193182 0.6180253 0.7277462 0.5932262 0.6161381 0.6476690 0.7696900  
## [71] 0.6290246 0.6360505 0.6332860 0.6499534 0.5677472 0.5903263 0.6660839  
## [78] 0.6584386 0.6636051 0.6086108 0.5993470 0.6853042 0.6876457 0.6722158  
## [85] 0.6067708 0.6165956 0.6399254 0.6931114 0.5820513 0.6118608 0.5940998  
## [92] 0.5569030 0.6275058 0.7547808 0.6669776 0.5942235 0.5981810 0.6431903  
## [99] 0.6742071 0.5525641

## Cross-Validated (10 fold, repeated 10 times) Confusion Matrix   
##   
## (entries are percentual average cell counts across resamples)  
##   
## Reference  
## Prediction BENIGN MALIGNANT  
## BENIGN 31.1 22.0  
## MALIGNANT 18.1 28.8  
##   
## Accuracy (average) : 0.5986



## [1] 0.566967

## [1] 0.6311628

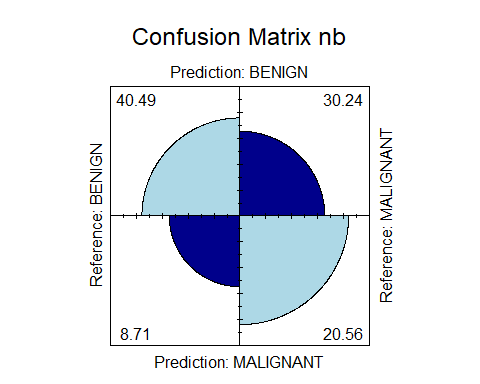
## [1] 0.5985507

Display info about nb model after 10-fold validation:

## $apriori  
## grouping  
## BENIGN MALIGNANT   
## 0.4919908 0.5080092   
##   
## $tables  
## $tables$LesionVolume  
## $tables$LesionVolume$BENIGN  
##   
## Call:  
## density.default(x = xx, adjust = ..1)  
##   
## Data: xx (645 obs.); Bandwidth 'bw' = 62.1  
##   
## x y   
## Min. : -178.1 Min. :0.000e+00   
## 1st Qu.: 5009.5 1st Qu.:0.000e+00   
## Median :10197.1 Median :0.000e+00   
## Mean :10197.1 Mean :4.812e-05   
## 3rd Qu.:15384.7 3rd Qu.:2.574e-06   
## Max. :20572.3 Max. :2.396e-03   
##   
## $tables$LesionVolume$MALIGNANT  
##   
## Call:  
## density.default(x = xx, adjust = ..1)  
##   
## Data: xx (666 obs.); Bandwidth 'bw' = 186.6  
##   
## x y   
## Min. : -556.4 Min. :0.000e+00   
## 1st Qu.: 5214.8 1st Qu.:1.100e-09   
## Median :10986.0 Median :1.743e-06   
## Mean :10986.0 Mean :4.325e-05   
## 3rd Qu.:16757.2 3rd Qu.:1.468e-05   
## Max. :22528.5 Max. :1.011e-03   
##   
##   
## $tables$LesionArea  
## $tables$LesionArea$BENIGN  
##   
## Call:  
## density.default(x = xx, adjust = ..1)  
##   
## Data: xx (645 obs.); Bandwidth 'bw' = 1.341  
##   
## x y   
## Min. : -3.721 Min. :0.000000   
## 1st Qu.:164.620 1st Qu.:0.000000   
## Median :332.962 Median :0.000000   
## Mean :332.962 Mean :0.001483   
## 3rd Qu.:501.303 3rd Qu.:0.000000   
## Max. :669.645 Max. :0.105701   
##   
## $tables$LesionArea$MALIGNANT  
##   
## Call:  
## density.default(x = xx, adjust = ..1)  
##   
## Data: xx (666 obs.); Bandwidth 'bw' = 4.053  
##   
## x y   
## Min. :-11.99 Min. :0.000e+00   
## 1st Qu.:129.59 1st Qu.:0.000e+00   
## Median :271.18 Median :3.925e-05   
## Mean :271.18 Mean :1.765e-03   
## 3rd Qu.:412.77 3rd Qu.:5.887e-04   
## Max. :554.35 Max. :4.648e-02   
##   
##   
## $tables$SphericalDisproportion  
## $tables$SphericalDisproportion$BENIGN  
##   
## Call:  
## density.default(x = xx, adjust = ..1)  
##   
## Data: xx (645 obs.); Bandwidth 'bw' = 0.0001827  
##   
## x y   
## Min. :0.0006667 Min. : 0.000   
## 1st Qu.:0.0047409 1st Qu.: 0.000   
## Median :0.0088152 Median : 1.021   
## Mean :0.0088152 Mean : 61.301   
## 3rd Qu.:0.0128894 3rd Qu.: 19.865   
## Max. :0.0169637 Max. :583.307   
##   
## $tables$SphericalDisproportion$MALIGNANT  
##   
## Call:  
## density.default(x = xx, adjust = ..1)  
##   
## Data: xx (666 obs.); Bandwidth 'bw' = 0.0003441  
##   
## x y   
## Min. :0.0002021 Min. : 0.016   
## 1st Qu.:0.0033761 1st Qu.: 1.458   
## Median :0.0065501 Median : 17.187   
## Mean :0.0065501 Mean : 78.686   
## 3rd Qu.:0.0097242 3rd Qu.:129.156   
## Max. :0.0128982 Max. :362.912   
##   
##   
## $tables$Sphericity  
## $tables$Sphericity$BENIGN  
##   
## Call:  
## density.default(x = xx, adjust = ..1)  
##   
## Data: xx (645 obs.); Bandwidth 'bw' = 31.4  
##   
## x y   
## Min. :-33.27 Min. :2.250e-07   
## 1st Qu.:204.39 1st Qu.:4.819e-05   
## Median :442.06 Median :6.654e-04   
## Mean :442.06 Mean :1.051e-03   
## 3rd Qu.:679.72 3rd Qu.:1.821e-03   
## Max. :917.38 Max. :3.301e-03   
##   
## $tables$Sphericity$MALIGNANT  
##   
## Call:  
## density.default(x = xx, adjust = ..1)  
##   
## Data: xx (666 obs.); Bandwidth 'bw' = 36.99  
##   
## x y   
## Min. :-26.69 Min. :3.844e-07   
## 1st Qu.:210.26 1st Qu.:1.389e-04   
## Median :447.21 Median :9.971e-04   
## Mean :447.21 Mean :1.054e-03   
## 3rd Qu.:684.16 3rd Qu.:1.870e-03   
## Max. :921.11 Max. :2.668e-03   
##   
##   
## $tables$SurfaceToVolumeRatio  
## $tables$SurfaceToVolumeRatio$BENIGN  
##   
## Call:  
## density.default(x = xx, adjust = ..1)  
##   
## Data: xx (645 obs.); Bandwidth 'bw' = 0.0005583  
##   
## x y   
## Min. :0.01891 Min. : 0.01566   
## 1st Qu.:0.02429 1st Qu.: 1.34523   
## Median :0.02967 Median : 7.89618   
## Mean :0.02967 Mean : 46.44101   
## 3rd Qu.:0.03505 3rd Qu.: 69.69501   
## Max. :0.04043 Max. :213.77942   
##   
## $tables$SurfaceToVolumeRatio$MALIGNANT  
##   
## Call:  
## density.default(x = xx, adjust = ..1)  
##   
## Data: xx (666 obs.); Bandwidth 'bw' = 0.0006193  
##   
## x y   
## Min. :0.01859 Min. : 0.00004   
## 1st Qu.:0.02657 1st Qu.: 0.36977   
## Median :0.03454 Median : 2.21571   
## Mean :0.03454 Mean : 31.31634   
## 3rd Qu.:0.04252 3rd Qu.: 29.68035   
## Max. :0.05049 Max. :216.01950   
##   
##   
##   
## $levels  
## [1] "BENIGN" "MALIGNANT"  
##   
## $call  
## NaiveBayes.default(x = x, grouping = y, usekernel = TRUE, fL = param$fL,   
## adjust = param$adjust)  
##   
## $x  
## LesionVolume LesionArea SphericalDisproportion Sphericity  
## X1 95.4425 2.34285 0.002040456 490.08659  
## X2 92.8025 2.29005 0.002015944 496.04546  
## X3 97.5525 2.42505 0.002050132 487.77337  
## X4 86.7525 2.16905 0.001900044 526.30369  
## X5 608.0525 13.38705 0.003201888 312.31570  
## X6 121.7725 2.96545 0.001938515 515.85886  
## X7 105.6125 2.63425 0.001878189 532.42778  
## X8 190.8025 4.44205 0.002346543 426.15886  
## X9 56.6325 1.47065 0.001732668 577.14462  
## X10 73.0525 1.85505 0.001781171 561.42840  
## X11 43.2725 1.16345 0.001701697 587.64866  
## X12 317.7125 7.18825 0.002650222 377.32682  
## X13 74.0525 1.88305 0.001790120 558.62190  
## X14 1378.8525 29.26705 0.004268041 234.29955  
## X15 642.7750 16.69150 0.003847141 259.93331  
## X16 1084.4325 23.23365 0.003813649 262.21605  
## X17 569.2225 12.49045 0.003124650 320.03583  
## X18 2328.0625 52.67125 0.005059026 197.66649  
## X19 1433.0125 33.12525 0.004355159 229.61273  
## X20 208.7125 4.83225 0.002357576 424.16441  
## X21 40.2025 1.10605 0.001709975 584.80386  
## X22 34.7025 1.03005 0.001575099 634.88059  
## X23 127.2025 3.07405 0.002196800 455.20753  
## X24 1049.4825 22.47965 0.003569182 280.17621  
## X25 174.4725 4.09145 0.002359153 423.88094  
## X26 1147.9825 25.28165 0.003820869 261.72057  
## X27 266.0525 6.05905 0.002459677 406.55741  
## X28 1197.4825 26.02365 0.003676331 272.01033  
## X29 277.4825 6.32765 0.002711667 368.77685  
## X30 48.9725 1.31745 0.001598764 625.48306  
## X31 94.3925 2.33785 0.001799082 555.83904  
## X32 221.0425 5.09485 0.002552705 391.74136  
## X33 152.7125 3.63225 0.002332830 428.66392  
## X34 233.6625 5.37125 0.002590344 386.04906  
## X35 897.6025 19.31405 0.003820042 261.77726  
## X36 17034.3125 560.50925 0.015581783 64.17751  
## X37 20386.0525 665.62205 0.016415586 60.91772  
## X38 1231.1575 47.29615 0.007577643 131.96715  
## X39 720.6050 15.70210 0.003537068 282.72002  
## X40 980.4925 20.99585 0.003840807 260.36197  
## X41 1038.3625 22.28925 0.003935622 254.08947  
## X42 71.3525 1.81405 0.001871860 534.22796  
## X43 465.9925 10.36185 0.003119521 320.56198  
## X44 1116.3125 24.14425 0.004126808 242.31801  
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## X882 0.02148415  
## X883 0.02167406  
## X884 0.02597763  
## X885 0.02257036  
## X886 0.02578012  
## X887 0.02202371  
## X888 0.02314014  
## X889 0.02707399  
## X890 0.02547751  
## X891 0.02642396  
## X892 0.02228233  
## X893 0.02293547  
## X894 0.02215440  
## X895 0.02311953  
## X896 0.02337002  
## X897 0.02237688  
## X898 0.02304840  
## X899 0.02588292  
## X900 0.02543592  
## X901 0.02232042  
## X902 0.02090627  
## X903 0.02154383  
## X904 0.02541925  
## X905 0.02322308  
## X906 0.02477697  
## X907 0.02359872  
## X908 0.02208539  
## X909 0.02223367  
## X910 0.03094177  
## X911 0.02623651  
## X912 0.03333029  
## X913 0.02633564  
## X914 0.02311579  
## X915 0.03688590  
## X916 0.02273450  
## X917 0.02447032  
## X918 0.02361447  
## X919 0.03422655  
## X920 0.02592052  
## X921 0.02311435  
## X922 0.02078347  
## X923 0.02326165  
## X924 0.02088419  
## X925 0.02081458  
## X926 0.02070512  
## X927 0.02077905  
## X928 0.02054594  
## X929 0.02093878  
## X930 0.02090358  
## X931 0.02745332  
## X932 0.02271442  
## X933 0.02531517  
## X934 0.02315093  
## X935 0.02188882  
## X936 0.02196620  
## X937 0.02694922  
## X938 0.02167358  
## X939 0.02579641  
## X940 0.02362313  
## X941 0.02648970  
## X942 0.02549285  
## X943 0.02452535  
## X944 0.02193155  
## X945 0.02298667  
## X946 0.02283691  
## X947 0.02347186  
## X948 0.02207399  
## X949 0.02538474  
## X950 0.02278905  
## X951 0.02418731  
## X952 0.02541086  
## X953 0.02560212  
## X954 0.02374152  
## X955 0.02330780  
## X956 0.02896486  
## X957 0.02709564  
## X958 0.02297175  
## X959 0.02336227  
## X960 0.02516520  
## X961 0.02412507  
## X962 0.02848894  
## X963 0.02873744  
## X964 0.02226893  
## X965 0.02222332  
## X966 0.02519949  
## X967 0.02687851  
## X968 0.02518559  
## X969 0.02528558  
## X970 0.02290737  
## X971 0.02431166  
## X972 0.02587663  
## X973 0.02181249  
## X974 0.02159182  
## X975 0.02539527  
## X976 0.02464225  
## X977 0.02611795  
## X978 0.02144828  
## X979 0.02095111  
## X980 0.02151647  
## X981 0.02104987  
## X982 0.02987654  
## X983 0.02618518  
## X984 0.02237191  
## X985 0.02737293  
## X986 0.02139071  
## X987 0.02141177  
## X988 0.02118698  
## X989 0.02088050  
## X990 0.02187538  
## X991 0.02085909  
## X992 0.02302009  
## X993 0.03067422  
## X994 0.02382021  
## X995 0.02450689  
## X996 0.02423814  
## X997 0.02246938  
## X998 0.02206257  
## X999 0.02078614  
## X1000 0.02109912  
## X1001 0.02149640  
## X1002 0.02080355  
## X1003 0.02359266  
## X1004 0.02347613  
## X1005 0.02111608  
## X1006 0.02286248  
## X1007 0.02285406  
## X1008 0.02183076  
## X1009 0.02266571  
## X1010 0.02468754  
## X1011 0.02560670  
## X1012 0.02561567  
## X1013 0.02513291  
## X1014 0.02199538  
## X1015 0.02101836  
## X1016 0.02515853  
## X1017 0.02240949  
## X1018 0.02193180  
## X1019 0.04510361  
## X1020 0.02221394  
## X1021 0.02167628  
## X1022 0.04133914  
## X1023 0.02667648  
## X1024 0.02213245  
## X1025 0.02232849  
## X1026 0.02254692  
## X1027 0.02410506  
## X1028 0.02380207  
## X1029 0.02107324  
## X1030 0.02160320  
## X1031 0.02115607  
## X1032 0.02184730  
## X1033 0.02258215  
## X1034 0.02323708  
## X1035 0.02198246  
## X1036 0.02202510  
## X1037 0.02451921  
## X1038 0.02679538  
## X1039 0.02363123  
## X1040 0.03166693  
## X1041 0.02259883  
## X1042 0.02116100  
## X1043 0.02131782  
## X1044 0.02218560  
## X1045 0.02219993  
## X1046 0.02095569  
## X1047 0.02095724  
## X1048 0.02721235  
## X1049 0.02523061  
## X1050 0.02636332  
## X1051 0.02322069  
## X1052 0.02428416  
## X1053 0.02491461  
## X1054 0.02917115  
## X1055 0.02217917  
## X1056 0.03087146  
## X1057 0.02384966  
## X1058 0.02316271  
## X1059 0.02379805  
## X1060 0.02256336  
## X1061 0.02379809  
## X1062 0.02265087  
## X1063 0.02414311  
## X1064 0.02280894  
## X1065 0.02370204  
## X1066 0.02197655  
## X1067 0.02512330  
## X1068 0.02364824  
## X1069 0.02470376  
## X1070 0.02336091  
## X1071 0.02669153  
## X1072 0.02399648  
## X1073 0.02582588  
## X1074 0.02751693  
## X1075 0.02577664  
## X1076 0.02166876  
## X1077 0.02639628  
## X1078 0.02170948  
## X1079 0.02652974  
## X1080 0.02327479  
## X1081 0.02341419  
## X1082 0.02654971  
## X1083 0.02739979  
## X1084 0.02754353  
## X1085 0.02699202  
## X1086 0.02263028  
## X1087 0.02471942  
## X1088 0.02201419  
## X1089 0.02152354  
## X1090 0.02482316  
## X1091 0.02415338  
## X1092 0.02261373  
## X1093 0.02207627  
## X1094 0.02210224  
## X1095 0.02161204  
## X1096 0.02697933  
## X1097 0.02512183  
## X1098 0.02740277  
## X1099 0.02509033  
## X1100 0.02273008  
## X1101 0.02321704  
## X1102 0.03006142  
## X1103 0.02770258  
## X1104 0.02571316  
## X1105 0.02309923  
## X1106 0.02130606  
## X1107 0.02453468  
## X1108 0.02128741  
## X1109 0.02142650  
## X1110 0.02234131  
## X1111 0.02327280  
## X1112 0.02424013  
## X1113 0.02270504  
## X1114 0.02369938  
## X1115 0.02343599  
## X1116 0.02287878  
## X1117 0.02400668  
## X1118 0.02117423  
## X1119 0.02356305  
## X1120 0.02354081  
## X1121 0.02212633  
## X1122 0.02191706  
## X1123 0.02364775  
## X1124 0.02464109  
## X1125 0.02384252  
## X1126 0.02360213  
## X1127 0.02253773  
## X1128 0.02278548  
## X1129 0.02219868  
## X1130 0.02341008  
## X1131 0.02353198  
## X1132 0.02505004  
## X1133 0.02374945  
## X1134 0.02279208  
## X1135 0.02341885  
## X1136 0.02746296  
## X1137 0.02744039  
## X1138 0.02075530  
## X1139 0.02074912  
## X1140 0.02267408  
## X1141 0.02130270  
## X1142 0.02233132  
## X1143 0.02133120  
## X1144 0.02278815  
## X1145 0.02359734  
## X1146 0.02123325  
## X1147 0.02408417  
## X1148 0.02151216  
## X1149 0.02179865  
## X1150 0.02225371  
## X1151 0.02105173  
## X1152 0.02213463  
## X1153 0.02234986  
## X1154 0.02126354  
## X1155 0.02157938  
## X1156 0.02145818  
## X1157 0.02214972  
## X1158 0.02203351  
## X1159 0.02161136  
## X1160 0.02220535  
## X1161 0.02224163  
## X1162 0.02405724  
## X1163 0.02182991  
## X1164 0.02439182  
## X1165 0.02165535  
## X1166 0.02084678  
## X1167 0.02135899  
## X1168 0.02201352  
## X1169 0.02211109  
## X1170 0.02199326  
## X1171 0.02228387  
## X1172 0.02397772  
## X1173 0.02388692  
## X1174 0.02256264  
## X1175 0.02093444  
## X1176 0.02089295  
## X1177 0.02275489  
## X1178 0.02158159  
## X1179 0.02155483  
## X1180 0.02124138  
## X1181 0.02167879  
## X1182 0.02127198  
## X1183 0.02129242  
## X1184 0.02152620  
## X1185 0.02152635  
## X1186 0.02434663  
## X1187 0.02162901  
## X1188 0.02153657  
## X1189 0.02143238  
## X1190 0.02187160  
## X1191 0.02158680  
## X1192 0.02087737  
## X1193 0.02108298  
## X1194 0.02271527  
## X1195 0.02316190  
## X1196 0.02085060  
## X1197 0.02052510  
## X1198 0.02168422  
## X1199 0.02064437  
## X1200 0.02044985  
## X1201 0.02172380  
## X1202 0.02203437  
## X1203 0.02154891  
## X1204 0.02339564  
## X1205 0.02205389  
## X1206 0.02125774  
## X1207 0.02250559  
## X1208 0.02158920  
## X1209 0.02350527  
## X1210 0.02316660  
## X1211 0.02095536  
## X1212 0.02087970  
## X1213 0.02095184  
## X1214 0.02179607  
## X1215 0.02120274  
## X1216 0.02056993  
## X1217 0.02071282  
## X1218 0.02194319  
## X1219 0.02263780  
## X1220 0.02194905  
## X1221 0.02082437  
## X1222 0.02055681  
## X1223 0.02183682  
## X1224 0.02326229  
## X1225 0.02186208  
## X1226 0.02192196  
## X1227 0.02181484  
## X1228 0.02193511  
## X1229 0.02168423  
## X1230 0.02158235  
## X1231 0.02447294  
## X1232 0.02549374  
## X1233 0.02120467  
## X1234 0.02119819  
## X1235 0.02377688  
## X1236 0.02497434  
## X1237 0.02181616  
## X1238 0.02269046  
## X1239 0.02290297  
## X1240 0.02315920  
## X1241 0.02305562  
## X1242 0.02141984  
## X1243 0.02269862  
## X1244 0.02192797  
## X1245 0.02800153  
## X1246 0.02722794  
## X1247 0.02295049  
## X1248 0.02967062  
## X1249 0.02486579  
## X1250 0.02566710  
## X1251 0.02691696  
## X1252 0.02398148  
## X1253 0.02223094  
## X1254 0.02983031  
## X1255 0.03135665  
## X1256 0.02136773  
## X1257 0.02352902  
## X1258 0.02459526  
## X1259 0.02339579  
## X1260 0.02364078  
## X1261 0.02391513  
## X1262 0.02393275  
## X1263 0.02398712  
## X1264 0.02455527  
## X1265 0.02325018  
## X1266 0.02303567  
## X1267 0.02385103  
## X1268 0.02439568  
## X1269 0.02285619  
## X1270 0.02502449  
## X1271 0.02284587  
## X1272 0.02853266  
## X1273 0.02177675  
## X1274 0.02212752  
## X1275 0.02642058  
## X1276 0.02238203  
## X1277 0.02206518  
## X1278 0.02144770  
## X1279 0.02207268  
## X1280 0.02728269  
## X1281 0.02266352  
## X1282 0.02553196  
## X1283 0.02461051  
## X1284 0.02517895  
## X1285 0.02472295  
## X1286 0.02291487  
## X1287 0.02225434  
## X1288 0.02242469  
## X1289 0.02133979  
## X1290 0.02432313  
## X1291 0.02585092  
## X1292 0.02742838  
## X1293 0.02127576  
## X1294 0.02511043  
## X1295 0.02661273  
## X1296 0.02360956  
## X1297 0.02395351  
## X1298 0.02275064  
## X1299 0.02404024  
## X1300 0.02337719  
## X1301 0.02474731  
## X1302 0.02200445  
## X1303 0.02275279  
## X1304 0.02322588  
## X1305 0.02286025  
## X1306 0.02311297  
## X1307 0.02496062  
## X1308 0.03012414  
## X1309 0.02905075  
## X1310 0.02182480  
## X1311 0.02134859  
##   
## $usekernel  
## [1] TRUE  
##   
## $varnames  
## [1] "LesionVolume" "LesionArea" "SphericalDisproportion"  
## [4] "Sphericity" "SurfaceToVolumeRatio"   
##   
## $xNames  
## [1] "LesionVolume" "LesionArea" "SphericalDisproportion"  
## [4] "Sphericity" "SurfaceToVolumeRatio"   
##   
## $problemType  
## [1] "Classification"  
##   
## $tuneValue  
## fL usekernel adjust  
## 2 0 TRUE 1  
##   
## $obsLevels  
## [1] "BENIGN" "MALIGNANT"  
## attr(,"ordered")  
## [1] FALSE  
##   
## $param  
## list()  
##   
## attr(,"class")  
## [1] "NaiveBayes"

## [1] 0.6977612 0.6941725 0.5849905 0.6483209 0.6709422 0.6286147 0.5352468  
## [8] 0.6314685 0.6118881 0.6190586 0.6808266 0.7326259 0.7487945 0.6991604  
## [15] 0.5958807 0.6546498 0.5363806 0.5601399 0.6659674 0.6588542 0.7329757  
## [22] 0.4995338 0.5935706 0.6483209 0.6214452 0.6874126 0.5830966 0.5688920  
## [29] 0.6479908 0.6702641 0.6359608 0.5594683 0.6121735 0.6397245 0.5703963  
## [36] 0.6133396 0.6163713 0.6613806 0.5913753 0.6613054 0.6884328 0.7208807  
## [43] 0.7388731 0.6312285 0.5554779 0.6833525 0.6484848 0.6275653 0.6168377  
## [50] 0.6564868 0.5940299 0.6319963 0.6304451 0.6078071 0.6460701 0.6808266  
## [57] 0.6030303 0.6602746 0.6462220 0.5652681 0.6254879 0.6732955 0.6161381  
## [64] 0.6456876 0.5859375 0.5260620 0.6540793 0.6184701 0.6813447 0.6199770  
## [71] 0.6175373 0.7255131 0.6075775 0.7524684 0.6456946 0.6065341 0.6194030  
## [78] 0.5310023 0.6683239 0.5345149 0.6150886 0.6054104 0.6673660 0.6723414  
## [85] 0.6208955 0.6654420 0.7139860 0.6647727 0.5847538 0.6539610 0.7233065  
## [92] 0.7267509 0.6243004 0.5491241 0.7628265 0.5631702 0.6483209 0.6748565  
## [99] 0.5862471 0.6298507

## Cross-Validated (10 fold, repeated 10 times) Confusion Matrix   
##   
## (entries are percentual average cell counts across resamples)  
##   
## Reference  
## Prediction BENIGN MALIGNANT  
## BENIGN 40.5 30.2  
## MALIGNANT 8.7 20.6  
##   
## Accuracy (average) : 0.6105



## [1] 0.4048048

## [1] 0.8229457

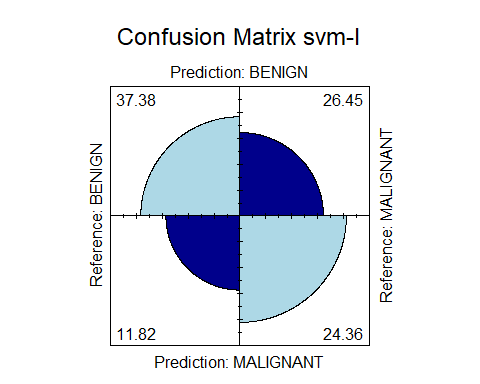
## [1] 0.6105263

Display info about svm-l model after 10-fold validation:

## Support Vector Machine object of class "ksvm"   
##   
## SV type: C-svc (classification)   
## parameter : cost C = 1   
##   
## Linear (vanilla) kernel function.   
##   
## Number of Support Vectors : 1122   
##   
## Objective Function Value : -1111.639   
## Training error : 0.386728   
## Probability model included.

## [1] 0.6683769 0.5588978 0.6421911 0.6753731 0.6808858 0.5939867 0.6515858  
## [8] 0.6007463 0.6470862 0.5995408 0.7066231 0.6681437 0.6867968 0.5191142  
## [15] 0.6524621 0.5533800 0.6376579 0.6789897 0.6500947 0.5643657 0.7051282  
## [22] 0.7583955 0.5653272 0.5988345 0.5660511 0.6110218 0.6177705 0.6359608  
## [29] 0.6240093 0.6177705 0.6559441 0.5485322 0.6615385 0.5820896 0.5834673  
## [36] 0.5886194 0.6681437 0.6664336 0.7308239 0.6332951 0.6594719 0.6023787  
## [43] 0.6464552 0.6116550 0.6788713 0.7019413 0.5738928 0.6463869 0.6103078  
## [50] 0.5850746 0.5968277 0.6711648 0.5871795 0.6261660 0.6360505 0.6865672  
## [57] 0.5697295 0.6289323 0.6727899 0.6453598 0.5745921 0.6576705 0.6554779  
## [64] 0.5547646 0.6154384 0.6204363 0.6958955 0.7143513 0.6149720 0.5991951  
## [71] 0.6951049 0.6534091 0.6110075 0.6149254 0.6195178 0.6082090 0.6690341  
## [78] 0.6112407 0.6200466 0.6130884 0.6680653 0.5916193 0.5223776 0.5872201  
## [85] 0.5909515 0.6765392 0.6211251 0.6747159 0.6326062 0.7336395 0.6115057  
## [92] 0.5762238 0.7067738 0.6213548 0.5416667 0.6964409 0.6014459 0.7280784  
## [99] 0.6543843 0.5883450

## Cross-Validated (10 fold, repeated 10 times) Confusion Matrix   
##   
## (entries are percentual average cell counts across resamples)  
##   
## Reference  
## Prediction BENIGN MALIGNANT  
## BENIGN 37.4 26.4  
## MALIGNANT 11.8 24.4  
##   
## Accuracy (average) : 0.6174



## [1] 0.4794294

## [1] 0.759845

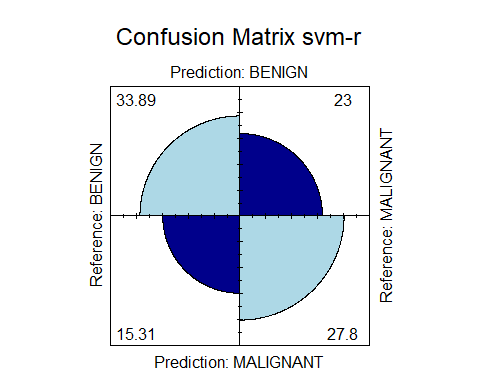
## [1] 0.6173913

Display info about svm-r model after 10-fold validation:

## Support Vector Machine object of class "ksvm"   
##   
## SV type: C-svc (classification)   
## parameter : cost C = 1   
##   
## Gaussian Radial Basis kernel function.   
## Hyperparameter : sigma = 3.28132203402867   
##   
## Number of Support Vectors : 1045   
##   
## Objective Function Value : -961.6327   
## Training error : 0.342487   
## Probability model included.

## [1] 0.6681975 0.5990676 0.6617681 0.7126866 0.7005208 0.7546642 0.6639459  
## [8] 0.4920746 0.6881119 0.6436567 0.6955224 0.7252799 0.6571096 0.6948335  
## [15] 0.7020979 0.6581157 0.6815814 0.6747159 0.6190586 0.5736940 0.6400932  
## [22] 0.5645989 0.6769231 0.6624709 0.6043628 0.7961754 0.6415578 0.6765392  
## [29] 0.6247991 0.6831228 0.6646455 0.6552448 0.6254735 0.7312354 0.6304451  
## [36] 0.6422822 0.6960227 0.6399541 0.7114219 0.6957520 0.6448228 0.6303638  
## [43] 0.6753157 0.6690765 0.6521240 0.6644123 0.6317016 0.6466131 0.6576493  
## [50] 0.6632463 0.6452892 0.6668998 0.6834499 0.6721010 0.6588153 0.6633523  
## [57] 0.7242250 0.7438447 0.6975890 0.7308239 0.6769231 0.6165327 0.6279720  
## [64] 0.6690341 0.6675086 0.7286932 0.6766935 0.6877332 0.6986014 0.7901263  
## [71] 0.6761364 0.6500574 0.6789773 0.7285448 0.6770056 0.6512821 0.6937063  
## [78] 0.6766935 0.7053961 0.6826636 0.6392257 0.6675086 0.6916084 0.7501722  
## [85] 0.5788352 0.6399148 0.6522854 0.6537313 0.6326340 0.6335227 0.6389925  
## [92] 0.5606343 0.6820513 0.7651586 0.5888526 0.6313920 0.6679104 0.7070896  
## [99] 0.6574160 0.6363636

## Cross-Validated (10 fold, repeated 10 times) Confusion Matrix   
##   
## (entries are percentual average cell counts across resamples)  
##   
## Reference  
## Prediction BENIGN MALIGNANT  
## BENIGN 33.9 23.0  
## MALIGNANT 15.3 27.8  
##   
## Accuracy (average) : 0.6169



## [1] 0.5472973

## [1] 0.6888372

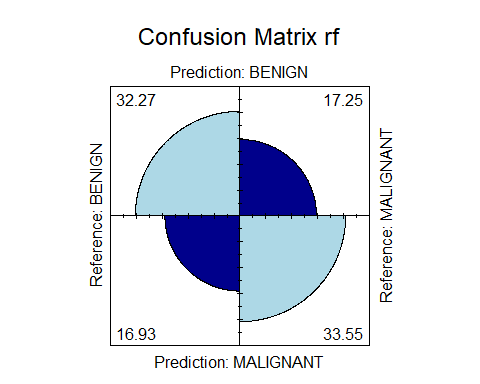
## [1] 0.6169336

Display info about rf model after 10-fold validation:

##   
## Call:  
## randomForest(x = x, y = y, mtry = param$mtry)   
## Type of random forest: classification  
## Number of trees: 500  
## No. of variables tried at each split: 2  
##   
## OOB estimate of error rate: 32.57%  
## Confusion matrix:  
## BENIGN MALIGNANT class.error  
## BENIGN 434 211 0.3271318  
## MALIGNANT 216 450 0.3243243

## [1] 0.7059441 0.7132032 0.6955492 0.7725047 0.7270953 0.6146853 0.7891791  
## [8] 0.6659282 0.7570608 0.6976446 0.7317016 0.7383467 0.7066434 0.7460354  
## [15] 0.7141335 0.6882102 0.6965557 0.6270989 0.7124534 0.7074592 0.7090909  
## [22] 0.7053613 0.6669346 0.7999067 0.7503498 0.7406716 0.6692308 0.8010333  
## [29] 0.7392724 0.6819347 0.7621922 0.7891608 0.6547112 0.6835938 0.7950994  
## [36] 0.6694604 0.7268065 0.7430540 0.6909981 0.7020756 0.7099885 0.7053405  
## [43] 0.7391504 0.7028918 0.7393939 0.7138921 0.6442397 0.6473881 0.7164179  
## [50] 0.6564103 0.6967366 0.7498278 0.7051073 0.7439631 0.6644087 0.7481061  
## [57] 0.6715270 0.7121212 0.7611888 0.6027285 0.7212121 0.6988636 0.7094145  
## [64] 0.7969934 0.7086108 0.7225979 0.7247086 0.7772675 0.7001657 0.7475316  
## [71] 0.7107008 0.7593284 0.6554338 0.6321678 0.6624709 0.7672790 0.7205511  
## [78] 0.7350172 0.6794543 0.7636051 0.7539627 0.7686567 0.6638258 0.7105824  
## [85] 0.6447062 0.7482204 0.6961538 0.6522254 0.7560634 0.6433069 0.6994172  
## [92] 0.7818330 0.7454524 0.6983902 0.6744403 0.6961287 0.7804338 0.6646853  
## [99] 0.7398393 0.7175660

## Cross-Validated (10 fold, repeated 10 times) Confusion Matrix   
##   
## (entries are percentual average cell counts across resamples)  
##   
## Reference  
## Prediction BENIGN MALIGNANT  
## BENIGN 32.3 17.3  
## MALIGNANT 16.9 33.5  
##   
## Accuracy (average) : 0.6581

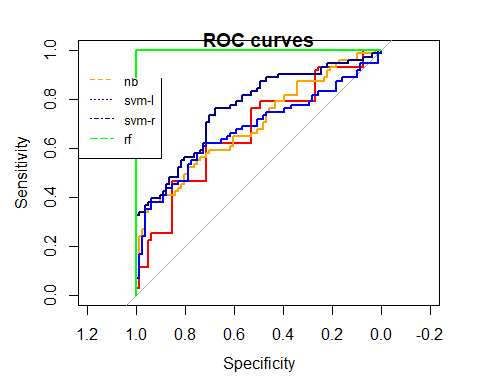


## [1] 0.6603604

## [1] 0.655814

## [1] 0.6581236

|  |  |
| --- | --- |
| Specificity | 0.6603604 |
| Sensitivity | 0.655814 |
| Accuracy | 0.6581236 |

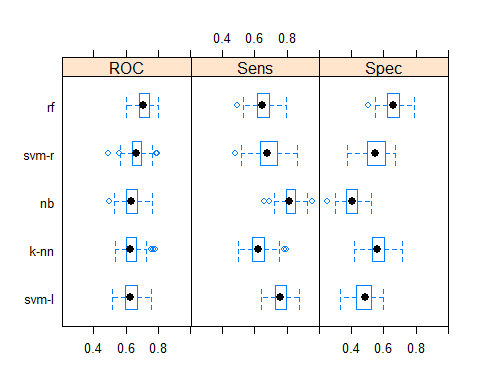
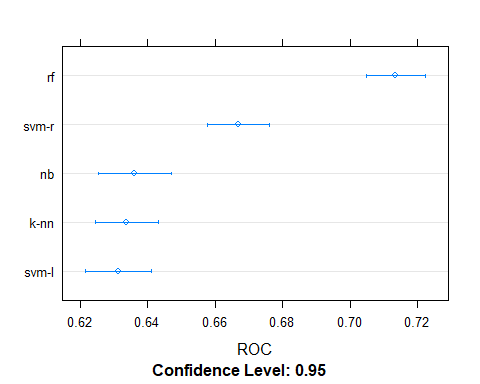
Let us display ROC curves for the all created ML methods: 

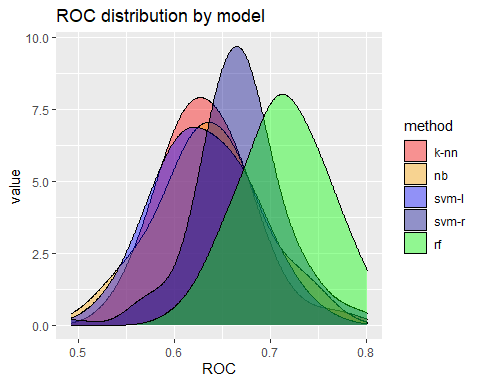
Compare ROC values of all models:

## Resample k-nn~ROC k-nn~Sens k-nn~Spec nb~ROC nb~Sens nb~Spec  
## 1 Fold01.Rep01 0.6605644 0.7500000 0.4776119 0.6709422 0.8593750 0.3731343  
## 2 Fold01.Rep02 0.7206157 0.6562500 0.6417910 0.7326259 0.8593750 0.4477612  
## 3 Fold01.Rep03 0.6046620 0.5076923 0.5909091 0.6659674 0.8153846 0.4393939  
## 4 Fold01.Rep04 0.6286713 0.6307692 0.6363636 0.6874126 0.8769231 0.4848485  
## 5 Fold01.Rep05 0.6455798 0.6461538 0.5522388 0.6833525 0.8461538 0.3880597  
## 6 Fold01.Rep06 0.6355350 0.6406250 0.5757576 0.6304451 0.8281250 0.3636364  
## 7 Fold01.Rep07 0.5775058 0.5846154 0.5303030 0.5652681 0.7692308 0.3484848  
## 8 Fold01.Rep08 0.6275058 0.6307692 0.5909091 0.6540793 0.8153846 0.4848485  
## 9 Fold01.Rep09 0.6876457 0.7230769 0.5909091 0.7139860 0.8769231 0.4696970  
## 10 Fold01.Rep10 0.6332860 0.7187500 0.5606061 0.5491241 0.8281250 0.3333333  
## 11 Fold02.Rep01 0.5957520 0.6153846 0.5373134 0.5352468 0.7846154 0.3283582  
## 12 Fold02.Rep02 0.6723414 0.6093750 0.6417910 0.6991604 0.8437500 0.4179104  
## 13 Fold02.Rep03 0.7826493 0.7968750 0.6716418 0.7329757 0.9531250 0.4776119  
## 14 Fold02.Rep04 0.5754025 0.6406250 0.5000000 0.5688920 0.8125000 0.3787879  
## 15 Fold02.Rep05 0.6309468 0.7031250 0.4776119 0.6275653 0.9062500 0.3731343  
## 16 Fold02.Rep06 0.6019176 0.7031250 0.5000000 0.6460701 0.8593750 0.4393939  
## 17 Fold02.Rep07 0.7277462 0.7031250 0.6515152 0.6732955 0.8125000 0.4545455  
## 18 Fold02.Rep08 0.5942235 0.5625000 0.5606061 0.6813447 0.8437500 0.4242424  
## 19 Fold02.Rep09 0.6165956 0.6093750 0.5303030 0.6065341 0.8125000 0.3484848  
## 20 Fold02.Rep10 0.5903263 0.6769231 0.4848485 0.5631702 0.8769231 0.3181818  
## 21 Fold03.Rep01 0.6094406 0.5692308 0.5606061 0.6118881 0.8615385 0.4393939  
## 22 Fold03.Rep02 0.6142365 0.6307692 0.6268657 0.6546498 0.8153846 0.4776119  
## 23 Fold03.Rep03 0.6048220 0.7538462 0.4925373 0.5935706 0.8461538 0.3283582  
## 24 Fold03.Rep04 0.6435132 0.6000000 0.5522388 0.6702641 0.8153846 0.4477612  
## 25 Fold03.Rep05 0.5645989 0.5781250 0.5373134 0.6163713 0.8437500 0.3582090  
## 26 Fold03.Rep06 0.6343823 0.5846154 0.5606061 0.6030303 0.8000000 0.4090909  
## 27 Fold03.Rep07 0.6476690 0.6461538 0.5454545 0.6456876 0.8307692 0.3939394  
## 28 Fold03.Rep08 0.6742071 0.5937500 0.7164179 0.6175373 0.7968750 0.4179104  
## 29 Fold03.Rep09 0.5820513 0.5692308 0.4848485 0.5310023 0.7846154 0.3333333  
## 30 Fold03.Rep10 0.6636051 0.5846154 0.6567164 0.6748565 0.8923077 0.4626866  
## 31 Fold04.Rep01 0.6230177 0.6250000 0.5223881 0.6977612 0.8906250 0.4029851  
## 32 Fold04.Rep02 0.6216783 0.6615385 0.5606061 0.5601399 0.7538462 0.3333333  
## 33 Fold04.Rep03 0.6019814 0.6000000 0.5606061 0.6214452 0.8000000 0.4090909  
## 34 Fold04.Rep04 0.5625000 0.5000000 0.5970149 0.5594683 0.6562500 0.3582090  
## 35 Fold04.Rep05 0.5798368 0.5692308 0.5303030 0.5913753 0.7846154 0.3939394  
## 36 Fold04.Rep06 0.6280317 0.6406250 0.5373134 0.6462220 0.8593750 0.3880597  
## 37 Fold04.Rep07 0.6360505 0.7230769 0.4328358 0.5260620 0.8461538 0.2537313  
## 38 Fold04.Rep08 0.6026406 0.6000000 0.5373134 0.6075775 0.8307692 0.3880597  
## 39 Fold04.Rep09 0.5569030 0.5781250 0.5373134 0.5345149 0.7500000 0.3283582  
## 40 Fold04.Rep10 0.6853042 0.7076923 0.5970149 0.6298507 0.8153846 0.4029851  
## 41 Fold05.Rep01 0.6783217 0.6153846 0.6363636 0.6941725 0.8461538 0.4696970  
## 42 Fold05.Rep02 0.6383759 0.6093750 0.5454545 0.6588542 0.7656250 0.5000000  
## 43 Fold05.Rep03 0.5345644 0.5000000 0.5757576 0.5830966 0.7500000 0.3484848  
## 44 Fold05.Rep04 0.5987371 0.6307692 0.5820896 0.6397245 0.8461538 0.3880597  
## 45 Fold05.Rep05 0.6549674 0.5625000 0.6417910 0.6884328 0.8281250 0.4925373  
## 46 Fold05.Rep06 0.6667049 0.5538462 0.6865672 0.6254879 0.7692308 0.4925373  
## 47 Fold05.Rep07 0.5677472 0.6093750 0.5223881 0.6184701 0.7812500 0.4179104  
## 48 Fold05.Rep08 0.6180253 0.6923077 0.4776119 0.6456946 0.8307692 0.4328358  
## 49 Fold05.Rep09 0.6669776 0.6718750 0.5820896 0.6054104 0.7812500 0.3880597  
## 50 Fold05.Rep10 0.6067708 0.6406250 0.5757576 0.5847538 0.7812500 0.3636364  
## 51 Fold06.Rep01 0.6735322 0.6718750 0.6060606 0.5849905 0.8125000 0.3333333  
## 52 Fold06.Rep02 0.5736597 0.6307692 0.4848485 0.4995338 0.7230769 0.3787879  
## 53 Fold06.Rep03 0.6898967 0.6923077 0.5671642 0.6479908 0.8153846 0.4776119  
## 54 Fold06.Rep04 0.6427239 0.7500000 0.4925373 0.6133396 0.8125000 0.3582090  
## 55 Fold06.Rep05 0.7103456 0.6250000 0.6363636 0.7388731 0.8750000 0.4393939  
## 56 Fold06.Rep06 0.6424799 0.6153846 0.5074627 0.6564868 0.8615385 0.3283582  
## 57 Fold06.Rep07 0.6584386 0.7384615 0.5373134 0.6199770 0.8307692 0.3432836  
## 58 Fold06.Rep08 0.6161381 0.7812500 0.4179104 0.6194030 0.9062500 0.3432836  
## 59 Fold06.Rep09 0.6431903 0.5781250 0.5820896 0.6723414 0.8437500 0.4179104  
## 60 Fold06.Rep10 0.6931114 0.6307692 0.6716418 0.7233065 0.8923077 0.4776119  
## 61 Fold07.Rep01 0.6819030 0.5937500 0.5820896 0.6483209 0.7968750 0.5223881  
## 62 Fold07.Rep02 0.6832377 0.6000000 0.6716418 0.6808266 0.8461538 0.3731343  
## 63 Fold07.Rep03 0.5966651 0.5781250 0.5223881 0.6359608 0.7656250 0.3731343  
## 64 Fold07.Rep04 0.6833022 0.7031250 0.5373134 0.6613806 0.8593750 0.4179104  
## 65 Fold07.Rep05 0.6350816 0.5846154 0.6212121 0.5554779 0.7692308 0.3939394  
## 66 Fold07.Rep06 0.6512360 0.6250000 0.6119403 0.6319963 0.7656250 0.3731343  
## 67 Fold07.Rep07 0.5993470 0.5468750 0.5970149 0.7255131 0.8750000 0.4776119  
## 68 Fold07.Rep08 0.6290246 0.5781250 0.6060606 0.6683239 0.7656250 0.3939394  
## 69 Fold07.Rep09 0.6281286 0.6153846 0.5671642 0.6654420 0.8307692 0.3731343  
## 70 Fold07.Rep10 0.5940998 0.6093750 0.5671642 0.6243004 0.7968750 0.4029851  
## 71 Fold08.Rep01 0.6028451 0.5468750 0.5970149 0.6286147 0.8281250 0.2985075  
## 72 Fold08.Rep02 0.7074627 0.7384615 0.5970149 0.7487945 0.9230769 0.4179104  
## 73 Fold08.Rep03 0.5715951 0.7031250 0.4925373 0.6121735 0.7968750 0.3432836  
## 74 Fold08.Rep04 0.6531469 0.6461538 0.5454545 0.6613054 0.8769231 0.3939394  
## 75 Fold08.Rep05 0.6610723 0.5538462 0.6363636 0.6484848 0.8000000 0.4696970  
## 76 Fold08.Rep06 0.6360505 0.6153846 0.5671642 0.6078071 0.8153846 0.4029851  
## 77 Fold08.Rep07 0.6722158 0.6461538 0.6567164 0.7524684 0.8923077 0.4328358  
## 78 Fold08.Rep08 0.6499534 0.6250000 0.5522388 0.6150886 0.8125000 0.4179104  
## 79 Fold08.Rep09 0.6193182 0.5625000 0.6212121 0.6647727 0.8125000 0.4090909  
## 80 Fold08.Rep10 0.7547808 0.7500000 0.6417910 0.7628265 0.9218750 0.4925373  
## 81 Fold09.Rep01 0.6596737 0.6615385 0.5303030 0.6314685 0.8000000 0.4242424  
## 82 Fold09.Rep02 0.5741004 0.6562500 0.4848485 0.5958807 0.8437500 0.3939394  
## 83 Fold09.Rep03 0.6258741 0.6153846 0.5151515 0.5703963 0.8153846 0.4090909  
## 84 Fold09.Rep04 0.6879735 0.6406250 0.5909091 0.7208807 0.8750000 0.4848485  
## 85 Fold09.Rep05 0.6520522 0.6406250 0.5522388 0.6168377 0.7812500 0.4179104  
## 86 Fold09.Rep06 0.6629162 0.6461538 0.5970149 0.6808266 0.8769231 0.4477612  
## 87 Fold09.Rep07 0.6399254 0.5468750 0.6567164 0.6161381 0.8437500 0.4477612  
## 88 Fold09.Rep08 0.6660839 0.6461538 0.6212121 0.6673660 0.8461538 0.4696970  
## 89 Fold09.Rep09 0.5932262 0.5692308 0.5522388 0.6539610 0.7846154 0.4029851  
## 90 Fold09.Rep10 0.5981810 0.5625000 0.5373134 0.6483209 0.6875000 0.4328358  
## 91 Fold10.Rep01 0.6003444 0.6769231 0.5223881 0.6190586 0.7692308 0.4328358  
## 92 Fold10.Rep02 0.5370802 0.5625000 0.4477612 0.5363806 0.8125000 0.3283582  
## 93 Fold10.Rep03 0.6245336 0.5937500 0.5373134 0.6483209 0.8437500 0.4179104  
## 94 Fold10.Rep04 0.6041332 0.6153846 0.5522388 0.6312285 0.8000000 0.3731343  
## 95 Fold10.Rep05 0.6568312 0.6615385 0.6119403 0.5940299 0.8153846 0.3582090  
## 96 Fold10.Rep06 0.6131629 0.6562500 0.5151515 0.6602746 0.7968750 0.3939394  
## 97 Fold10.Rep07 0.6118608 0.6406250 0.5454545 0.5859375 0.7500000 0.4090909  
## 98 Fold10.Rep08 0.6086108 0.5230769 0.5820896 0.6208955 0.8307692 0.3283582  
## 99 Fold10.Rep09 0.7696900 0.7384615 0.6865672 0.7267509 0.9076923 0.5223881  
## 100 Fold10.Rep10 0.5525641 0.6153846 0.4848485 0.5862471 0.7538462 0.3939394  
## svm-l~ROC svm-l~Sens svm-l~Spec svm-r~ROC svm-r~Sens svm-r~Spec rf~ROC  
## 1 0.6683769 0.8125000 0.4925373 0.6581157 0.6718750 0.5522388 0.7460354  
## 2 0.7066231 0.7968750 0.5522388 0.7546642 0.8281250 0.5820896 0.7725047  
## 3 0.7051282 0.8153846 0.5151515 0.6769231 0.6307692 0.6212121 0.7090909  
## 4 0.6559441 0.7846154 0.5151515 0.6834499 0.6000000 0.6212121 0.6967366  
## 5 0.6594719 0.7692308 0.4776119 0.6753157 0.6307692 0.6268657 0.7099885  
## 6 0.5968277 0.7500000 0.3787879 0.6254735 0.7031250 0.4696970 0.7621922  
## 7 0.5745921 0.7230769 0.4090909 0.6279720 0.6461538 0.5151515 0.7212121  
## 8 0.6951049 0.7538462 0.5151515 0.6820513 0.6153846 0.6060606 0.6994172  
## 9 0.6680653 0.8000000 0.4848485 0.6916084 0.7230769 0.5303030 0.7539627  
## 10 0.6115057 0.7656250 0.4393939 0.6789773 0.7656250 0.5303030 0.7107008  
## 11 0.5588978 0.7384615 0.4029851 0.6190586 0.7230769 0.4925373 0.6965557  
## 12 0.6681437 0.8281250 0.5074627 0.7126866 0.6718750 0.5820896 0.7891791  
## 13 0.7583955 0.8750000 0.5820896 0.7961754 0.8437500 0.6567164 0.7999067  
## 14 0.5485322 0.7187500 0.4242424 0.6633523 0.7343750 0.4242424 0.7439631  
## 15 0.6023787 0.8437500 0.4477612 0.6644123 0.7812500 0.4776119 0.7028918  
## 16 0.6711648 0.7968750 0.4848485 0.6422822 0.6093750 0.5606061 0.6835938  
## 17 0.6576705 0.7656250 0.5454545 0.7286932 0.7500000 0.5303030 0.7969934  
## 18 0.6534091 0.7656250 0.5000000 0.6313920 0.7031250 0.5151515 0.6983902  
## 19 0.5916193 0.7343750 0.4090909 0.6399148 0.7187500 0.5000000 0.7105824  
## 20 0.5762238 0.8307692 0.3333333 0.6512821 0.6615385 0.5303030 0.6321678  
## 21 0.6421911 0.8153846 0.4696970 0.6881119 0.7692308 0.5303030 0.7074592  
## 22 0.6867968 0.7076923 0.5223881 0.6681975 0.6461538 0.6119403 0.7132032  
## 23 0.5653272 0.8000000 0.3880597 0.6247991 0.7846154 0.4776119 0.6692308  
## 24 0.6615385 0.7384615 0.5522388 0.6975890 0.7076923 0.5820896 0.6715270  
## 25 0.6464552 0.7500000 0.4328358 0.6576493 0.7500000 0.4776119 0.6442397  
## 26 0.5871795 0.8153846 0.4242424 0.7114219 0.7846154 0.5151515 0.7268065  
## 27 0.6554779 0.7692308 0.5000000 0.6986014 0.6307692 0.6363636 0.7247086  
## 28 0.6110075 0.7187500 0.4925373 0.6574160 0.7031250 0.5074627 0.7804338  
## 29 0.5223776 0.7230769 0.4090909 0.6326340 0.7692308 0.4393939 0.6961538  
## 30 0.7067738 0.8307692 0.5970149 0.7053961 0.7230769 0.6567164 0.7205511  
## 31 0.6753731 0.8281250 0.4925373 0.7252799 0.7343750 0.5373134 0.6976446  
## 32 0.5191142 0.6615385 0.3636364 0.5990676 0.6615385 0.4242424 0.7059441  
## 33 0.5988345 0.7538462 0.4696970 0.6552448 0.6769231 0.5606061 0.6819347  
## 34 0.5820896 0.6406250 0.4626866 0.5645989 0.5156250 0.5820896 0.6027285  
## 35 0.6116550 0.7384615 0.4545455 0.6668998 0.6615385 0.5303030 0.6564103  
## 36 0.6261660 0.7656250 0.4776119 0.6303638 0.7343750 0.4477612 0.7020756  
## 37 0.5547646 0.7538462 0.3582090 0.6500574 0.8307692 0.3731343 0.7475316  
## 38 0.6149254 0.7692308 0.4328358 0.6165327 0.6461538 0.5223881 0.7175660  
## 39 0.5872201 0.7031250 0.4029851 0.5606343 0.5625000 0.4776119 0.6433069  
## 40 0.6213548 0.6923077 0.4925373 0.6675086 0.6615385 0.5522388 0.7636051  
## 41 0.6808858 0.7384615 0.5303030 0.7020979 0.7692308 0.6060606 0.7066434  
## 42 0.6524621 0.7187500 0.5909091 0.7005208 0.6718750 0.6060606 0.6955492  
## 43 0.5660511 0.6406250 0.5151515 0.6304451 0.6093750 0.5454545 0.6547112  
## 44 0.5834673 0.7846154 0.4179104 0.6043628 0.7384615 0.4477612 0.6669346  
## 45 0.6788713 0.7187500 0.5820896 0.6588153 0.6093750 0.6417910 0.7051073  
## 46 0.6360505 0.6923077 0.5522388 0.6521240 0.6615385 0.5970149 0.7391504  
## 47 0.6154384 0.6875000 0.5074627 0.6770056 0.6562500 0.5223881 0.6554338  
## 48 0.6195178 0.7538462 0.5074627 0.6675086 0.6615385 0.5970149 0.7094145  
## 49 0.5909515 0.7031250 0.4179104 0.5888526 0.6093750 0.5671642 0.7454524  
## 50 0.5416667 0.7187500 0.4393939 0.5788352 0.6093750 0.4848485 0.6638258  
## 51 0.5939867 0.7656250 0.4393939 0.6747159 0.6718750 0.5909091 0.6882102  
## 52 0.5533800 0.6769231 0.3939394 0.4920746 0.4769231 0.4090909 0.6146853  
## 53 0.6110218 0.7692308 0.4776119 0.6399541 0.7538462 0.4477612 0.6694604  
## 54 0.5886194 0.7968750 0.3880597 0.6765392 0.7500000 0.4328358 0.7406716  
## 55 0.7019413 0.8437500 0.5454545 0.7438447 0.7500000 0.5454545 0.7481061  
## 56 0.6865672 0.8307692 0.4626866 0.6466131 0.6307692 0.5223881 0.7138921  
## 57 0.6204363 0.7846154 0.4179104 0.6766935 0.7384615 0.5820896 0.7672790  
## 58 0.6082090 0.7968750 0.4029851 0.6877332 0.8125000 0.4925373 0.7225979  
## 59 0.6765392 0.8125000 0.5671642 0.7070896 0.6875000 0.6716418 0.6961287  
## 60 0.6964409 0.8461538 0.5522388 0.6537313 0.5846154 0.6268657 0.7482204  
## 61 0.6515858 0.7343750 0.5373134 0.6639459 0.5781250 0.6417910 0.7124534  
## 62 0.6376579 0.8153846 0.4477612 0.6955224 0.6923077 0.6119403 0.7570608  
## 63 0.6177705 0.7031250 0.4925373 0.6448228 0.6875000 0.5373134 0.6909981  
## 64 0.6681437 0.7968750 0.4626866 0.6646455 0.8125000 0.4626866 0.7392724  
## 65 0.5738928 0.7384615 0.4090909 0.6400932 0.7076923 0.5000000 0.7611888  
## 66 0.5697295 0.6562500 0.5223881 0.6452892 0.6562500 0.4776119 0.7164179  
## 67 0.6958955 0.7812500 0.5820896 0.6392257 0.6093750 0.6417910 0.6794543  
## 68 0.6690341 0.7500000 0.4393939 0.6761364 0.7500000 0.5454545 0.7001657  
## 69 0.6211251 0.7846154 0.4925373 0.6769231 0.6769231 0.5671642 0.7398393  
## 70 0.6014459 0.7343750 0.4029851 0.6389925 0.6718750 0.5522388 0.7560634  
## 71 0.6007463 0.7656250 0.3880597 0.6436567 0.7812500 0.4029851 0.6659282  
## 72 0.6789897 0.8461538 0.5074627 0.6948335 0.8461538 0.5223881 0.7383467  
## 73 0.6359608 0.7500000 0.4179104 0.6690765 0.6718750 0.5373134 0.7053405  
## 74 0.6664336 0.8307692 0.5303030 0.7312354 0.7230769 0.6363636 0.7891608  
## 75 0.6463869 0.7076923 0.5303030 0.6624709 0.6000000 0.6515152 0.7053613  
## 76 0.6289323 0.7538462 0.4776119 0.6721010 0.6461538 0.6119403 0.7498278  
## 77 0.7143513 0.8153846 0.5074627 0.7501722 0.8615385 0.5522388 0.7686567  
## 78 0.6112407 0.7343750 0.5074627 0.7285448 0.7343750 0.6417910 0.7593284  
## 79 0.6747159 0.7812500 0.5454545 0.6690341 0.6093750 0.6515152 0.6988636  
## 80 0.7280784 0.8593750 0.5671642 0.7651586 0.8125000 0.6417910 0.7818330  
## 81 0.6470862 0.7076923 0.5151515 0.6571096 0.6000000 0.6060606 0.7317016  
## 82 0.6500947 0.7500000 0.5000000 0.6815814 0.5937500 0.6515152 0.7141335  
## 83 0.6240093 0.7384615 0.4545455 0.6317016 0.5692308 0.5757576 0.7393939  
## 84 0.7308239 0.7656250 0.5909091 0.6960227 0.6562500 0.6212121 0.7950994  
## 85 0.6103078 0.7500000 0.4925373 0.6415578 0.6718750 0.5522388 0.7503498  
## 86 0.6727899 0.8153846 0.4776119 0.7242250 0.7384615 0.5820896 0.6644087  
## 87 0.6149720 0.7656250 0.5223881 0.6522854 0.5312500 0.5671642 0.6447062  
## 88 0.6200466 0.7692308 0.5303030 0.6937063 0.6769231 0.5151515 0.6624709  
## 89 0.6326062 0.7384615 0.5223881 0.6766935 0.6461538 0.6268657 0.7086108  
## 90 0.6543843 0.6562500 0.5522388 0.6679104 0.5937500 0.6119403 0.6744403  
## 91 0.5995408 0.6923077 0.5074627 0.6617681 0.7076923 0.5074627 0.7270953  
## 92 0.5643657 0.7187500 0.4179104 0.5736940 0.6250000 0.4776119 0.6270989  
## 93 0.6177705 0.7656250 0.4477612 0.6632463 0.7187500 0.4626866 0.6473881  
## 94 0.6332951 0.7692308 0.4626866 0.6957520 0.6615385 0.6119403 0.7430540  
## 95 0.5850746 0.7538462 0.4328358 0.6831228 0.7692308 0.4029851 0.8010333  
## 96 0.6453598 0.7343750 0.5000000 0.7308239 0.7656250 0.5454545 0.7121212  
## 97 0.5991951 0.7500000 0.4545455 0.6335227 0.6406250 0.5151515 0.6522254  
## 98 0.6130884 0.7692308 0.4925373 0.6826636 0.7230769 0.5373134 0.7350172  
## 99 0.7336395 0.8307692 0.5522388 0.7901263 0.7384615 0.6268657 0.7772675  
## 100 0.5883450 0.6769231 0.4242424 0.6363636 0.7076923 0.4393939 0.6646853  
## rf~Sens rf~Spec  
## 1 0.6875000 0.6865672  
## 2 0.6562500 0.7014925  
## 3 0.5538462 0.6666667  
## 4 0.6153846 0.6969697  
## 5 0.6461538 0.6417910  
## 6 0.7343750 0.6969697  
## 7 0.7384615 0.6363636  
## 8 0.6153846 0.6515152  
## 9 0.7384615 0.6212121  
## 10 0.6875000 0.6515152  
## 11 0.6923077 0.6119403  
## 12 0.6406250 0.7910448  
## 13 0.7656250 0.6417910  
## 14 0.7812500 0.6212121  
## 15 0.6250000 0.6119403  
## 16 0.6406250 0.6969697  
## 17 0.7812500 0.6969697  
## 18 0.5468750 0.6818182  
## 19 0.6406250 0.6515152  
## 20 0.6153846 0.5909091  
## 21 0.6769231 0.6363636  
## 22 0.6153846 0.7164179  
## 23 0.7538462 0.5074627  
## 24 0.4923077 0.7014925  
## 25 0.6093750 0.5970149  
## 26 0.7076923 0.6212121  
## 27 0.6000000 0.6363636  
## 28 0.6562500 0.7014925  
## 29 0.6615385 0.6212121  
## 30 0.6307692 0.6567164  
## 31 0.6406250 0.6716418  
## 32 0.6615385 0.6818182  
## 33 0.5692308 0.6818182  
## 34 0.5312500 0.5820896  
## 35 0.6307692 0.5757576  
## 36 0.6875000 0.6865672  
## 37 0.7384615 0.6417910  
## 38 0.7076923 0.5820896  
## 39 0.6250000 0.6119403  
## 40 0.6615385 0.6865672  
## 41 0.6153846 0.6212121  
## 42 0.6093750 0.6060606  
## 43 0.5937500 0.6818182  
## 44 0.5692308 0.6268657  
## 45 0.6875000 0.7164179  
## 46 0.6461538 0.7313433  
## 47 0.5625000 0.6268657  
## 48 0.7076923 0.6716418  
## 49 0.7968750 0.6119403  
## 50 0.7031250 0.5909091  
## 51 0.6406250 0.6212121  
## 52 0.6000000 0.5606061  
## 53 0.6153846 0.5970149  
## 54 0.7031250 0.5970149  
## 55 0.6093750 0.6666667  
## 56 0.6461538 0.6567164  
## 57 0.6769231 0.6716418  
## 58 0.7656250 0.5970149  
## 59 0.5781250 0.7313433  
## 60 0.6307692 0.7611940  
## 61 0.6875000 0.6865672  
## 62 0.7076923 0.7014925  
## 63 0.6406250 0.6417910  
## 64 0.6875000 0.6567164  
## 65 0.6769231 0.7272727  
## 66 0.6562500 0.6417910  
## 67 0.6093750 0.6716418  
## 68 0.6562500 0.6666667  
## 69 0.6153846 0.7462687  
## 70 0.6875000 0.6865672  
## 71 0.6093750 0.6417910  
## 72 0.6615385 0.6716418  
## 73 0.6718750 0.6865672  
## 74 0.6461538 0.7727273  
## 75 0.5846154 0.7121212  
## 76 0.5846154 0.7761194  
## 77 0.6923077 0.7014925  
## 78 0.7656250 0.6119403  
## 79 0.6250000 0.6969697  
## 80 0.7187500 0.7462687  
## 81 0.6461538 0.6969697  
## 82 0.7500000 0.5454545  
## 83 0.6769231 0.6818182  
## 84 0.7500000 0.7121212  
## 85 0.6875000 0.6567164  
## 86 0.5692308 0.6268657  
## 87 0.5937500 0.6567164  
## 88 0.6615385 0.6363636  
## 89 0.6461538 0.6716418  
## 90 0.6093750 0.7014925  
## 91 0.6923077 0.6119403  
## 92 0.6250000 0.5970149  
## 93 0.5937500 0.5970149  
## 94 0.6307692 0.7164179  
## 95 0.7384615 0.7761194  
## 96 0.6562500 0.6666667  
## 97 0.5937500 0.6212121  
## 98 0.6153846 0.7761194  
## 99 0.7692308 0.6567164  
## 100 0.6769231 0.5909091

##   
## Call:  
## summary.resamples(object = res)  
##   
## Models: k-nn, nb, svm-l, svm-r, rf   
## Number of resamples: 100   
##   
## ROC   
## Min. 1st Qu. Median Mean 3rd Qu. Max. NA's  
## k-nn 0.5345644 0.6019654 0.6299857 0.6336994 0.6615332 0.7826493 0  
## nb 0.4995338 0.6062532 0.6317324 0.6361215 0.6688089 0.7628265 0  
## svm-l 0.5191142 0.5983328 0.6250877 0.6313611 0.6681437 0.7583955 0  
## svm-r 0.4920746 0.6411917 0.6672042 0.6668712 0.6921329 0.7961754 0  
## rf 0.6027285 0.6870561 0.7106416 0.7134846 0.7455982 0.8010333 0  
##   
## Sens   
## Min. 1st Qu. Median Mean 3rd Qu. Max. NA's  
## k-nn 0.5000000 0.5846154 0.6250000 0.6311587 0.6615385 0.7968750 0  
## nb 0.6562500 0.7968750 0.8153846 0.8229207 0.8494591 0.9531250 0  
## svm-l 0.6406250 0.7315505 0.7597356 0.7598101 0.7968750 0.8750000 0  
## svm-r 0.4769231 0.6381611 0.6769231 0.6888293 0.7384615 0.8615385 0  
## rf 0.4923077 0.6153846 0.6461538 0.6558558 0.6887019 0.7968750 0  
##   
## Spec   
## Min. 1st Qu. Median Mean 3rd Qu. Max. NA's  
## k-nn 0.4179104 0.5303030 0.5606061 0.5669380 0.6060606 0.7164179 0  
## nb 0.2537313 0.3707598 0.4029851 0.4048168 0.4393939 0.5223881 0  
## svm-l 0.3333333 0.4328358 0.4886929 0.4793917 0.5223881 0.5970149 0  
## svm-r 0.3731343 0.5000000 0.5454545 0.5472886 0.6075305 0.6716418 0  
## rf 0.5074627 0.6212121 0.6567164 0.6603121 0.6969697 0.7910448 0

Obtained results can be visualized:



Moreover, calculated ROC distributions should be visualized: 

### References

A. Karatzoglou, K. Hornik, A. Smola. 2019. *Package Kernlab*. <https://cran.r-project.org/web/packages/kernlab/kernlab.pdf>.

B. Ripley, W. Venables. 2020. *Package Class*. <https://cran.r-project.org/web/packages/class/class.pdf>.

C. Roever, K. Luebke, N. Raabe. 2020. *Package klaR*. <https://cran.r-project.org/web/packages/klaR/klaR.pdf>.

Kuhn, M. n.d. “Library Caret: Available Models.” <https://topepo.github.io/caret/available-models.html>.

L. Breiman, A. Liaw, A. Cutler. 2018. *Package randomRorest*. <https://cran.r-project.org/web/packages/randomForest/randomForest.pdf>.

M. Kuhn, S. Weston, J. Wing. 2020. *Package Caret*. <https://cran.r-project.org/web/packages/caret/caret.pdf>.

Murphy, K. P. 2012. *Machine Learning - a Probabilistic Perspective*. Adaptive Computation and Machine Learning Series. MIT Press.

R. Alizadehsani, M. Roshanzamir. 2019. “A Database for Using Machine Learning and Data Mining Techniques for Coronary Artery Disease Diagnosis.” *Scientific Data* 6 (227): 1–12. <https://doi.org/10.1002/andp.19053221004>.

R Core Team. 2019. *R: A Language and Environment for Statistical Computing*. Vienna, Austria: R Foundation for Statistical Computing. <https://www.R-project.org>.

R Documentation team. n.d. “R Documentation: Knn.” <https://www.rdocumentation.org/packages/class/versions/7.3-17/topics/knn>.

———. n.d. “R Documentation: Ksvm.” <https://www.rdocumentation.org/packages/kernlab/versions/0.9-29/topics/ksvm>.

———. n.d. “R Documentation: NaiveBayes.” <https://www.rdocumentation.org/packages/klaR/versions/0.6-15/topics/NaiveBayes>.

———. n.d. “R Documentation: RandomForest.” <https://www.rdocumentation.org/packages/randomForest/versions/4.6-14/topics/randomForest>.

———. n.d. “R Documentation: Train.” <https://www.rdocumentation.org/packages/caret/versions/4.47/topics/train>.