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 1311 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$CalcType <- as.numeric(all_dt$CalcType)
all_dt$CalcDistribution <- as.numeric(all_dt$CalcDistribution)
all_dt$Patology <- as.numeric(all_dt$Patology)

head(all_dt)

##    BrestDensity CalcType CalcDistribution Patology LesionVolume LesionArea
## 1:            2       19                1        1      95.4425    2.34285
## 2:            2       19                1        1      92.8025    2.29005
## 3:            4       11                1        1      97.5525    2.42505
## 4:            4       11                1        1      86.7525    2.16905
## 5:            4        1               10        1     608.0525   13.38705
## 6:            2       11                1        2     121.7725    2.96545
##    SphericalDisproportion Sphericity SurfaceToVolumeRatio
## 1:            0.002040456   490.0866           0.02454724
## 2:            0.002015944   496.0455           0.02467660
## 3:            0.002050132   487.7734           0.02485892
## 4:            0.001900044   526.3037           0.02500274
## 5:            0.003201888   312.3157           0.02201627
## 6:            0.001938515   515.8589           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

tibble(all_dt_ex)
```

```
## # A tibble: 1,311 x 9
##    BrestDensity CalcType CalcDistribution Patology LesionVolume LesionArea
##           <int> <fct>    <fct>            <fct>            <dbl>      <dbl>
## 1             2 PUNCTAT~ CLUSTERED        BENIGN            95.4       2.34
## 2             2 PUNCTAT~ CLUSTERED        BENIGN            92.8       2.29
## 3             4 PLEOMOR~ CLUSTERED        BENIGN            97.6       2.43
## 4             4 PLEOMOR~ CLUSTERED        BENIGN            86.8       2.17
## 5             4 AMORPHO~ SEGMENTAL        BENIGN           608.       13.4
## 6             2 PLEOMOR~ CLUSTERED        MALIGNA~         122.        2.97
## 7             2 PLEOMOR~ CLUSTERED        MALIGNA~         106.        2.63
## 8             1 AMORPHO~ CLUSTERED        BENIGN           191.        4.44
## 9             3 PLEOMOR~ CLUSTERED        MALIGNA~          56.6       1.47
## 10            1 PLEOMOR~ CLUSTERED        BENIGN            73.1       1.86
## # ... with 1,301 more rows, and 3 more variables: SphericalDisproportion
<dbl>,
## #   Sphericity <dbl>, SurfaceToVolumeRatio <dbl>
```

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

```
##         BrestDensity               CalcType      CalcDistribution
##                    0                      0                     0
##             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
```

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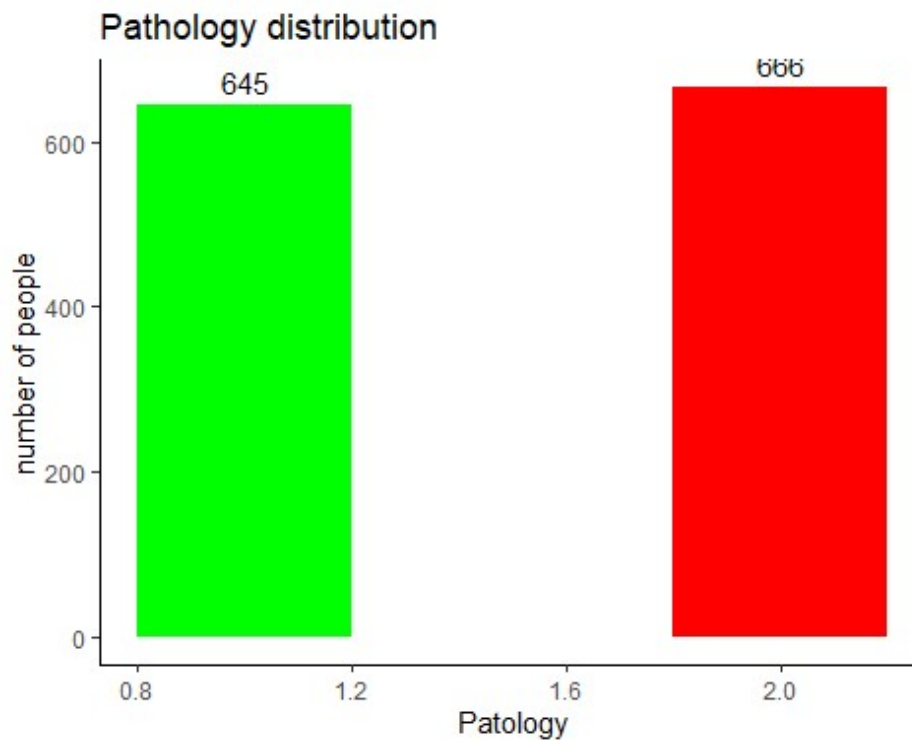
Corelation among variables in dataset is calculated and displayed on the following diagram.

```
##                        BrestDensity CalcType CalcDistribution Patology
## BrestDensity                 1.000    0.091            0.065   -0.034
## CalcType                     0.091    1.000           -0.076    0.009
## CalcDistribution             0.065   -0.076            1.000    0.162
## Patology                    -0.034    0.009            0.162    1.000
## LesionVolume                -0.070   -0.077            0.343    0.172
## LesionArea                  -0.058   -0.064            0.301    0.145
## SphericalDisproportion      -0.077   -0.156            0.484    0.208



## Sphericity                   0.093    0.196           -0.483   -0.184
## SurfaceToVolumeRatio         0.118    0.150           -0.312   -0.083
##                        LesionVolume LesionArea SphericalDisproportion
## BrestDensity                 -0.070     -0.058                 -0.077
## CalcType                     -0.077     -0.064                 -0.156
## CalcDistribution              0.343      0.301                  0.484
## Patology                      0.172      0.145                  0.208
## LesionVolume                  1.000      0.983                  0.861
## LesionArea                    0.983      1.000                  0.848
## SphericalDisproportion        0.861      0.848                  1.000
## Sphericity                   -0.543     -0.503                 -0.850
## SurfaceToVolumeRatio         -0.251     -0.189                 -0.485
##                        Sphericity SurfaceToVolumeRatio
```

```
## BrestDensity                 0.093              0.118
## CalcType                     0.196              0.150
## CalcDistribution            -0.483             -0.312
## 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
```
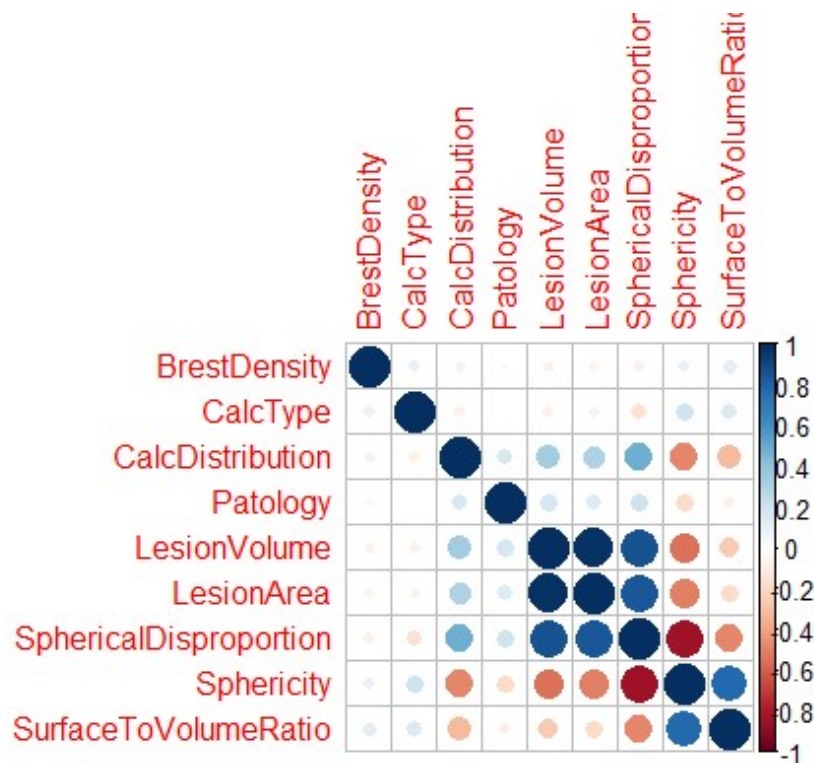

In this diagram, positive corelation is marked with different shades of blue, while negative correlation is marked with different shades of red. More intesive color indicate that correlation is higher.

Correlations of Patology [%]
Top 5 out of 8 variables (original & dummy)
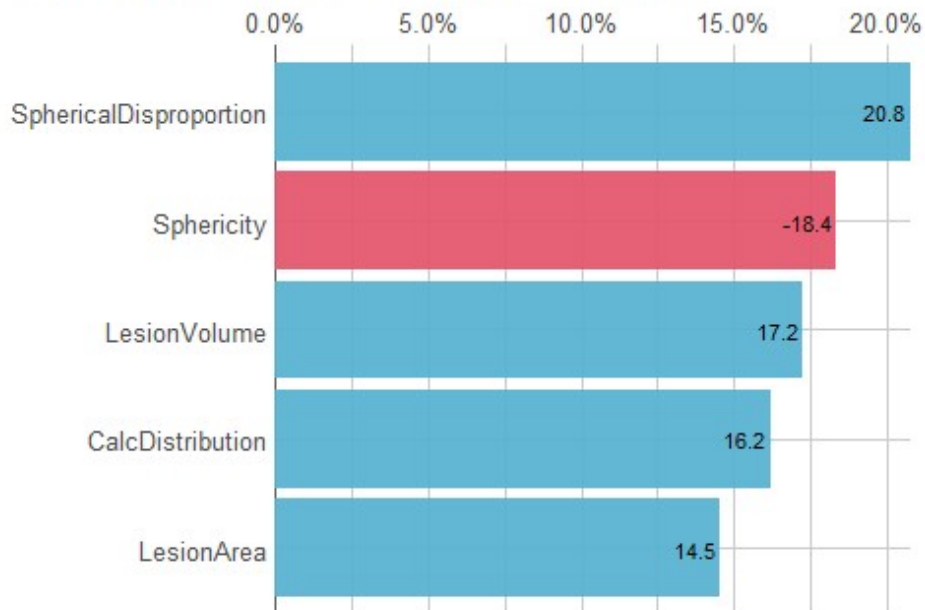
Models

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, 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, 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, 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, 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:

$$k(x_i, x_j) = e^{-\sigma|x_i - x_j|^2}$$

- Random Forest (**rf**), also described in (Murphy 2012, 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) 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.) in library 'class'(B. Ripley 2020) is used for k-nn model realization.

- Function 'NaiveBayes'(R Documentation team, n.d.) in library 'klaR'(C. Roever 2020) is used for nb model realization.

- Function 'ksvm' (R Documentation team, n.d.) in library 'kernlab'(A. Karatzoglou 2019) 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.) in library 'randomForest'(L. Breiman 2018) is used for rf model realization.

Last, but not the least, R function 'train' (R Documentation team, n.d.) in library 'caret' (M. Kuhn 2020) 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.).

Developed models are compared using k-fold validation (Murphy 2012, 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, 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 (TP)	False positive (FP)
Predicted class is $C2$	False negative (TN)	True negative (TN)

Cells in confusion matrix have the following meaning (R. Alizadehsani 2019): - 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. - TP is number of samples of class C1 which has been correctly classified. - TN is number of samples of class C2 which has been correctly classified. - FN is number of samples of class C1 which has been falsely classified as C2. - FP 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:

$$Specificity = \frac{TN}{TN + FP}$$

$$Sensitivity = \frac{TP}{TP + FN}$$

$$Accuracy = \frac{TP + TN}{TP + TN + FP + FN}$$

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 (TPR) and false positive rate (FPR).

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

$$TPR = \frac{TP}{TP + FN}$$

False Positive Rate (FPR) is defined as follows:

$$FPR = \frac{FP}{TN + FP}$$

An ROC curve plots TPR vs. FPR 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] 0.6331803 0.6374126 0.5873708 0.6985774 0.6374290 0.7316931
0.6724580
##   [8] 0.5504662 0.6178322 0.6105410 0.6889782 0.6326959 0.6729604
0.7019518
##  [15] 0.6955711 0.6778218 0.5801373 0.6712831 0.6161883 0.5573694
0.6244755
##  [22] 0.5650653 0.6275058 0.6552448 0.6153846 0.7817164 0.6359608
0.6640625
##  [29] 0.5979334 0.6703789 0.6820196 0.6118881 0.6774384 0.6284382
0.5105350
##  [36] 0.5867661 0.7001657 0.7324914 0.6300699 0.6011481 0.5852379
0.6288479
##  [43] 0.6117107 0.6041278 0.6466131 0.6793377 0.6020979 0.6497130
0.5903685
##  [50] 0.6142724 0.6406250 0.6066434 0.6245921 0.6470723 0.6473881
0.6289062
##  [57] 0.6758898 0.7026515 0.6344432 0.5870028 0.6167623 0.6190586
0.5979021
##  [64] 0.5891335 0.6613088 0.7676373 0.6022962 0.6468050 0.6779720
0.7779564
##  [71] 0.6364820 0.6087256 0.6253551 0.6670942 0.5670476 0.5775058
0.6243590
##  [78] 0.6529277 0.6678530 0.6063146 0.5865205 0.6575201 0.6837995
0.6967853
##  [85] 0.6210938 0.6239347 0.6255830 0.6842710 0.5686480 0.6102036
0.6373601
##  [92] 0.5722948 0.6486014 0.7602612 0.6444729 0.5872396 0.6126399
0.6691931
##  [99] 0.6562500 0.5770396

## Cross-Validated (10 fold, repeated 10 times) Confusion Matrix
##
## (entries are percentual average cell counts across resamples)
##
##            Reference
## Prediction  BENIGN MALIGNANT
##   BENIGN      29.8      20.7
##   MALIGNANT   19.4      30.1
##
##  Accuracy (average) : 0.5991
```

Confusion Matrix k-nn
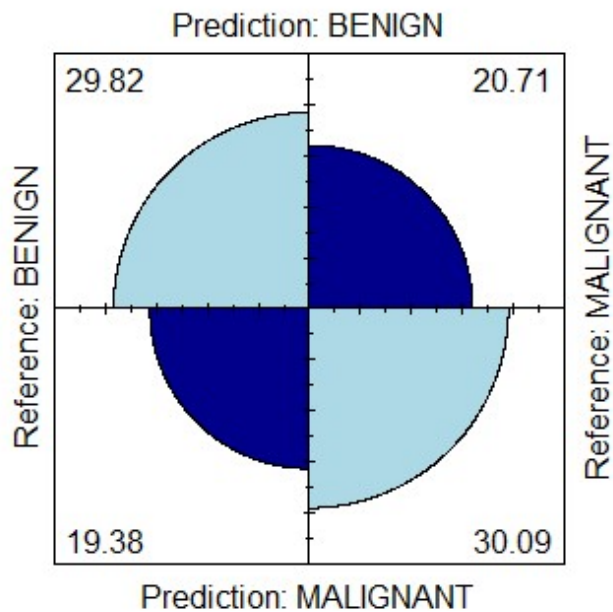

```
## [1] 0.5923423

## [1] 0.6060465

## [1] 0.5990847
```

Display info about nb model after 10-fold validation:

```
## $apriori
## grouping
##    BENIGN MALIGNANT
## 0.4919908 0.5080092
##
## $tables
## $tables$BrestDensity
## $tables$BrestDensity$BENIGN
##
## Call:
##  density.default(x = xx, adjust = ..1)
##
## Data: xx (645 obs.); Bandwidth 'bw' = 0.2325
##
##        x                 y
##  Min.   :0.3024   Min.   :0.001372
##  1st Qu.:1.4012   1st Qu.:0.084890
##  Median :2.5000   Median :0.162937
##  Mean   :2.5000   Mean   :0.227182
```

```
##   3rd Qu.:3.5988   3rd Qu.:0.390467
##   Max.   :4.6976   Max.   :0.539886
##
## $tables$BrestDensity$MALIGNANT
##
## Call:
##   density.default(x = xx, adjust = ..1)
##
## Data: xx (666 obs.); Bandwidth 'bw' = 0.2199
##
##        x                 y
##  Min.   :-0.6596   Min.   :0.0000614
##  1st Qu.: 0.6702   1st Qu.:0.0167508
##  Median : 2.0000   Median :0.1042738
##  Mean   : 2.0000   Mean   :0.1877535
##  3rd Qu.: 3.3298   3rd Qu.:0.3326793
##  Max.   : 4.6596   Max.   :0.6589046
##
##
## $tables$CalcType
## $tables$CalcType$BENIGN
##
## Call:
##   density.default(x = xx, adjust = ..1)
##
## Data: xx (645 obs.); Bandwidth 'bw' = 1.244
##
##        x                 y
##  Min.   :-2.732   Min.   :1.128e-05
##  1st Qu.: 4.884   1st Qu.:6.784e-03
##  Median :12.500   Median :1.257e-02
##  Mean   :12.500   Mean   :3.279e-02
##  3rd Qu.:20.116   3rd Qu.:3.870e-02
##  Max.   :27.732   Max.   :1.875e-01
##
## $tables$CalcType$MALIGNANT
##
## Call:
##   density.default(x = xx, adjust = ..1)
##
## Data: xx (666 obs.); Bandwidth 'bw' = 0.9605
##
##        x                 y
##  Min.   :-1.881   Min.   :7.030e-06
##  1st Qu.: 5.059   1st Qu.:3.228e-03
##  Median :12.000   Median :1.272e-02
##  Mean   :12.000   Mean   :3.598e-02
##  3rd Qu.:18.941   3rd Qu.:3.689e-02
##  Max.   :25.881   Max.   :2.702e-01
##
```

```
## 
## $tables$CalcDistribution
## $tables$CalcDistribution$BENIGN
## 
## Call:
##  density.default(x = xx, adjust = ..1)
## 
## Data: xx (645 obs.); Bandwidth 'bw' = 0.7613
## 
##        x                 y
##  Min.   :-1.284   Min.   :0.0006948
##  1st Qu.: 2.108   1st Qu.:0.0133741
##  Median : 5.500   Median :0.0227009
##  Mean   : 5.500   Mean   :0.0735447
##  3rd Qu.: 8.892   3rd Qu.:0.0608569
##  Max.   :12.284   Max.   :0.4136169
## 
## $tables$CalcDistribution$MALIGNANT
## 
## Call:
##  density.default(x = xx, adjust = ..1)
## 
## Data: xx (666 obs.); Bandwidth 'bw' = 0.732
## 
##        x                 y
##  Min.   :-1.196   Min.   :0.001085
##  1st Qu.: 2.152   1st Qu.:0.021150
##  Median : 5.500   Median :0.042757
##  Mean   : 5.500   Mean   :0.074524
##  3rd Qu.: 8.848   3rd Qu.:0.082770
##  Max.   :12.196   Max.   :0.334919
## 
## 
## $tables$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
##     BrestDensity CalcType CalcDistribution LesionVolume LesionArea
## X1             2       19                1      95.4425    2.34285
## X2             2       19                1      92.8025    2.29005
## X3             4       11                1      97.5525    2.42505
## X4             4       11                1      86.7525    2.16905
## X5             4        1               10     608.0525   13.38705
## X6             2       11                1     121.7725    2.96545
## X7             2       11                1     105.6125    2.63425
## X8             1        1                1     190.8025    4.44205
## X9             3       11                1      56.6325    1.47065
## X10            1       11                1      73.0525    1.85505
## X11            4       11                1      43.2725    1.16345
## X12            1        1                1     317.7125    7.18825
## X13            1       11                1      74.0525    1.88305
## X14            4        1               10    1378.8525   29.26705
## X15            4       11                1     642.7750   16.69150
## X16            4        1               10    1084.4325   23.23365
## X17            4       11                1     569.2225   12.49045
## X18            1       11                2    2328.0625   52.67125
## X19            1       11                2    1433.0125   33.12525
## X20            4       11                1     208.7125    4.83225
## X21            4       15                1      40.2025    1.10605
## X22            1       11                1      34.7025    1.03005
## X23            2       11                1     127.2025    3.07405
## X24            4       11               10    1049.4825   22.47965
## X25            2       11                1     174.4725    4.09145
## X26            4        7               10    1147.9825   25.28165
## X27            4       11                1     266.0525    6.05905
## X28            4        7               10    1197.4825   26.02365
## X29            4       11                1     277.4825    6.32765
## X30            3       11                1      48.9725    1.31745
## X31            3       11                1      94.3925    2.33785
## X32            2       11                1     221.0425    5.09485
## X33            2       11                1     152.7125    3.63225
## X34            4       11                1     233.6625    5.37125
## X35            3        1               10     897.6025   19.31405
## X36            3       12                1   17034.3125  560.50925
## X37            3       11                1   20386.0525  665.62205
## X38            3        1               10    1231.1575   47.29615
## X39            3        7                1     720.6050   15.70210
## X40            3        7                1     980.4925   20.99585
## X41            2       11                1    1038.3625   22.28925
## X42            4       11                1      71.3525    1.81405
## X43            2       11                1     465.9925   10.36185
## X44            2       10                5    1116.3125   24.14425
## X45            2       10                5    1441.7725   30.89345
## X46            3        1               10    1211.2400   29.46580
## X47            3        1               10    1119.1225   23.88045
```

```
## X48          4      11              1      108.9025     2.66805
## X49          3      11              1      169.2375     3.96275
## X50          3      11             10      530.9725    11.78145
## X51          3      11             10      908.4225    19.58645
## X52          4      13             10     1005.7550    21.78710
## X53          3      11              1     3519.5950    80.49590
## X54          2      11              1       47.0125     1.24625
## X55          3       1              1      357.1525     8.00905
## X56          4      15              1      501.9150    11.08030
## X57          3       1              1      539.7200    11.89240
## X58          3      11             10      201.7475     4.78595
## X59          3       7              5      219.5525     5.25105
## X60          3      16              1      340.0925     7.66785
## X61          3      11             10      251.4200     5.87540
## X62          3       7              5      143.1525     3.53005
## X63          3      11             10      408.4775     9.22655
## X64          3       1              5      141.6500     5.43700
## X65          3      11             10      418.8525     9.58405
## X66          3       1              5      298.6625    11.57325
## X67          2      11              1      389.9200     8.70440
## X68          2      11              1      664.5975    14.46995
## X69          4      11             10     4448.8525    92.21105
## X70          2       7              2       46.5625     1.24525
## X71          2       7              2       36.6025     1.02205
## X72          2      11              1      538.5150    11.95730
## X73          2      11              1      735.5150    15.98730
## X74          4      11              1       85.9250     2.23650
## X75          2      11              1      145.2625     3.48325
## X76          2       1              1      440.6125     9.78225
## X77          2       1              1      692.6525    15.02305
## X78          4       1              4      417.0225     9.33445
## X79          4      11              1      111.6925     2.80385
## X80          4      11              1      155.3125     3.72325
## X81          3      11              1      110.0325     2.69065
## X82          3      11              1      137.1125     3.28025
## X83          4      11              1       51.0025     1.35005
## X84          3      11              1      107.5325     2.64065
## X85          4       1              8     3730.1525    77.40505
## X86          4      11              1       50.4325     1.33865
## X87          3      11              1      104.7825     2.56965
## X88          3       1             10     1227.8500    26.27100
## X89          3       1             10     1029.9125    22.04825
## X90          4      11              1       54.5525     1.42905
## X91          4      11              1       54.6425     1.43085
## X92          3       7              5      130.8525     3.24305
## X93          3       7              5      148.5625     3.62125
## X94          4      19              1       49.3525     1.31705
## X95          2      11              1       42.3925     1.17785
## X96          4      15              1       46.0000     1.23400
## X97          2      11              1       34.7425     0.97685
```

```
## X98      3   11       5     60.4325    1.57865
## X99      3   11       5    122.9325    3.00465
## X100     2   19       1    227.9025    5.24005
## X101     4    1       1    304.2025    6.91805
## X102     4    1       1    316.7925    7.19385
## X103     2   19       1    722.3625   15.73725
## X104     3   22       1     30.9325    0.90065
## X105     3   16       1     38.1225    1.05245
## X106     2   11       1    300.8425    6.82685
## X107     4    7      10    284.6150    6.70230
## X108     2   11       1    266.7525    6.06505
## X109     3   11       1    105.5425    2.60085
## X110     3   11       1     94.6075    2.39715
## X111     2   11       1    139.2825    3.47565
## X112     4   11       1     58.2825    1.52465
## X113     2   11       1    145.2450    3.64890
## X114     4   11       1     53.5600    1.40720
## X115     2   11       1     55.2625    1.49925
## X116     4   11       1     90.9650    2.27030
## X117     2    1       1     78.8725    1.97145
## X118     4   11      10   1619.8925   34.24785
## X119     3   11       5    199.8825    4.76765
## X120     3   11       5    205.9825    4.88165
## X121     3   11       1    118.7525    2.91205
## X122     4   11      10   1144.4525   24.70705
## X123     4   11       1    373.5225    8.41645
## X124     4   11       1    222.6225    5.16645
## X125     2   11       1     85.2250    2.28450
## X126     2   15       1    591.7500   12.93200
## X127     2   11       1     95.8575    2.53315
## X128     2   15       1    506.4675   11.13935
## X129     4   15       1     59.6875    1.56275
## X130     3   11       1    135.9925    3.30585
## X131     3   11       1    190.4425    4.47485
## X132     4   15       1     52.7950    1.42490
## X133     4   11       1    381.5625    8.57725
## X134     3   11       1     42.1025    1.15605
## X135     4   11       1    844.1225   18.23545
## X136     4    1      10    540.4125   11.88225
## X137     3   11       1    174.0225    4.05845
## X138     3   11       1    313.7425    7.06885
## X139     4    1      10    770.9225   16.72445
## X140     3   11       1    176.6325    4.13465
## X141     3   11       1     83.4025    2.11005
## X142     3   11       1    163.1225    3.88845
## X143     3   11       1     85.2700    2.13940
## X144     4   11       1    474.7950   13.49990
## X145     4   11       1    326.1125    7.38025
## X146     3    7       5    121.4000    2.95600
## X147     3    7       5    168.3700    4.00240
```

```
## X148     3     11        1       41.5000     1.15100
## X149     2      7       10      333.7950     7.86590
## X150     2      7       10      378.9275     8.73455
## X151     4     11        1       82.4325     2.06665
## X152     4     11        1       26.3775     0.79955
## X153     3     11        1      375.6825     8.41965
## X154     4     11        1       59.9400     1.60080
## X155     3     11        1      576.2225    12.63045
## X156     1      1        1     2478.7900    51.84180
## X157     1      1        1     1426.6050    30.20710
## X158     3     15        1       23.6425     0.69885
## X159     3     11        1       25.2225     0.75445
## X160     4     11        5      243.7425     5.87685
## X161     2      7        1      963.6525    20.71505
## X162     2      7        1     1067.7325    22.89265
## X163     3     11        1      369.7925     8.26185
## X164     4     11        1       32.6875     0.91075
## X165     4     11        1       32.9700     0.93240
## X166     3     11        1      285.0025     6.53705
## X167     3     11        1      543.4400    12.07980
## X168     3     11        1       78.6125     1.99025
## X169     2     11        1      170.1825     4.00565
## X170     2     11        1      145.0725     3.47945
## X171     1     11        1       64.4250     1.64250
## X172     1     11        1      137.6925     3.27585
## X173     3      2        1      145.6525     3.49105
## X174     1     11        1      918.7025    19.90405
## X175     1     11        1      521.0125    11.67825
## X176     2     11        1       80.7025     2.03205
## X177     2      2        1       78.5025     1.98005
## X178     2      1        1      270.7075     6.14315
## X179     2     11        1       78.7125     1.98325
## X180     2      1        1      160.6825     3.81565
## X181     2     11        1      142.7725     3.41745
## X182     3     17        1      125.3825     3.05365
## X183     3     15       10      847.9225    18.30445
## X184     3     15       10      935.1825    20.09765
## X185     3      1        1      482.3725    10.65745
## X186     3     17        1       33.6025     0.95405
## X187     4      1        1      353.5825     8.07365
## X188     0     11        4     2473.6350    52.29870
## X189     4      1        1      317.6225     7.21045
## X190     0     11        4     2970.6850    64.88270
## X191     1     11        1      234.9525     5.45305
## X192     4     11        1      389.1125     8.80025
## X193     1     11        1      388.2825     8.66365
## X194     2      1        1      485.3925    10.73385
## X195     2      1       10      631.1625    13.80925
## X196     2     11        5      707.4825    15.49565
## X197     4      1        1       45.5125     1.21625
```

```
## X198            4    11          1     111.2725      2.74745
## X199            2    11          1      45.3025      1.22005
## X200            2    11          1      19.7525      0.60505
## X201            4    15          1      22.0525      0.66705
## X202            4    15          1      20.5325      0.61265
## X203            2    11          1     363.6425      8.14685
## X204            2    11          1     427.7600      9.48520
## X205            4    11          1      45.4300      1.21460
## X206            4    11          1      32.5850      0.92470
## X207            2    11          1     159.0725      3.79145
## X208            2    11          1     102.0525      2.53905
## X209            2    13          6    1499.1175     32.50335
## X210            2    13          6    1392.1125     30.02825
## X211            2    11         10    4060.4275     88.89455
## X212            2     7          5     230.8625      5.31925
## X213            2     7          5     742.7600     16.12920
## X214            2     1          1     390.9625      8.70125
## X215            2    11         10    3623.0725     75.26345
## X216            2     1          1     339.9975      7.64995
## X217            2     1          1     341.0125      7.66225
## X218            2     1          1     222.3825      5.12965
## X219            3     7          1     837.4675     18.05535
## X220            4     2          8    7028.7950    148.71290
## X221            4     2          8    6922.9100    144.61420
## X222            3     7          1    1361.5325     28.89665
## X223            2     1         10    4850.8575    114.64115
## X224            2     1         10    3096.8675     64.84235
## X225            3     7          5    2432.0825     50.94765
## X226            2    11          1     836.0325     18.00665
## X227            3     7          5    2038.8375     42.90275
## X228            2    11          1    1191.1875     25.40575
## X229            2     1          1     948.7175     20.36435
## X230            2    15          1     774.6275     16.74555
## X231            2     7          1    1860.8625     39.25925
## X232            4    15          1     362.1050      8.91010
## X233            2     7          1    3421.6975     71.08395
## X234            3    11          1     720.2725     15.61545
## X235            3    11          1     434.6225      9.64645
## X236            4    15          1     159.6575      4.62915
## X237            3     1          1     706.5525     15.32105
## X238            3     1          1     594.2825     13.03565
## X239            4    11          5     649.0925     14.15985
## X240            4    11          5     865.8025     18.68605
## X241            3    11          1     152.4725      3.73145
## X242            2    11          1    1442.7125     30.59225
## X243            2    11          1    1470.5525     31.17305
## X244            4    11         10     622.1925     13.57385
## X245            3    11          1      89.1925      2.27385
## X246            4    11          1     157.2725      3.73945
## X247            4    11          1     342.6925      7.77585
```

```
## X248          4      11              1       287.2925    6.57985
## X249          4      11              1       565.3625   12.39725
## X250          4      11              1        92.0725    2.29945
## X251          2      11              1       210.8125    4.88225
## X252          2      11              1       212.7225    4.90445
## X253          3      11              1       279.4025    6.34205
## X254          4      15              1        43.4425    1.18285
## X255          4      11              1      1055.0525   22.59905
## X256          3       1              1       239.2825    5.49165
## X257          4      15              1        39.2425    1.09885
## X258          4      11              1        22.5425    0.66885
## X259          3      11              1        92.4825    2.29965
## X260          3      11              1        68.1125    1.74825
## X261          4      11              1        43.0825    1.15965
## X262          3      11              1       173.3025    4.15605
## X263          3      11             10      1270.7225   27.15245
## X264          2       7              2        17.0825    0.53565
## X265          3      11              1       427.6225    9.50645
## X266          2       7              2        21.3625    0.63725
## X267          4      11              1       172.8525    4.06705
## X268          4      11              1       108.3725    2.66545
## X269          3      11              1       141.1225    3.37745
## X270          3       1              1       174.9225    4.09245
## X271          3       1              1       154.3625    3.64925
## X272          2      11              1       146.7225    3.51945
## X273          3      11              1       153.7625    3.67725
## X274          2      11              1       114.5925    2.81385
## X275          2      11              1       202.4500    4.70700
## X276          2      11              1       148.0125    3.53025
## X277          2      11              1       229.9325    5.29665
## X278          2      11              1       142.4125    3.47425
## X279          4      11              1        83.1925    2.08185
## X280          3      11             10       495.7650   11.33130
## X281          2      15              1       895.4550   19.50010
## X282          3      11             10       375.6325    8.58165
## X283          4       1              1        31.8775    0.90955
## X284          2      11              1       707.3975   15.65295
## X285          4       1              1        47.8150    1.26330
## X286          3      11              1       370.2725    8.28745
## X287          3      11              1       500.6825   11.04765
## X288          3      11              1      1161.8425   24.91885
## X289          3      11              1      1110.0300   30.28460
## X290          3      15              1       316.1225    7.16445
## X291          3      15              1       479.5725   10.58545
## X292          2      19              1        71.2225    1.81845
## X293          2      19              1        74.5325    1.87665
## X294          3      11              1       105.4425    2.60685
## X295          3      11              1        90.6625    2.23125
## X296          2       1              1       398.3425    8.86485
## X297          3      15              1       149.6600    3.64020
```

```
## X298      3      7             1      264.1625      6.05325
## X299      2      1             1      350.5600      7.86120
## X300      3     13             1       65.9725      1.70545
## X301      3     13             1       37.9625      1.04125
## X302      4      1            10     1249.4525     26.66305
## X303      4     11            10     1537.9025     32.72005
## X304      2      7             5       71.0750      1.89150
## X305      2      7             5       87.2725      2.19145
## X306      3     11             1      188.9425      4.46085
## X307      4     11             1      182.6225      4.37445
## X308      3     11             1      413.7225      9.41245
## X309      4     11             1      180.6825      4.34365
## X310      3      1             1      182.9925      4.27785
## X311      2      1             1      479.9325     10.56065
## X312      2      1             1      282.6225      6.43045
## X313      2     11             1       95.5525      2.38505
## X314      2     11             1      115.0125      2.84625
## X315      3      7             1      216.0650      5.01830
## X316      4     11             1      255.2225      5.83445
## X317      4     11             1      242.2125      5.59825
## X318      4     11             1       23.2025      0.67405
## X319      4     11             1       20.7425      0.62485
## X320      1     11            10     1294.6825     27.63965
## X321      1     11            10      703.0925     15.34485
## X322      3     11            10     2288.4625     49.27125
## X323      3     11             1      827.4825     17.89565
## X324      3      1             1      176.1725      4.13345
## X325      3     11             1      726.0925     15.72385
## X326      4     15             1       54.5225      1.44445
## X327      3     11             1      687.9525     14.98505
## X328      4     15             8     1374.3000     29.32700
## X329      4     15             1       66.9025      1.72405
## X330      3      1             1      203.6325      4.73865
## X331      4     15             8     1092.2725     23.46545
## X332      4     11             1       14.3025      0.46405
## X333      3     11             1      207.7825      4.80565
## X334      3     11             1      318.6125      7.17425
## X335      3     11             1      110.6825      2.73465
## X336      4     11            10      476.5125     10.53225
## X337      4     11            10      910.0925     19.77185
## X338      2     11             1      237.3100      5.49220
## X339      2     11             5      303.0150      7.04230
## X340      2     11             1       97.3925      2.40585
## X341      2      1             4     3741.0125     78.23725
## X342      2     11            10    16317.2550    345.66210
## X343      2     11            10    21004.7050    521.76910
## X344      3     11             1      109.3025      2.73205
## X345      2      1             4     5215.4425    107.79085
## X346      3     11             1      104.8425      2.57085
## X347      4     15            10      612.4325     13.74665
```

```
## X348      4    15      10     838.5025     18.21105
## X349      1     1       8    4967.6850    102.72870
## X350      1     1       8    4680.4800     96.62660
## X351      3    11       1      76.3950      1.97790
## X352      2    11       1      31.1025      0.88005
## X353      3    11       1     213.3825      4.92565
## X354      3    11       1     100.9825      2.49365
## X355      3    11       1      87.3925      2.18985
## X356      3    15       1     342.9550      8.61810
## X357      2    11      10     781.9325     17.02465
## X358      3    15      10     276.5950      7.16890
## X359      2    11      10     938.1625     20.57325
## X360      2    15       1     125.4425      3.08585
## X361      2    15       1     158.0825      3.74765
## X362      1    11       1      45.3025      1.25305
## X363      3    11       3     123.1025      2.96805
## X364      1    11       1      84.5025      2.14205
## X365      3    11       1     115.2475      2.81795
## X366      3    11       1      92.4525      2.27505
## X367      3    11       3     150.6100      3.55820
## X368      4    15       1     271.3525      6.19705
## X369      4    15       1     132.3525      3.20105
## X370      2    11       1      75.7025      1.95605
## X371      2    11       1     238.0825      5.46765
## X372      2     1       1     188.6925      4.37585
## X373      2    15      10    1263.2325     26.89065
## X374      2    11       1      66.3425      1.76885
## X375      2    15      10    1158.0600     24.82120
## X376      2    11       1     351.6575      7.97015
## X377      3    11       1     130.6525      3.13505
## X378      2    11       1     389.9500      8.71300
## X379      4    11      10     926.5725     20.06145
## X380      3    11       1     120.4025      2.91405
## X381      4    11       1      44.4825      1.20365
## X382      4    11      10     968.5025     22.78705
## X383      4    11      10     886.2400     19.84680
## X384      1    11       1     101.8400      2.53380
## X385      2     1      10     473.4725     10.55145
## X386      1    11       1     127.9650      3.12630
## X387      2     1      10    1233.8925     26.40785
## X388      4    11       1     185.7025      4.57205
## X389      4    11       1     265.0725      6.03945
## X390      4    11       1      17.1725      0.52945
## X391      4    11       1      74.2125      1.88625
## X392      4    11       1      70.8025      1.80205
## X393      4    11       1      31.0025      0.87805
## X394      2     1       1     291.4925      6.59985
## X395      3     2       1      55.0925      1.43985
## X396      3     1       1      48.8025      1.30605
## X397      2     1       1     253.6225      5.81845
```

```
## X398              2      20             1        131.7325     3.14065
## X399              1      11            10       1303.3875    27.70575
## X400              2      19             1        107.8825     2.61565
## X401              3       1             1        685.8125    14.95825
## X402              4      11             5       1037.0625    22.31925
## X403              1      11            10       1222.7475    26.01695
## X404              4      11             5        925.2600    20.04820
## X405              4      15             1        185.4725     4.32745
## X406              1      11             1         90.0325     2.21865
## X407              4      15             1        187.2700     4.38740
## X408              4      11             1        544.6825    11.98365
## X409              1      11             1        151.1325     3.57665
## X410              4      11            10       1678.1375    51.07775
## X411              4      11             1         68.2225     1.75845
## X412              4      11             1         53.4325     1.39865
## X413              2       7             1        318.1025     7.18005
## X414              2       7             1        233.4125     5.42225
## X415              3      11             5        182.7600     4.31420
## X416              3      11             5         90.4450     2.36090
## X417              1      11             1        436.7950     9.71390
## X418              2      15            10        968.8225    20.80245
## X419              1       7             1        201.2775     4.96555
## X420              3      15             1         17.8925     0.58385
## X421              4       1             1        507.7125    11.16425
## X422              4       1             1        421.9125     9.39225
## X423              3      15             1         49.9075     1.34315
## X424              3      11             5        130.9150     3.24030
## X425              2      20             1         60.4275     1.58555
## X426              3      11             1         89.4525     2.21505
## X427              3      11             5        119.0775     2.88855
## X428              3      11             1         97.1825     2.37765
## X429              3      11             1         52.0325     1.38665
## X430              3      11             1         50.8325     1.40165
## X431              1       5             1        283.8025     6.44605
## X432              1       5             1        233.4325     5.36665
## X433              4      11             1        689.2925    15.04385
## X434              4      11             8        278.9725     6.55745
## X435              2       7            10       1749.7025    37.19605
## X436              2       7             5        645.5125    14.25425
## X437              3      11             1        317.8225     7.19045
## X438              3       1             1        446.3925     9.89785
## X439              3      11             1        236.1425     5.43685
## X440              3       1             1        440.2825     9.74365
## X441              3       4             1        226.7525     5.22105
## X442              3       4             1        333.3775     7.48155
## X443              3      11             1         63.4725     1.62945
## X444              3      11             1         58.5425     1.52485
## X445              3      11             1         42.4225     1.15445
## X446              3      11             1         66.1025     1.69205
## X447              3      11             1         44.3825     1.20165
```

```
## X448          4    11          10     1813.7125      38.47625
## X449          4    11          10     1156.9125      24.76325
## X450          4    11           8     2308.4225      48.69045
## X451          4    11           8    21968.6250     542.19450
## X452          3    13           2      274.0025       6.24205
## X453          3    13           2      247.5525       5.67305
## X454          2    11          10     2012.6125      42.32525
## X455          1     1           8     3457.7700      72.36540
## X456          2    11          10     1692.5525      36.06905
## X457          1     1           8     2672.2725      56.15945
## X458          3    11           1      189.0275       4.40155
## X459          4    11           1      121.6625       2.96325
## X460          4    11           1      102.2925       2.55185
## X461          4    11           5       32.7900       0.93680
## X462          3    11          10     1131.2025      24.43405
## X463          3    11          10     1556.2325      32.92665
## X464          4    11           5       49.5400       1.38280
## X465          2    11           1      116.3425       2.82485
## X466          2    11           1      297.0825       6.77565
## X467          2    11           1      347.5125       7.77625
## X468          2    11           1       48.2925       1.30385
## X469          2    11           1      476.3500      10.52900
## X470          2    11           1      512.2325      11.29465
## X471          3    11           1       96.4125       2.41825
## X472          2    11           5       20.6675       0.62835
## X473          2    11           5       34.1875       0.95075
## X474          2    11           1       26.0325       0.75465
## X475          2    11           1       34.5925       0.95785
## X476          3     1           1     1523.6625      32.25125
## X477          3     1           1     1478.5825      31.38165
## X478          3    11           1        9.9025       0.35205
## X479          4    11           1       77.4925       1.95985
## X480          3    19           1      597.3525      13.61205
## X481          3    11           1        3.4225       0.16645
## X482          2    11           5      847.8525      18.49505
## X483          4    11           1      130.2800       3.11160
## X484          2    11           5      662.0825      14.57965
## X485          4    11           1      134.4825       3.23565
## X486          4    20           1      207.5825       4.84165
## X487          2    11           1       51.9125       1.37625
## X488          4    20           1      149.8425       3.55885
## X489          2    11           1       59.3225       1.54045
## X490          4    19           1      125.8725       3.02345
## X491          2    11           1       35.6325       0.98665
## X492          4    19           7      269.6225       6.12245
## X493          4     7           5       47.9775       1.30655
## X494          2     1           1      322.5125       7.26025
## X495          2     1           1      274.7900       6.38680
## X496          1     1           1     2928.1025      61.58805
## X497          2    11           1       40.7850       1.13070
```

```
## X498             1    1             1   3804.0225    79.11445
## X499             1   13             5    313.7125     7.42825
## X500             4   11             1     30.4825     0.88365
## X501             1   13             5    321.0725     7.59145
## X502             3   11            10   1813.5425    38.24085
## X503             4   11             1     26.8725     0.78745
## X504             4    1             1    227.0625     5.21525
## X505             4    1             1    322.4325     7.27465
## X506             1    1             1   1234.0625    26.31525
## X507             1   11             1     43.1525     1.16105
## X508             1   11             1   7798.7325   168.53765
## X509             1   11             1   5677.1300   119.62960
## X510             1   11             1    113.8525     2.78305
## X511             4   11             1     42.5125     1.14825
## X512             2   11             1    116.9600     3.78920
## X513             2   11             1    160.3650     4.83030
## X514             4   11             1     88.4925     2.19585
## X515             4   11             1    131.8525     3.21905
## X516             4   20             1     64.5025     1.69205
## X517             4   11             1    138.1650     3.42530
## X518             4   20             1     68.1125     1.75625
## X519             3    1             1    303.5925     6.85785
## X520             3    1             1    363.5100     8.15220
## X521             3   11            10    393.7925     8.90985
## X522             2    7            10   1666.5025    35.30805
## X523             3   11            10    393.1025     8.96005
## X524             2    7            10   1634.9725    34.70145
## X525             3   11            10    453.4450    10.09390
## X526             3   11            10    527.2025    11.90705
## X527             3   11             1    169.4425     3.98285
## X528             3    1            10   3298.2250    68.65750
## X529             3   11             1    120.2825     2.91165
## X530             3    1            10   2006.8825    42.67565
## X531             3    1            10    190.7075     4.44015
## X532             3    1            10    158.7275     3.74855
## X533             4   11             1    280.2125     6.42225
## X534             3   19             1    302.0725     6.85945
## X535             2   15            10    824.2325    17.94265
## X536             3   19             1    277.2875     6.31475
## X537             4    1             1    247.2225     5.69845
## X538             3   11            10   3256.3325    68.28065
## X539             3   11            10   4268.7525    88.87205
## X540             2   11             1    194.2025     4.55005
## X541             2   11             1    113.3975     2.77195
## X542             2   10             5    271.9325     6.17665
## X543             2    8             5    186.1525     4.37305
## X544             2    1             1    310.9825     7.02165
## X545             3   11             5    176.2875     4.15475
## X546             4   15            10    544.5025    12.03605
## X547             4   15            10    466.7225    10.37645
```

```
## X548              3    13            2     186.2025      4.35805
## X549              2     1            1     288.6125      6.52625
## X550              3    13            2     206.5925      4.78985
## X551              3    11            5      79.2600      2.14620
## X552              3    11            5      94.0975      2.47495
## X553              2     7            5     576.0675     12.69835
## X554              2     7            5     204.1025      4.82805
## X555              4    11            1    1305.4425     27.71085
## X556              3    11           10    1798.0250     46.17450
## X557              4    11            1    1404.7925     31.62785
## X558              3    11           10    1205.5925     26.79685
## X559              2    15            1     244.2125      5.60625
## X560              2    11            1     342.5150      7.68430
## X561              2    11            1     140.3025      3.34405
## X562              4    15            1     211.9825      4.92165
## X563              4    15            1     361.6000      8.17000
## X564              2    15            1     229.5425      5.28785
## X565              2    11            1     115.3625      2.78125
## X566              2    11            1     331.3125      7.46825
## X567              4    15            4    2679.9125     56.24025
## X568              4    15            4    2372.1625     49.70125
## X569              4    15            4    3021.0025     63.34205
## X570              4    15            4    3584.4700     76.12540
## X571              4    11            1      69.4625      1.78325
## X572              4    11           10    2593.0725     54.37545
## X573              4    11            1      62.4825      1.61165
## X574              3    11            1     186.3125      4.34425
## X575              4    11           10    1261.9225     27.21645
## X576              3    11            1     168.1825      3.97365
## X577              3    15            1     266.0325      7.05265
## X578              2    11            8    9912.6175    203.53935
## X579              3    15            1     297.7175      7.24535
## X580              3    11            1     286.6025      6.50205
## X581              2    11            8    6856.8125    152.40025
## X582              3    11            1     356.8100      7.99420
## X583              2    19            1      32.8525      0.91505
## X584              2    19            1      43.3325      1.17265
## X585              4    11            1     163.8725      3.85545
## X586              2    11            1     135.3225      3.31645
## X587              2    11            1     335.4725      7.67145
## X588              4    11            8    2648.7950     57.30690
## X589              4    11            1     117.6725      2.88345
## X590              4    11            8    3123.7575     68.60515
## X591              1    11            1     104.0625      2.77125
## X592              4    11            1      21.2625      0.64325
## X593              4    11            1      37.5425      1.04085
## X594              4    11            1     233.0150      5.45730
## X595              4    11            1     166.8650      4.01430
## X596              2     7            5     501.6325     11.64765
## X597              2    13            2     817.2525     18.33905
```

```
## X598    2    11     1      42.1325     1.14065
## X599    2    11     1      34.8225     0.96245
## X600    2    11     1      84.3525     2.15305
## X601    2    11     1      56.0925     1.50785
## X602    3    11     1     128.1700     3.08540
## X603    3    11     1     144.5525     3.45305
## X604    4    11     1      42.5325     1.16465
## X605    4    11     1     349.3525     7.84505
## X606    2    11     1     121.9725     2.95345
## X607    3    15     1     600.6625    13.12725
## X608    4    11     1      58.2225     1.51845
## X609    3    15     1      91.9425     2.28085
## X610    2    11     1      99.2725     2.44345
## X611    2    11     1     125.4825     3.03965
## X612    2     1     1     555.6100    12.17820
## X613    4    11     1      98.0150     2.41230
## X614    2     1     1     274.0925     6.22785
## X615    4    11     1     131.7150     3.17130
## X616    3    11     1      98.4625     2.45925
## X617    3     2     1      71.4725     1.82345
## X618    3    11     1     116.0525     2.83805
## X619    1    11     1    4090.2125    84.73325
## X620    2     1     1     153.7125     3.65225
## X621    3    11     1      68.2275     1.75155
## X622    1    11     1    7574.1450   155.36490
## X623    2     1     1     216.0625     5.01925
## X624    4     1    10     585.1900    12.94180
## X625    4     1    10     759.8175    16.53335
## X626    4    11     1      70.6575     1.81015
## X627    2     1     1    1104.1000    23.61200
## X628    4    11     1     116.7725     2.89745
## X629    4    11     1      29.4325     0.83065
## X630    3    11     4    5876.8825   120.99565
## X631    3    11     4    5737.8050   118.32810
## X632    2     1     1    1413.3100    41.09520
## X633    3    11     1      93.2325     2.30665
## X634    3    11     4    5482.7450   112.92790
## X635    3    11     4    6148.8525   126.87505
## X636    3    11     1      98.3125     2.41625
## X637    2    11     1     140.3525     3.33705
## X638    2    11     1     154.6525     3.68705
## X639    4    11    10     457.5075    10.87415
## X640    4    11    10     903.3200    20.07640
## X641    1    11     1      76.2950     1.93890
## X642    3     1     1     242.6625     5.58325
## X643    3    11     1     199.9300     4.69660
## X644    2    15     1      75.4225     1.90245
## X645    2    19     1      43.4225     1.17445
## X646    3     7     5      39.4225     1.09445
## X647    3     7     5      37.8225     1.06245
```

```
## X648          2      11              1      192.0725      4.50745
## X649          4      11              1       32.2425      0.97485
## X650          4      11              1       38.5325      1.07665
## X651          2      11              1      205.5825      4.80165
## X652          4       7              2       52.2125      1.38225
## X653          4      11              1       68.9275      1.85055
## X654          4       7              2       83.9325      2.10465
## X655          4      15              1       17.4425      0.55085
## X656          3      23              4       89.2000      2.51900
## X657          2      10              1      703.7400     15.37280
## X658          4      11              1       90.8650      2.30430
## X659          4      15              1       27.9725      0.80945
## X660          3      11              1      156.2700      3.68740
## X661          2      11              1       99.7725      2.46145
## X662          4      15              1       24.1775      0.71055
## X663          2      11              1       80.5225      2.06845
## X664          4      15              1       28.4650      0.82130
## X665          3      13             10     1225.4525     26.35105
## X666          2      11              1      149.2925      3.56385
## X667          3      13             10     1313.5525     28.24905
## X668          2      11              1       28.1225      0.82045
## X669          2      11              1      206.9925      4.86985
## X670          2      13              1       56.2625      1.47125
## X671          2      11              1       23.6825      0.69165
## X672          2       7              2      113.6725      2.77145
## X673          4      11              1       47.0825      1.23965
## X674          3      11              8     2826.1750     70.00550
## X675          2      11              1      555.9325     12.18465
## X676          2      11              1      468.1225     10.37245
## X677          3      11              8     4320.9575    105.86815
## X678          2      11              1       41.7825      1.14965
## X679          4      11              1      160.3125      3.79225
## X680          4      11              1      218.2725      5.14345
## X681          4      11              1      254.2525      5.82305
## X682          4      11              1      203.0125      4.88625
## X683          2      11              1       43.5425      1.17685
## X684          2      15              1       57.9625      1.50925
## X685          3      11              1      214.2625      4.95925
## X686          2      15              1       51.7325      1.39365
## X687          4      15              1       10.3525      0.36105
## X688          3      11              1      170.0225      4.00245
## X689          3       1              1     1376.4925     29.21985
## X690          3       1              1     1039.5325     22.25665
## X691          2      11              1      181.7225      4.24545
## X692          2      11              1      240.2625      5.51925
## X693          3      11              1      162.8325      3.90665
## X694          3      11              1       99.0025      2.46205
## X695          3      11              1      125.0525      3.02305
## X696          3      11              1      126.5275      3.16655
## X697          3      11             10     1542.3925     32.72185
```

```
## X698          3     1        1    134.7925      3.23385
## X699          3    11       10   1369.3825     29.22965
## X700          3     1        1    168.7700      5.19040
## X701          1    11        1    242.1725      5.55645
## X702          1    11        1    174.3600      4.08920
## X703          3    11        1     68.7525      1.76905
## X704          3    11        1     65.8725      1.70345
## X705          2     1        1    204.5125      4.75625
## X706          4    11        1    736.4925     16.07585
## X707          4    11        1    877.0125     18.95825
## X708          2    15        1    208.1425      4.90085
## X709          2    11        1    100.6150      2.47830
## X710          3    11        1     37.7025      1.04405
## X711          2    11        1     48.1025      1.31605
## X712          2     2        1     62.0125      1.59425
## X713          2    11        1     50.7325      1.37665
## X714          2    11        1   1011.6325     21.69865
## X715          2    11        1    113.6975      2.77395
## X716          2    11       10   1371.4625     29.20725
## X717          2    11        1    222.8700      5.19740
## X718          3    11        6     97.4775      2.55055
## X719          2    11        1    337.5325      7.72865
## X720          3    11        6    416.5725      9.86145
## X721          4     1       10    322.0725      7.24345
## X722          4     1        1    239.4825      5.50365
## X723          4     1       10    725.9925     15.84185
## X724          3    11       10   2482.6775     52.33555
## X725          3     2        1     97.2025      2.41805
## X726          3    11        1     66.5425      1.70085
## X727          3    11       10   1989.0400     42.03280
## X728          3    11       10    228.8825      5.33965
## X729          3    19        1     18.5125      0.56425
## X730          3    19        1     76.2200      1.94240
## X731          3     7       10   1604.8425     33.93885
## X732          3    11        5     44.1900      1.26580
## X733          3     7       10   1781.0225     37.55845
## X734          3     7        8   6072.5900    125.33680
## X735          3    11        5     37.4275      1.08055
## X736          4    11        5    298.3925      6.84185
## X737          3     7        8   6292.7275    134.76555
## X738          3    15        1    196.1025      4.64405
## X739          2    11        5    254.3650      6.07830
## X740          4     1        1    465.5400     12.28380
## X741          2    11        5    185.1650      4.46030
## X742          2     9        1    458.7675     10.12135
## X743          2     9        1    576.8175     12.63835
## X744          2     1        1    133.0825      3.20765
## X745          2     1        1    166.3325      3.91265
## X746          4    11        1     51.3075      1.35615
## X747          2    11        8     58.1425      1.51685
```

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## X748          3          11                   1          196.8925    4.61985
## X749          2          14                   9           51.3025    1.34005
## X750          4          11                   1           53.5825    1.43665
## X751          4          19                   1          331.4975    8.45695
## X752          4          19                   1          428.4475   10.84295
## X753          3          11                   1          198.6625    4.63125
## X754          2          11                   1          305.7625    6.92525
## X755          2          11                   5          217.7975    5.14495
## X756          2          11                   1          307.8825    6.97565
## X757          2          11                   5          122.2150    3.04430
## X758          2          11                   1           33.5125    0.96825
## X759          2          11                   1           30.7225    0.90445
## X760          4          11                   1           45.7325    1.22065
## X761          2          11                   1          190.5000    4.43600
## X762          2           1                   1           75.6725    1.96345
## X763          4          11                  10          706.5875   15.52475
## X764          4          11                   1           66.9925    1.70985
## X765          4          11                  10          779.6475   17.00895
## X766          4          15                   1           22.5925    0.66185
## X767          2          11                   1           58.4275    1.55055
## X768          1          11                   5          118.8625    2.90525
## X769          1          11                   5          197.5500    4.69500
## X770          4           2                  10         1692.8025   35.92205
## X771          4           2                  10         2803.5675   59.04135
## X772          3          11                   1           65.6525    1.75505
## X773          3          11                   1           41.7825    1.14965
## X774          3          11                   1          285.3425    6.46885
## X775          4           6                   1          157.3525    3.72505
## X776          4           6                   1          113.3425    2.75685
## X777          3           3                   1            4.4025    0.19405
## X778          3           3                   1           12.0425    0.40285
## X779          3          11                   2          564.8525   12.39505
## X780          2          11                   8         3044.0125   63.77825
## X781          3          11                   1          378.7025    8.45605
## X782          3          11                   1           61.3125    1.59625
## X783          3          15                   1          445.6825    9.88365
## X784          3          15                   1          402.7175    8.99235
## X785          3          11                   1           54.2925    1.43185
## X786          4          11                   1          316.1700    7.14640
## X787          4          11                   1          379.4425    8.57585
## X788          3           1                   7          923.4325   19.80665
## X789          3           1                   7         1059.9125   22.65625
## X790          2          11                   1           30.9825    0.87765
## X791          4          13                   8         2120.9850   44.87270
## X792          4          13                   8         1771.2300   40.00760
## X793          1          11                   1         1371.7425   29.34885
## X794          2          11                   1           66.1825    1.70165
## X795          2          22                   1           58.3125    1.52025
## X796          2          11                  10          718.2225   15.78245
## X797          4          11                   1           95.5950    2.35290
```

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## X798          1    11         1    1321.5325    28.29565
## X799          3    11         1      21.4625     0.63925
## X800          2    11        10     766.0575    17.25415
## X801          4    11         1      23.2200     0.71240
## X802          3    11         1      52.6150     1.40930
## X803          3    11         1      51.5025     1.38705
## X804          2    11        10    1835.5750    39.63350
## X805          3     7         1     562.1325    12.35265
## X806          1    11         1     192.4525     4.50705
## X807          1    11         1     306.5525     6.92505
## X808          3     7         1     756.5475    16.38895
## X809          4    11         1      25.8925     0.75185
## X810          4    11         1      29.9125     0.84025
## X811          2    11         1    1577.6525    33.90605
## X812          3    11         1     332.4825     7.63565
## X813          2    11         1    1701.5225    36.77445
## X814          3    11         1     280.6425     6.45485
## X815          3    15        10    1654.3625    35.32025
## X816          3    13         1     166.3225     4.13645
## X817          3    11        10     903.0125    20.27825
## X818          3    15        10    2059.9225    43.69645
## X819          4    24         8     417.5175     9.31335
## X820          4    24         8     683.8525    14.89505
## X821          3    11         2     102.9625     2.64525
## X822          2     7         5     638.3425    14.01685
## X823          2     7         5     694.0825    15.09965
## X824          2     7         5     481.2525    10.63505
## X825          2     7         5     681.1425    14.78585
## X826          2     7         5      38.2650     1.06730
## X827          2     7         5      29.5150     0.84230
## X828          3    11         1      46.1225     1.24445
## X829          3    11         1      46.8325     1.25065
## X830          3     1         1     267.2425     6.10685
## X831          3     1         1     177.4125     4.19025
## X832          4    11        10     175.2525     4.27505
## X833          4    11        10     393.8525     8.87905
## X834          3    11         2    1224.5425    26.22885
## X835          3    11         2    1296.1125    27.63625
## X836          2     1         1     325.8225     7.34245
## X837          2     7         5     137.4625     3.33525
## X838          2     7         5     145.5900     3.50580
## X839          4    11        10    2880.4225    60.12245
## X840          2     1         1     347.1125     7.76825
## X841          4    11        10    2536.3550    53.44410
## X842          4    11        10    1108.8025    23.77005
## X843          3    11         1     509.5425    11.16885
## X844          3    11         1     511.3100    12.21320
## X845          2    11         1     430.8225     9.60245
## X846          2    11         1     864.4625    18.65125
## X847          3     4         7      48.0225     1.29045
```

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## X848                1        7                1     145.4375      3.62475
## X849                2       15               10     545.5725     12.26545
## X850                2       15               10     577.8575     12.90315
## X851                2       11                1     230.5525      5.29305
## X852                4       11                1      54.9025      1.43505
## X853                2       11                1     332.0600      7.51520
## X854                3       11                1      33.5000      0.93300
## X855                3       11                1      40.2025      1.09505
## X856                4       11                1      59.6650      1.57530
## X857                4       11                1      58.4400      1.54280
## X858                4       11                1      53.1975      1.40295
## X859                4       11                1      31.6075      0.89515
## X860                4       11                1      58.7375      1.51975
## X861                4       11                1     302.7725      6.84945
## X862                4        1                1     299.0950      7.56090
## X863                4        1                1     417.3125      9.30025
## X864                4       11                1     192.5325      4.47665
## X865                3       11                8    1188.0800     26.13060
## X866                2       11                8    5640.0725    116.27545
## X867                2       11                8    5338.1725    110.44445
## X868                3       11                8    1357.6975     29.33895
## X869                4       11                1     201.1025      4.68805
## X870                4       19                1     131.4825      3.15965
## X871                4       11                1     197.9725      4.61745
## X872                4       19                1     116.7925      2.81785
## X873                2       13               10      13.4325      0.43865
## X874                2       11                1      33.6825      0.99465
## X875                2       11                1      81.3725      2.11745
## X876                2       11                1      86.0325      2.18665
## X877                2       13               10      10.3975      0.36095
## X878                2       11                1      78.6225      1.98245
## X879                3        1                1     445.2125      9.89825
## X880                3        1                1     426.4625      9.49925
## X881                3       11                1     130.4125      3.13025
## X882                3       11               10    1397.4325     30.02265
## X883                3       11               10    1406.1625     30.47725
## X884                3       11                1      57.8825      1.50365
## X885                3        7               10     433.4025      9.78205
## X886                2       11                1      64.0125      1.65025
## X887                3        7               10     650.2900     14.32180
## X888                2       11               10     311.1325      7.19965
## X889                3        6                1      50.0425      1.35485
## X890                3        6                1      77.7725      1.98145
## X891                2       11               10      48.4125      1.27925
## X892                2       11                1     396.9625      8.84525
## X893                4       11                1     253.7925      5.82085
## X894                2       11                1     472.5225     10.46845
## X895                4       11                1     218.6225      5.05445
## X896                2       11                1     202.3725      4.72945
## X897                2       11                1     381.1725      8.52945
```

```
## X898          3    1         1     326.0725      7.51545
## X899          1   11         1      77.8525      2.01505
## X900          1   11         1      73.9525      1.88105
## X901          3    1         1     414.5800      9.25360
## X902          2    1         8    3356.6025     70.17405
## X903          2    1         8    1125.7725     24.25345
## X904          4   11         1      77.1325      1.96065
## X905          1   21         7     204.1525      4.74105
## X906          4   11         1     119.3225      2.95645
## X907          1   11         1     160.6125      3.79025
## X908          3   20         1     534.1925     11.79785
## X909          3   20         1     409.1925      9.09785
## X910          1    7         2      19.1925      0.59385
## X911          3    2         1      56.7625      1.48925
## X912          1    7         2      10.9525      0.36505
## X913          3    2         1      59.6625      1.57125
## X914          4    1         1     221.4525      5.11905
## X915          4   11         1       8.1725      0.30145
## X916          4    1         1     310.8425      7.06685
## X917          4   11         1     106.4800      2.60560
## X918          2   11         1     173.1925      4.08985
## X919          4   11         1      10.2625      0.35125
## X920          4   11         1      58.9475      1.52795
## X921          2   11         1     247.2425      5.71485
## X922          2   11        10    3719.3325     77.30065
## X923          3   11         5     224.1200      5.21340
## X924          2   11         8    3421.2025     71.44905
## X925          2   11         8    3803.1925     79.16185
## X926          2   11        10    4983.5300    103.18460
## X927          4   11        10    5220.4900    108.47680
## X928          3   11         8   18575.2425    381.64585
## X929          3   11         8   17353.4150    363.35930
## X930          4   11        10    4229.8525     88.41905
## X931          3   11         1      65.7425      1.80485
## X932          4   11        10     504.3425     11.45585
## X933          3   11         1      75.6325      1.91465
## X934          4   11         1     226.2825      5.23865
## X935          3   11         5     983.6825     21.53165
## X936          4   11        10     676.4325     14.85865
## X937          4   11         1      42.8825      1.15565
## X938          3   11         5     957.2325     20.74665
## X939          1   11         1      62.4525      1.61105
## X940          4   11         1     157.3225      3.71645
## X941          1   11         1      52.0825      1.37965
## X942          2   11         1      74.6425      1.90285
## X943          2   11         1     113.5825      2.78565
## X944          1   13         1     560.1725     12.28545
## X945          4    1         1     220.3125      5.06425
## X946          4    1         1     265.7825      6.06965
## X947          4   11         1    1502.3650     35.26330
```

```
## X948          1    11          1    479.7525    10.59005
## X949          2    11          1     79.1125     2.00825
## X950          4    11          1   2125.1000    48.42900
## X951          2    11          1    124.6625     3.01525
## X952          3    11          1     66.9025     1.70005
## X953          3    11          1     68.9025     1.76405
## X954          2    11          1    154.4825     3.66765
## X955          2    11          1    201.3425     4.69285
## X956          2    11          1     28.6675     0.83035
## X957          2    11          1     44.2525     1.19905
## X958          4     1          1    240.2625     5.51925
## X959          4     1          1    181.7225     4.24545
## X960          3    11          5    136.8775     3.44455
## X961          3    11          5    250.1775     6.03555
## X962          3    11          1     30.3925     0.86585
## X963          3    11          1     28.6125     0.82225
## X964          4    11          1    402.8325     8.97065
## X965          4    11          1    439.8825     9.77565
## X966          3    11          1     80.3925     2.02585
## X967          3    11          1     46.8125     1.25825
## X968          3    11          1     77.5225     1.95245
## X969          3    11          1     74.5425     1.88485
## X970          1    11          1    278.6025     6.38205
## X971          1    11          1    187.8625     4.56725
## X972          1    11          1     84.7425     2.19285
## X973          1    20          1    636.6925    13.88785
## X974          1    20          1    820.4450    17.71490
## X975          2     7          5     75.9925     1.92985
## X976          2    13          8     95.2125     2.34625
## X977          2    13          8     57.8625     1.51125
## X978          4    11         10   1282.9025    27.51605
## X979          3    11          8   3021.7325    63.30865
## X980          4    11         10   1362.3725    29.31345
## X981          3    11          8   3480.4150    73.26230
## X982          2    11          1     25.3125     0.75625
## X983          4    11          1     65.8025     1.72305
## X984          3    15          1    395.4625     8.84725
## X985          2    11          1     40.2825     1.10265
## X986          3    19          1   1094.4025    23.41005
## X987          4    16          8   1474.7425    31.57685
## X988          4    16          8   1511.4025    32.02205
## X989          3    11          8   4892.6800   102.16160
## X990          4    16          8   1680.7275    36.76655
## X991          3    11          8   3755.1325    78.32865
## X992          2    11          1    228.4700     5.25940
## X993          4    11          1     21.1725     0.64945
## X994          2    11          1    147.1125     3.50425
## X995          2    11          1    108.7225     2.66445
## X996          2    11          1    128.8300     3.12260
## X997          3    11         10    695.3150    15.62330
```

```
## X998      3    11    10    623.9775    13.76655
## X999      4    11     1   3360.7075    69.85615
## X1000     3    11     1   1736.8375    36.64575
## X1001     3    11     1    939.5900    20.19780
## X1002     2    11     8   4492.5525    93.46105
## X1003     3    11     1    196.7900     4.64280
## X1004     3    11     1    187.5650     4.40330
## X1005     2    11     8   6617.7875   139.74175
## X1006     3    11     1    266.2025     6.08605
## X1007     3    11     1    261.3825     5.97365
## X1008     2     1     1    577.9025    12.61605
## X1009     2     1     1    285.8525     6.47905
## X1010     3     6     1     94.2925     2.32785
## X1011     3    19     1     65.9925     1.68985
## X1012     3    11     1     64.4625     1.65125
## X1013     3     6     1     84.5525     2.12505
## X1014     2     1     1    542.2525    11.92705
## X1015     4    16     8   2154.4425    45.28285
## X1016     4    16     8     84.1325     2.11665
## X1017     2     1     1    372.6925     8.35185
## X1018     4    11    10    601.5125    13.19225
## X1019     3    11     1      4.2225     0.19045
## X1020     2     1     1    427.2925     9.49185
## X1021     4    11    10    755.2425    16.37085
## X1022     3    11     1      4.5925     0.18985
## X1023     4    11     1     56.0175     1.49435
## X1024     2     1     1    451.5925     9.99485
## X1025     2     1     1    382.2225     8.53445
## X1026     2     1     1    380.8525     8.58705
## X1027     1    15     1    123.2625     2.97125
## X1028     1    15     1    152.0225     3.61845
## X1029     2     1     8   2238.0800    47.16360
## X1030     2     1     1   1009.2325    21.80265
## X1031     2     1     8   2119.2425    44.83485
## X1032     2     1     1    815.2425    17.81085
## X1033     2    11    10    428.7125     9.68125
## X1034     2    11    10    245.2825     5.69965
## X1035     2    11     5    662.8125    14.57025
## X1036     2    11     5    597.5025    13.16005
## X1037     3    11     1    159.7625     3.91725
## X1038     4    11     1     49.5925     1.32885
## X1039     3    11     1    179.0025     4.23005
## X1040     4    11     1     15.9425     0.50485
## X1041     1     1     1    305.5225     6.90445
## X1042     4     1    10   2557.2700    54.11440
## X1043     4     1    10   2490.4825    53.09165
## X1044     2    11     1    421.8525     9.35905
## X1045     2    11     1    440.9225     9.78845
## X1046     2    11    10   2521.7325    52.84465
## X1047     2    11    10   2902.1100    60.82020
```

```
## X1048        3      16           2       49.0825      1.33565
## X1049        3      16           1       84.5025      2.13205
## X1050        4      11           1       50.6025      1.33405
## X1051        4      11          10      241.2525      5.60205
## X1052        4      11          10      172.2625      4.18325
## X1053        4      11           1       85.0525      2.11905
## X1054        3      11           1       24.6425      0.71885
## X1055        4      15          10      665.3925     14.75785
## X1056        3      11           1       20.0525      0.61905
## X1057        2      15           5      173.0025      4.12605
## X1058        4      15          10      291.5225      6.75245
## X1059        2      15           5      221.6925      5.27585
## X1060        4      11           1      353.4425      7.97485
## X1061        3      11           5      171.6650      4.08530
## X1062        4       6           1      302.5425      6.85285
## X1063        3      11           5      147.7150      3.56630
## X1064        4       6           1      262.7325      5.99265
## X1065        4      11          10     1308.1975     31.00695
## X1066        3      11          10      587.8925     12.91985
## X1067        4      11           1       86.2725      2.16745
## X1068        4      15           5      173.7825      4.10965
## X1069        2      11           5      216.4225      5.34645
## X1070        4      15           5      212.4425      4.96285
## X1071        4      11           1       49.6150      1.32430
## X1072        2      11           5      184.6625      4.43125
## X1073        4      11           1       60.9350      1.57370
## X1074        3      11           1       34.3225      0.94445
## X1075        4      11           1       62.3200      1.60640
## X1076        4      11          10      691.5325     14.98465
## X1077        3      15           1       51.5925      1.36185
## X1078        4      11          10      824.8125     17.90625
## X1079        3      15           1       46.8625      1.24325
## X1080        3      11           5      319.7150      7.44130
## X1081        3      11           5      309.5900      7.24880
## X1082        4      11           1       49.1625      1.30525
## X1083        3      11           1       41.3525      1.13305
## X1084        4      11           1       36.3225      1.00045
## X1085        3      11           1       46.0525      1.24305
## X1086        4      11           1      307.9525      6.96905
## X1087        4      11          10      854.9775     21.13455
## X1088        4      11           1      525.2725     11.56345
## X1089        4      11          10      904.4725     19.46745
## X1090        2      11           2       89.9825      2.23365
## X1091        2      11           1      119.9025      2.89605
## X1092        3      11          10      492.4000     11.13500
## X1093        3      11          10      490.3025     10.82405
## X1094        4       7           5      655.4925     14.48785
## X1095        4       7           5      899.4825     19.43965
## X1096        4      11           1       47.2825      1.27565
## X1097        4      11           1      106.6025      2.67805
```

```
## X1098      4    11     1     35.9325     0.98465
## X1099      4    11     1     97.8325     2.45465
## X1100      3    15     1    273.2525     6.21105
## X1101      3    15     1    199.5625     4.63325
## X1102      4    11     1     25.6425     0.77085
## X1103      4    11     1     35.5725     0.98545
## X1104      3    15    10     63.3625     1.62925
## X1105      3    11    10    235.5425     5.44085
## X1106      4    11    10   1574.2050    33.54010
## X1107      2    11     1    110.7025     2.71605
## X1108      2    11    10   1259.1175    26.80335
## X1109      2    11    10   1242.2000    26.61600
## X1110      2    11     1    363.0450     8.11090
## X1111      2    11     1    196.1625     4.56525
## X1112      4    11     1    115.5625     2.80125
## X1113      4    11     1    343.8025     7.80605
## X1114      4    11     1    147.5925     3.49785
## X1115      3    11     1    191.5025     4.48805
## X1116      4     1     1    298.0425     6.81885
## X1117      3    11     1    142.2625     3.41525
## X1118      2    11    10   2352.1775    49.80555
## X1119      4    11     1    161.9400     3.81580
## X1120      4    11     1    178.4900     4.20180
## X1121      2    11     1    437.3725     9.67745
## X1122      2    11     1    585.2725    12.82745
## X1123      1    11     1    171.6125     4.05825
## X1124      1    11     1     93.5125     2.30425
## X1125      4    11    10   1187.7625    28.31925
## X1126      3    11     1    213.7625     5.04525
## X1127      3     7     6    545.3700    12.29140
## X1128      4    11    10    873.4575    19.90215
## X1129      3     7    10    684.5025    15.19505
## X1130      4    11     5    286.2100     6.70020
## X1131      4    11     5    236.9775     5.57655
## X1132      3    11     1     98.4150     2.46530
## X1133      3    11     1    275.2400     6.53680
## X1134      2    15     1    304.4325     6.93865
## X1135      2    15     1    178.4225     4.17845
## X1136      2    11     1     41.0025     1.12605
## X1137      2    11     1     44.3525     1.21705
## X1138      2     1     5   4059.3025    84.25205
## X1139      2     1     5   5617.2775   116.55355
## X1140      3     1     1    275.9825     6.25765
## X1141      3     7     5   1070.0825    22.79565
## X1142      3     1     1    380.0425     8.48685
## X1143      3     7     5   1053.1825    22.46565
## X1144      4    11     1    241.7375     5.50875
## X1145      4    11     1    159.5625     3.76525
## X1146      3     1     1   1341.1725    28.47745
## X1147      4    11     1    124.8725     3.00745
```

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## X1148          3      1             1     892.7625    19.20525
## X1149          4     11             1     621.0200    13.53740
## X1150          2      1             5     543.9925    12.10585
## X1151          2      1             5    1773.2725    37.33045
## X1152          2     18             1     452.5375    10.01675
## X1153          2     18             1     356.6175     7.97035
## X1154          3      7             1    1198.2175    25.47835
## X1155          3      7             1     844.6375    18.22675
## X1156          2      7             1    1054.7425    22.63285
## X1157          3     22             1     467.9675    10.36535
## X1158          3     22             1     516.3475    11.37695
## X1159          2      7             1     835.3175    18.05235
## X1160          2      7             1     438.0250     9.72650
## X1161          2      7             1     384.5425     8.55285
## X1162          3     18             1     731.2850    17.59270
## X1163          2     11             1     573.7975    12.52595
## X1164          3     18             1     752.7625    18.36125
## X1165          2     11             1     728.5475    15.77695
## X1166          2     22             1    2737.4275    57.06655
## X1167          2     22             1    1084.6275    23.16655
## X1168          2     11             1     519.4875    11.43575
## X1169          2     15             1     423.4775     9.36355
## X1170          2     11             1     526.2725    11.57445
## X1171          3     18             1     361.6675     8.05935
## X1172          2     15             1     607.6350    14.56970
## X1173          3     18             1     688.7200    16.45140
## X1174          3     15             1     303.2025     6.84105
## X1175          2     11             1    2219.5225    46.46445
## X1176          2     11             1    2497.3325    52.17665
## X1177          3     15             1     275.1475     6.26095
## X1178          2     11             1     747.3475    16.12895
## X1179          2     11             1     834.8175    17.99435
## X1180          3      1             1    1290.5025    27.41205
## X1181          3      1             1     749.3475    16.24495
## X1182          3      1             1    1168.2575    24.85115
## X1183          1      7             1    1255.0075    26.72215
## X1184          3     11             1     929.1075    20.00015
## X1185          3      1             1     866.1200    18.64440
## X1186          1      7             1     857.6750    20.88150
## X1187          2      1             1     809.0825    17.49965
## X1188          3     11             1     948.8675    20.43535
## X1189          3     11             1    1124.0025    24.09005
## X1190          2      1             1     603.7625    13.20525
## X1191          3     11             1     792.7925    17.11385
## X1192          2      7            10    2765.0925    57.72785
## X1193          2      7            10    1723.0225    36.32645
## X1194          3     22             1     274.7425     6.24085
## X1195          3     22             1     197.9825     4.58565
## X1196          3     11             8    7157.2900   149.23380
## X1197          1     11             5    6568.2425   134.81385
```

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## X1198    1    11     1    822.9325    17.84465
## X1199    1    11     5   5889.4725   121.58445
## X1200    3    11     8   9056.4425   185.20285
## X1201    2     1     1    704.2575    15.29915
## X1202    4    11    10    675.3925    14.88185
## X1203    2     1     1    786.3575    16.94515
## X1204    3     1    10   1622.0775    37.94955
## X1205    4    11    10   3198.8150    70.54630
## X1206    3     1    10   1505.8725    32.01145
## X1207    2    11     1    329.6625     7.41925
## X1208    1     7     1    784.0425    16.92685
## X1209    1     7     1    650.7350    15.29570
## X1210    2    11     1    525.4850    12.17370
## X1211    2     1    10   2518.4225    52.77445
## X1212    2     1    10   2780.4775    58.05555
## X1213    3     1    10   2321.8275    48.64655
## X1214    3     1    10   1198.1725    26.11545
## X1215    3     7     5   1481.6225    31.41445
## X1216    2     1    10   6678.0425   137.36685
## X1217    2     1    10   5092.4200   105.47840
## X1218    3     7     5    696.7925    15.28985
## X1219    3    16     1    284.3275     6.43655
## X1220    3    16     1    542.8275    11.91455
## X1221    2     2    10   3263.1175    67.95235
## X1222    2     2    10   7007.7875   144.05775
## X1223    2     1     1    565.1075    12.34015
## X1224    2     1     1    584.2525    13.59105
## X1225    1    11    10    544.5525    11.90505
## X1226    1    11    10    510.9375    11.20075
## X1227    4    11     5    649.0925    14.15985
## X1228    3     1     1    594.2825    13.03565
## X1229    3     1     1    706.5525    15.32105
## X1230    4    11     5    865.8025    18.68605
## X1231    3    11     1    152.4725     3.73145
## X1232    3    11     1     89.1925     2.27385
## X1233    2    11     1   1442.7125    30.59225
## X1234    2    11     1   1470.5525    31.17305
## X1235    4    11     1    157.2725     3.73945
## X1236    4    11     1     92.0725     2.29945
## X1237    4    11    10    622.1925    13.57385
## X1238    4    11     1    342.6925     7.77585
## X1239    4    11     1    287.2925     6.57985
## X1240    2    11     1    210.8125     4.88225
## X1241    2    11     1    212.7225     4.90445
## X1242    4    11     1   1055.0525    22.59905
## X1243    3    11     1    279.4025     6.34205
## X1244    4    11     1    565.3625    12.39725
## X1245    4    15     1     39.2425     1.09885
## X1246    4    15     1     43.4425     1.18285
## X1247    3     1     1    239.2825     5.49165
```

```
## X1248           4       11             1      22.5425      0.66885
## X1249           3       11             1      92.4825      2.29965
## X1250           3       11             1      68.1125      1.74825
## X1251           4       11             1      43.0825      1.15965
## X1252           3       11             1     173.3025      4.15605
## X1253           3       11             1     427.6225      9.50645
## X1254           2        7             2      21.3625      0.63725
## X1255           2        7             2      17.0825      0.53565
## X1256           3       11            10    1270.7225     27.15245
## X1257           4       11             1     172.8525      4.06705
## X1258           4       11             1     108.3725      2.66545
## X1259           3        1             1     174.9225      4.09245
## X1260           3        1             1     154.3625      3.64925
## X1261           3       11             1     153.7625      3.67725
## X1262           3       11             1     141.1225      3.37745
## X1263           2       11             1     146.7225      3.51945
## X1264           2       11             1     114.5925      2.81385
## X1265           2       11             1     202.4500      4.70700
## X1266           2       11             1     229.9325      5.29665
## X1267           2       11             1     148.0125      3.53025
## X1268           2       11             1     142.4125      3.47425
## X1269           3       11            10     495.7650     11.33130
## X1270           4       11             1      83.1925      2.08185
## X1271           3       11            10     375.6325      8.58165
## X1272           4        1             1      31.8775      0.90955
## X1273           2       15             1     895.4550     19.50010
## X1274           2       11             1     707.3975     15.65295
## X1275           4        1             1      47.8150      1.26330
## X1276           3       11             1     370.2725      8.28745
## X1277           3       11             1     500.6825     11.04765
## X1278           3       11             1    1161.8425     24.91885
## X1279           3       15             1     479.5725     10.58545
## X1280           3       11             1    1110.0300     30.28460
## X1281           3       15             1     316.1225      7.16445
## X1282           2       19             1      71.2225      1.81845
## X1283           3       11             1      90.6625      2.23125
## X1284           2       19             1      74.5325      1.87665
## X1285           3       11             1     105.4425      2.60685
## X1286           3        7             1     264.1625      6.05325
## X1287           2        1             1     398.3425      8.86485
## X1288           2        1             1     350.5600      7.86120
## X1289           4        1            10    1249.4525     26.66305
## X1290           3       15             1     149.6600      3.64020
## X1291           3       13             1      65.9725      1.70545
## X1292           3       13             1      37.9625      1.04125
## X1293           4       11            10    1537.9025     32.72005
## X1294           2        7             5      87.2725      2.19145
## X1295           2        7             5      71.0750      1.89150
## X1296           3       11             1     188.9425      4.46085
## X1297           4       11             1     182.6225      4.37445
```

```
## X1298                  3          11                             1      413.7225      9.41245
## X1299                  4          11                             1      180.6825      4.34365
## X1300                  3           1                             1      182.9925      4.27785
## X1301                  2          11                             1      115.0125      2.84625
## X1302                  2           1                             1      479.9325     10.56065
## X1303                  2           1                             1      282.6225      6.43045
## X1304                  3           7                             1      216.0650      5.01830
## X1305                  4          11                             1      255.2225      5.83445
## X1306                  4          11                             1      242.2125      5.59825
## X1307                  2          11                             1       95.5525      2.38505
## X1308                  4          11                             1       20.7425      0.62485
## X1309                  4          11                             1       23.2025      0.67405
## X1310                  1          11                            10      703.0925     15.34485
## X1311                  1          11                            10     1294.6825     27.63965
##          SphericalDisproportion  Sphericity  SurfaceToVolumeRatio
## X1                   0.002040456   490.08659            0.02454724
## X2                   0.002015944   496.04546            0.02467660
## X3                   0.002050132   487.77337            0.02485892
## X4                   0.001900044   526.30369            0.02500274
## X5                   0.003201888   312.31570            0.02201627
## X6                   0.001938515   515.85886            0.02435238
## X7                   0.001878189   532.42778            0.02494260
## X8                   0.002346543   426.15886            0.02328088
## X9                   0.001732668   577.14462            0.02596830
## X10                  0.001781171   561.42840            0.02539338
## X11                  0.001701697   587.64866            0.02688659
## X12                  0.002650222   377.32682            0.02262501
## X13                  0.001790120   558.62190            0.02542858
## X14                  0.004268041   234.29955            0.02122566
## X15                  0.003847141   259.93331            0.02596787
## X16                  0.003813649   262.21605            0.02142471
## X17                  0.003124650   320.03583            0.02194300
## X18                  0.005059026   197.66649            0.02262450
## X19                  0.004355159   229.61273            0.02311581
## X20                  0.002357576   424.16441            0.02315266
## X21                  0.001709975   584.80386            0.02751197
## X22                  0.001575099   634.88059            0.02968230
## X23                  0.002196800   455.20753            0.02416659
## X24                  0.003569182   280.17621            0.02141975
## X25                  0.002359153   423.88094            0.02345040
## X26                  0.003820869   261.72057            0.02202268
## X27                  0.002459677   406.55741            0.02277389
## X28                  0.003676331   272.01033            0.02173197
## X29                  0.002711667   368.77685            0.02280378
## X30                  0.001598764   625.48306            0.02690183
## X31                  0.001799082   555.83904            0.02476733
## X32                  0.002552705   391.74136            0.02304919
## X33                  0.002332830   428.66392            0.02378489
## X34                  0.002590344   386.04906            0.02298721
## X35                  0.003820042   261.77726            0.02151737
```

```
## X36              0.015581783   64.17751          0.03290472
## X37              0.016415586   60.91772          0.03265085
## X38              0.007577643  131.96715          0.03841600
## X39              0.003537068  282.72002          0.02179016
## X40              0.003840807  260.36197          0.02141358
## X41              0.003935622  254.08947          0.02146577
## X42              0.001871860  534.22796          0.02542378
## X43              0.003119521  320.56198          0.02223609
## X44              0.004126808  242.31801          0.02162858
## X45              0.004400430  227.25050          0.02142741
## X46              0.004758337  210.15747          0.02432697
## X47              0.004062785  246.13661          0.02133855
## X48              0.002149357  465.25542          0.02449944
## X49              0.002154820  464.07589          0.02341532
## X50              0.003167272  315.72912          0.02218844
## X51              0.003584642  278.96786          0.02156095
## X52              0.003774549  264.93231          0.02166243
## X53              0.005842694  171.15392          0.02287079
## X54              0.001731276  577.60875          0.02650891
## X55              0.002928168  341.51047          0.02242474
## X56              0.003031157  329.90701          0.02207605
## X57              0.003288011  304.13521          0.02203439
## X58              0.002286808  437.29082          0.02372247
## X59              0.002714603  368.37798          0.02391706
## X60              0.002508906  398.58003          0.02254637
## X61              0.002363455  423.10937          0.02336886
## X62              0.002230809  448.26791          0.02465937
## X63              0.002911904  343.41789          0.02258766
## X64              0.003192084  313.27501          0.03838334
## X65              0.003205727  311.94176          0.02288168
## X66              0.004220525  236.93735          0.03875026
## X67              0.002954519  338.46462          0.02232355
## X68              0.003444088  290.35264          0.02177250
## X69              0.005598494  178.61947          0.02072693
## X70              0.001762322  567.43304          0.02674362
## X71              0.001786845  559.64561          0.02792296
## X72              0.003175096  314.95107          0.02220421
## X73              0.003371259  296.62509          0.02173620
## X74              0.001917370  521.54764          0.02602851
## X75              0.002110284  473.86987          0.02397900
## X76              0.003043275  328.59334          0.02220148
## X77              0.003456911  289.27560          0.02168916
## X78              0.002870766  348.33911          0.02238356
## X79              0.002094581  477.42255          0.02510330
## X80              0.002271534  440.23116          0.02397264
## X81              0.002121585  471.34571          0.02445323
## X82              0.002223514  449.73859          0.02392378
## X83              0.001700776  587.96682          0.02647027
## X84              0.002116723  472.42840          0.02455676
## X85              0.005555110  180.01443          0.02075118
```

```
## X86             0.001683483   594.00660    0.02654340
## X87             0.002082677   480.15137    0.02452366
## X88             0.004141171   241.47761    0.02139594
## X89             0.003894463   256.77480    0.02140789
## X90             0.001799848   555.60242    0.02619587
## X91             0.001805303   553.92370    0.02618566
## X92             0.002169894   460.85194    0.02478401
## X93             0.002216160   451.23101    0.02437526
## X94             0.001641003   609.38323    0.02668659
## X95             0.001676935   596.32597    0.02778440
## X96             0.001617223   618.34388    0.02682609
## X97             0.001592554   627.92209    0.02811686
## X98             0.001687595   592.55917    0.02612253
## X99             0.001963547   509.28239    0.02444146
## X100            0.002359762   423.77157    0.02299251
## X101            0.002881039   347.09698    0.02274159
## X102            0.002657420   376.30489    0.02270840
## X103            0.003288910   304.05206    0.02178581
## X104            0.001711315   584.34592    0.02911663
## X105            0.001712059   584.09201    0.02760706
## X106            0.002742139   364.67878    0.02269244
## X107            0.002659096   376.06765    0.02354865
## X108            0.002650000   377.35844    0.02273662
## X109            0.002129365   469.62357    0.02464268
## X110            0.002137724   467.78731    0.02533784
## X111            0.002322329   430.60220    0.02495396
## X112            0.001741112   574.34556    0.02615965
## X113            0.002368272   422.24887    0.02512238
## X114            0.001700112   588.19663    0.02627334
## X115            0.001762762   567.29161    0.02712961
## X116            0.001806701   553.49488    0.02495795
## X117            0.001805204   553.95387    0.02499540
## X118            0.004338840   230.47635    0.02114205
## X119            0.002436982   410.34364    0.02385226
## X120            0.002402675   416.20270    0.02369934
## X121            0.002067239   483.73694    0.02452201
## X122            0.003876482   257.96588    0.02158853
## X123            0.002913218   343.26298    0.02253265
## X124            0.002467301   405.30121    0.02320722
## X125            0.002126167   470.32988    0.02680551
## X126            0.003193834   313.10327    0.02185382
## X127            0.002187258   457.19347    0.02642621
## X128            0.003157262   316.73009    0.02199420
## X129            0.001772797   564.08053    0.02618220
## X130            0.002174037   459.97375    0.02430906
## X131            0.002169487   460.93841    0.02349712
## X132            0.001783047   560.83757    0.02698930
## X133            0.002798893   357.28411    0.02247928
## X134            0.001639784   609.83632    0.02745799
## X135            0.003504786   285.32412    0.02160285
```

```
## X136             0.003102940  322.27499          0.02198737
## X137             0.002358784  423.94727          0.02332141
## X138             0.002775106  360.34665          0.02253074
## X139             0.003414759  292.84644          0.02169407
## X140             0.002382063  419.80424          0.02340821
## X141             0.002011724  497.08610          0.02529960
## X142             0.002374570  421.12895          0.02383761
## X143             0.002013317  496.69283          0.02508971
## X144             0.003906311  255.99599          0.02843311
## X145             0.002674082  373.96005          0.02263099
## X146             0.002077294  481.39561          0.02434926
## X147             0.002253336  443.78638          0.02377146
## X148             0.001529687  653.72871          0.02773494
## X149             0.002850982  350.75632          0.02356506
## X150             0.002909170  343.74068          0.02305072
## X151             0.001874761  533.40125          0.02507082
## X152             0.001703777  586.93143          0.03031182
## X153             0.002891150  345.88308          0.02241161
## X154             0.001847925  541.14761          0.02670671
## X155             0.003131175  319.36891          0.02191940
## X156             0.004709039  212.35754          0.02091416
## X157             0.003976264  251.49238          0.02117412
## X158             0.001610039  621.10310          0.02955906
## X159             0.001644513  608.08272          0.02991178
## X160             0.002585468  386.77722          0.02411090
## X161             0.003580651  279.27882          0.02149639
## X162             0.003662120  273.06584          0.02144044
## X163             0.002598895  384.77893          0.02234185
## X164             0.001540608  649.09437          0.02786233
## X165             0.001556700  642.38444          0.02828026
## X166             0.002715472  368.26005          0.02293682
## X167             0.003200778  312.42409          0.02222840
## X168             0.001861781  537.12012          0.02531722
## X169             0.002379397  420.27456          0.02353738
## X170             0.002309741  432.94892          0.02398421
## X171             0.001745530  572.89187          0.02549476
## X172             0.002102206  475.69081          0.02379106
## X173             0.002304495  433.93446          0.02396835
## X174             0.003558360  281.02835          0.02166539
## X175             0.003050048  327.86368          0.02241453
## X176             0.001953568  511.88395          0.02517952
## X177             0.001949870  512.85469          0.02522276
## X178             0.002668604  374.72774          0.02269294
## X179             0.001969785  507.66963          0.02519612
## X180             0.002352275  425.12044          0.02374652
## X181             0.002274219  439.71132          0.02393633
## X182             0.002263936  441.70870          0.02435467
## X183             0.003587713  278.72907          0.02158741
## X184             0.003607694  277.18536          0.02149062
## X185             0.003097816  322.80811          0.02209382
```

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## X186                0.001672299  597.97926        0.02839223
## X187                0.002981693  335.37996        0.02283385
## X188                0.005216001  191.71776        0.02114245
## X189                0.002857044  350.01214        0.02270132
## X190                0.005496998  181.91747        0.02184099
## X191                0.002401943  416.32964        0.02320916
## X192                0.002834394  352.80908        0.02261621
## X193                0.002720282  367.60899        0.02231275
## X194                0.003141258  318.34384        0.02211375
## X195                0.003411687  293.11012        0.02187907
## X196                0.003350282  298.48235        0.02190252
## X197                0.001664058  600.94075        0.02672343
## X198                0.001926140  519.17308        0.02469119
## X199                0.001749415  571.61956        0.02693118
## X200                0.001437309  695.74439        0.03063157
## X201                0.001480816  675.30334        0.03024827
## X202                0.001402598  712.96263        0.02983806
## X203                0.002918751  342.61226        0.02240346
## X204                0.003063934  326.37778        0.02217412
## X205                0.001646693  607.27785        0.02673564
## X206                0.001555981  642.68122        0.02837809
## X207                0.002322485  430.57322        0.02383473
## X208                0.002089734  478.52989        0.02487984
## X209                0.004158034  240.49826        0.02168166
## X210                0.004043129  247.33318        0.02157027
## X211                0.006034450  165.71519        0.02189290
## X212                0.002460483  406.42428        0.02304077
## X213                0.003436462  290.99692        0.02171522
## X214                0.002835590  352.66032        0.02225597
## X215                0.005569900  179.53645        0.02077338
## X216                0.002733676  365.80784        0.02250002
## X217                0.002551898  391.86513        0.02246912
## X218                0.002266578  441.19380        0.02306679
## X219                0.003561354  280.79208        0.02155946
## X220                0.006760025  147.92844        0.02115767
## X221                0.006646127  150.46357        0.02088922
## X222                0.004083218  244.90488        0.02122362
## X223                0.006518682  153.40524        0.02363317
## X224                0.004890502  204.47798        0.02093804
## X225                0.004894652  204.30463        0.02094816
## X226                0.003237006  308.92748        0.02153822
## X227                0.004640419  215.49780        0.02104275
## X228                0.003650126  273.96314        0.02132809
## X229                0.003654300  273.65019        0.02146514
## X230                0.003459309  289.07511        0.02161755
## X231                0.004139918  241.55066        0.02109734
## X232                0.003125956  319.90212        0.02460640
## X233                0.005046419  198.16032        0.02077447
## X234                0.003386168  295.31911        0.02167992
## X235                0.003034082  329.58899        0.02219501
```

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## X236              0.002738087  365.21848       0.02899425
## X237              0.003407917  293.43435       0.02168423
## X238              0.003186259  313.84765       0.02193511
## X239              0.003269439  305.86287       0.02181484
## X240              0.003531184  283.19116       0.02158235
## X241              0.002263092  441.87328       0.02447294
## X242              0.004014905  249.07190       0.02120467
## X243              0.004030249  248.12365       0.02119819
## X244              0.003068540  325.88783       0.02181616
## X245              0.001955352  511.41688       0.02549374
## X246              0.002315861  431.80479       0.02377688
## X247              0.003027892  330.26281       0.02269046
## X248              0.002594270  385.46491       0.02290297
## X249              0.003031936  329.82228       0.02192797
## X250              0.002041838  489.75488       0.02497434
## X251              0.002488519  401.84545       0.02315920
## X252              0.002490489  401.52754       0.02305562
## X253              0.002648083  377.63169       0.02269862
## X254              0.001653726  604.69515       0.02722794
## X255              0.003473761  287.87239       0.02141984
## X256              0.002546812  392.64777       0.02295049
## X257              0.001633488  612.18687       0.02800153
## X258              0.001444109  692.46861       0.02967062
## X259              0.001791353  558.23721       0.02486579
## X260              0.001682184  594.46525       0.02566710
## X261              0.001644163  608.21226       0.02691696
## X262              0.002175209  459.72590       0.02398148
## X263              0.004021225  248.68043       0.02136773
## X264              0.001456382  686.63285       0.03135665
## X265              0.002668111  374.79704       0.02223094
## X266              0.001491015  670.68385       0.02983031
## X267              0.002319637  431.10186       0.02352902
## X268              0.002077381  481.37533       0.02459526
## X269              0.002234576  447.51223       0.02393275
## X270              0.002389629  418.47500       0.02339579
## X271              0.002310686  432.77189       0.02364078
## X272              0.002293278  436.05710       0.02398712
## X273              0.002302811  434.25186       0.02391513
## X274              0.002158242  463.34010       0.02455527
## X275              0.002315127  431.94172       0.02325018
## X276              0.002065451  484.15573       0.02385103
## X277              0.002389837  418.43867       0.02303567
## X278              0.002104071  475.26921       0.02439568
## X279              0.001875320  533.24239       0.02502449
## X280              0.003111031  321.43690       0.02285619
## X281              0.003842419  260.25274       0.02177675
## X282              0.002829724  353.39138       0.02284587
## X283              0.001668780  599.24014       0.02853266
## X284              0.003600792  277.71666       0.02212752
## X285              0.001663014  601.31795       0.02642058
```

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## X286          0.002684667  372.48573     0.02238203
## X287          0.002922785  342.13938     0.02206518
## X288          0.004061659  246.20478     0.02144770
## X289          0.005082988  196.73466     0.02728269
## X290          0.002650297  377.31615     0.02266352
## X291          0.002965891  337.16683     0.02207268
## X292          0.001904336  525.11734     0.02553196
## X293          0.001903472  525.35590     0.02517895
## X294          0.002148309  465.48246     0.02472295
## X295          0.002027509  493.21604     0.02461051
## X296          0.002745029  364.29485     0.02225434
## X297          0.002347549  425.97622     0.02432313
## X298          0.002679002  373.27333     0.02291487
## X299          0.002644733  378.11003     0.02242469
## X300          0.001879537  532.04604     0.02585092
## X301          0.001658717  602.87569     0.02742838
## X302          0.003945591  253.44749     0.02133979
## X303          0.004283125  233.47441     0.02127576
## X304          0.001756120  569.43704     0.02661273
## X305          0.001775642  563.17644     0.02511043
## X306          0.002296748  435.39824     0.02360956
## X307          0.002607867  383.45515     0.02395351
## X308          0.002827593  353.65773     0.02275064
## X309          0.002341621  427.05454     0.02404024
## X310          0.002432463  411.10602     0.02337719
## X311          0.002748505  363.83417     0.02200445
## X312          0.002436762  410.38067     0.02275279
## X313          0.001958926  510.48368     0.02496062
## X314          0.002065975  484.03299     0.02474731
## X315          0.002392484  417.97564     0.02322588
## X316          0.002521822  396.53873     0.02286025
## X317          0.002473261  404.32450     0.02311297
## X318          0.001442363  693.30691     0.02905075
## X319          0.001431361  698.63581     0.03012414
## X320          0.003934758  254.14523     0.02134859
## X321          0.003281825  304.70855     0.02182480
## X322          0.004712834  212.18656     0.02153028
## X323          0.003441499  290.57109     0.02162662
## X324          0.002370672  421.82125     0.02346251
## X325          0.003176439  314.81797     0.02165544
## X326          0.001896887  527.17957     0.02649273
## X327          0.003237322  308.89732     0.02178210
## X328          0.004091535  244.40708     0.02133959
## X329          0.001819346  549.64793     0.02576959
## X330          0.002464829  405.70770     0.02327060
## X331          0.003798017  263.29529     0.02148315
## X332          0.001365806  732.16857     0.03244538
## X333          0.002351589  425.24429     0.02312827
## X334          0.002640077  378.77678     0.02251716
## X335          0.002036406  491.06111     0.02470716
```

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## X336               0.002979976   335.57320        0.02210278
## X337               0.003614146   276.69057        0.02172510
## X338               0.002430981   411.35651        0.02314357
## X339               0.002512606   397.99310        0.02324076
## X340               0.001934624   516.89641        0.02470262
## X341               0.005858154   170.70223        0.02091339
## X342               0.008935260   111.91616        0.02118384
## X343               0.011458828    87.26896        0.02484058
## X344               0.002072529   482.50221        0.02499531
## X345               0.006504265   153.74527        0.02066763
## X346               0.001984878   503.80927        0.02452107
## X347               0.003334061   299.93452        0.02244598
## X348               0.003515719   284.43688        0.02171854
## X349               0.006363329   157.15045        0.02067939
## X350               0.006234787   160.39041        0.02064459
## X351               0.002008695   497.83554        0.02589044
## X352               0.001417543   705.44583        0.02829515
## X353               0.002519234   396.94600        0.02308366
## X354               0.001974029   506.57828        0.02469388
## X355               0.001908887   523.86541        0.02505764
## X356               0.003177490   314.71383        0.02512895
## X357               0.003376427   296.17105        0.02177253
## X358               0.003045451   328.35862        0.02591840
## X359               0.003592366   278.36804        0.02192930
## X360               0.002251635   444.12164        0.02459972
## X361               0.002315620   431.84984        0.02370693
## X362               0.001631139   613.06849        0.02765962
## X363               0.002154535   464.13730        0.02411040
## X364               0.001759339   568.39545        0.02534895
## X365               0.002144684   466.26926        0.02445129
## X366               0.002011200   497.21562        0.02460777
## X367               0.002275857   439.39486        0.02362526
## X368               0.002538114   393.99333        0.02283764
## X369               0.002115857   472.62166        0.02418579
## X370               0.001779646   561.90950        0.02583865
## X371               0.002414877   414.09975        0.02296536
## X372               0.002259873   442.50269        0.02319038
## X373               0.003920751   255.05319        0.02128717
## X374               0.001785530   560.05778        0.02666240
## X375               0.003824079   261.50090        0.02143343
## X376               0.002673405   374.05480        0.02266452
## X377               0.002210849   452.31484        0.02399533
## X378               0.002735345   365.58457        0.02234389
## X379               0.003817384   261.95950        0.02165125
## X380               0.002183928   457.89045        0.02420257
## X381               0.001678579   595.74192        0.02705896
## X382               0.004123943   242.48639        0.02352813
## X383               0.003702794   270.06634        0.02239438
## X384               0.002092403   477.91946        0.02488020
## X385               0.003174052   315.05469        0.02228524
```

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## X386              0.002205583   453.39493          0.02443090
## X387              0.004207179   237.68897          0.02140207
## X388              0.002435929   410.52104          0.02462029
## X389              0.002455668   407.22111          0.02278414
## X390              0.001516811   659.27794          0.03083127
## X391              0.001833566   545.38531          0.02541688
## X392              0.001807520   553.24420          0.02545179
## X393              0.001556217   642.58375          0.02832191
## X394              0.002514414   397.70694          0.02264158
## X395              0.001810932   552.20184          0.02613514
## X396              0.001773754   563.77619          0.02676195
## X397              0.002442176   409.47086          0.02294138
## X398              0.002033625   491.73268          0.02384112
## X399              0.003919322   255.14615          0.02125673
## X400              0.001934902   516.82204          0.02424536
## X401              0.003301864   302.85921          0.02181099
## X402              0.003739599   267.40838          0.02152160
## X403              0.003713141   269.31378          0.02127745
## X404              0.003406174   293.58451          0.02166764
## X405              0.002443021   409.32921          0.02333203
## X406              0.001838344   543.96785          0.02464277
## X407              0.002450839   408.02351          0.02342821
## X408              0.003318783   301.31531          0.02200117
## X409              0.002098177   476.60430          0.02366566
## X410              0.006664766   150.04278          0.03043717
## X411              0.001912918   522.76163          0.02577522
## X412              0.001741402   574.25001          0.02617602
## X413              0.002766314   361.49184          0.02257150
## X414              0.002572219   388.76946          0.02323033
## X415              0.002361461   423.46663          0.02360582
## X416              0.002011422   497.16067          0.02610316
## X417              0.002826157   353.83744          0.02223904
## X418              0.003820874   261.72021          0.02147189
## X419              0.002420448   413.14661          0.02467017
## X420              0.001550590   644.91590          0.03263099
## X421              0.003101530   322.42151          0.02198931
## X422              0.002866180   348.89649          0.02226113
## X423              0.001806474   553.56471          0.02691279
## X424              0.001996302   500.92632          0.02475117
## X425              0.001689654   591.83699          0.02623888
## X426              0.002026112   493.55623          0.02476230
## X427              0.001961524   509.80763          0.02425773
## X428              0.002057930   485.92507          0.02446583
## X429              0.001813850   551.31352          0.02664969
## X430              0.001862214   536.99524          0.02757390
## X431              0.002526471   395.80898          0.02271315
## X432              0.002384987   419.28949          0.02299016
## X433              0.003484710   286.96790          0.02182506
## X434              0.002776115   360.21562          0.02350572
## X435              0.004248057   235.40175          0.02125850
```

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## X436            0.003136714   318.80502          0.02208207
## X437            0.002650422   377.29843          0.02262411
## X438            0.002844680   351.53338          0.02217298
## X439            0.002442943   409.34240          0.02302360
## X440            0.002818552   354.79216          0.02213045
## X441            0.002458240   406.79517          0.02302532
## X442            0.002716535   368.11598          0.02244168
## X443            0.001631335   612.99488          0.02567175
## X444            0.001838539   543.91015          0.02604689
## X445            0.001516375   659.46766          0.02721315
## X446            0.001891326   528.72963          0.02559737
## X447            0.001570563   636.71448          0.02707486
## X448            0.004625277   216.20327          0.02121408
## X449            0.003857352   259.24517          0.02140460
## X450            0.004785371   208.97022          0.02109252
## X451            0.011865933    84.27488          0.02468040
## X452            0.002679013   373.27184          0.02278100
## X453            0.002609756   383.17758          0.02291655
## X454            0.004558005   219.39424          0.02103001
## X455            0.005295781   188.82957          0.02092834
## X456            0.004359687   229.37428          0.02131045
## X457            0.004880138   204.91223          0.02101562
## X458            0.002294058   435.90883          0.02328524
## X459            0.002190152   456.58931          0.02435631
## X460            0.002118454   472.04226          0.02494660
## X461            0.001484236   673.74709          0.02856969
## X462            0.003863527   258.83088          0.02160007
## X463            0.004209010   237.58559          0.02115793
## X464            0.001717121   582.37016          0.02791280
## X465            0.002177591   459.22308          0.02428047
## X466            0.002755392   362.92471          0.02280730
## X467            0.002856602   350.06624          0.02237689
## X468            0.001805189   553.95856          0.02699902
## X469            0.003127288   319.76586          0.02210350
## X470            0.003199800   312.51951          0.02204985
## X471            0.002077669   481.30861          0.02508233
## X472            0.001375746   726.87821          0.03040281
## X473            0.001477621   676.76335          0.02780987
## X474            0.001457802   685.96422          0.02898876
## X475            0.001447874   690.66788          0.02768953
## X476            0.004422629   226.10984          0.02116692
## X477            0.004380365   228.29148          0.02122414
## X478            0.001291627   774.21711          0.03555163
## X479            0.001984421   503.92531          0.02529084
## X480            0.003517325   284.30693          0.02278730
## X481            0.001240565   806.08408          0.04863404
## X482            0.003594023   278.23973          0.02181399
## X483            0.002227014   449.03166          0.02388394
## X484            0.003294739   303.51416          0.02202090
## X485            0.002116085   472.57088          0.02406001
```

```
## X486           0.002422565  412.78559     0.02332398
## X487           0.001809357  552.68263     0.02651096
## X488           0.002165551  461.77630     0.02375061
## X489           0.001863883  536.51424     0.02596738
## X490           0.002183285  458.02544     0.02401994
## X491           0.001533059  652.29054     0.02768961
## X492           0.002668282  374.77298     0.02270749
## X493           0.001753043  570.43656     0.02723256
## X494           0.002817805  354.88610     0.02251153
## X495           0.002746898  364.04696     0.02324248
## X496           0.005454462  183.33614     0.02103343
## X497           0.001598336  625.65064     0.02772343
## X498           0.005898434  169.53652     0.02079758
## X499           0.002601481  384.39644     0.02367853
## X500           0.001499242  667.00394     0.02898876
## X501           0.002742360  364.64946     0.02364404
## X502           0.004629555  216.00349     0.02108627
## X503           0.001467676  681.34919     0.02930319
## X504           0.002232222  447.98413     0.02296835
## X505           0.002466390  405.45084     0.02256178
## X506           0.004136559  241.74684     0.02132408
## X507           0.001596650  626.31133     0.02690574
## X508           0.007184462  139.18926     0.02161090
## X509           0.006265199  159.61186     0.02107220
## X510           0.002002560  499.36086     0.02444435
## X511           0.001728722  578.46214     0.02700970
## X512           0.002860495  349.58990     0.03239740
## X513           0.002959540  337.89037     0.03012066
## X514           0.002021862  494.59370     0.02481397
## X515           0.002366591  422.54865     0.02441402
## X516           0.001892994  528.26368     0.02623232
## X517           0.002310517  432.80363     0.02479137
## X518           0.001894766  527.76971     0.02578455
## X519           0.002737931  365.23925     0.02258900
## X520           0.002894590  345.47207     0.02242634
## X521           0.003112722  321.26220     0.02262575
## X522           0.004216708  237.15180     0.02118692
## X523           0.002871541  348.24509     0.02279317
## X524           0.004210804  237.48434     0.02122449
## X525           0.003014698  331.70813     0.02226047
## X526           0.003132092  319.27539     0.02258534
## X527           0.002166880  461.49297     0.02350561
## X528           0.005353587  186.79066     0.02081650
## X529           0.001993301  501.68043     0.02420676
## X530           0.004669149  214.17179     0.02126465
## X531           0.002341802  427.02152     0.02328251
## X532           0.002236543  447.11851     0.02361626
## X533           0.002574607  388.40884     0.02291921
## X534           0.002795797  357.67982     0.02270796
## X535           0.003503769  285.40696     0.02176892
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## X536               0.002728197  366.54239     0.02277329
## X537               0.002648267  377.60543     0.02304988
## X538               0.005420564  184.48266     0.02096857
## X539               0.005802866  172.32863     0.02081921
## X540               0.002277631  439.05260     0.02342941
## X541               0.001979913  505.07262     0.02444454
## X542               0.002513259  397.88983     0.02271391
## X543               0.002271463  440.24488     0.02349176
## X544               0.002580903  387.46135     0.02257892
## X545               0.002215358  451.39434     0.02356804
## X546               0.003188191  313.65749     0.02210467
## X547               0.002968586  336.86075     0.02223259
## X548               0.002426769  412.07059     0.02340489
## X549               0.002529405  395.34983     0.02261250
## X550               0.002481587  402.96801     0.02318501
## X551               0.002091760  478.06630     0.02707797
## X552               0.002159896  462.98522     0.02630197
## X553               0.003107431  321.80925     0.02204316
## X554               0.002353050  424.98029     0.02365503
## X555               0.004174442  239.55297     0.02122717
## X556               0.005064715  197.44449     0.02568068
## X557               0.004542224  220.15646     0.02251425
## X558               0.003768564  265.35306     0.02222712
## X559               0.002428802  411.72569     0.02295644
## X560               0.002653246  376.89688     0.02243493
## X561               0.002092446  477.90969     0.02383457
## X562               0.002507893  398.74115     0.02321725
## X563               0.002922781  342.13990     0.02259403
## X564               0.002375353  420.99013     0.02303648
## X565               0.002118924  471.93760     0.02410879
## X566               0.002828927  353.49086     0.02254141
## X567               0.005410483  184.82637     0.02098585
## X568               0.005145749  194.33517     0.02095187
## X569               0.005585082  179.04839     0.02096723
## X570               0.006093197  164.11744     0.02123756
## X571               0.001912897  522.76727     0.02567213
## X572               0.005113952  195.54347     0.02096951
## X573               0.001847922  541.14838     0.02579362
## X574               0.002418132  413.54237     0.02331701
## X575               0.004008219  249.48735     0.02156745
## X576               0.002364007  423.01062     0.02362701
## X577               0.003126767  319.81912     0.02651048
## X578               0.007338403  136.26944     0.02053336
## X579               0.002969533  336.75325     0.02433633
## X580               0.002739786  364.99198     0.02268665
## X581               0.007031275  142.22173     0.02222611
## X582               0.002914182  343.14944     0.02240464
## X583               0.001639826  609.82078     0.02785328
## X584               0.001743113  573.68617     0.02706167
## X585               0.002333397  428.55976     0.02352713
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## X586            0.002270388  440.45331          0.02450775
## X587            0.002875253  347.79542          0.02286760
## X588            0.005416823  184.61005          0.02163508
## X589            0.002072702  482.46201          0.02450403
## X590            0.005812849  172.03267          0.02196238
## X591            0.002049016  488.03914          0.02663063
## X592            0.001453458  688.01458          0.03025279
## X593            0.001728146  578.65470          0.02772458
## X594            0.002528121  395.55073          0.02342038
## X595            0.002148076  465.53293          0.02405717
## X596            0.003316016  301.56668          0.02321949
## X597            0.003766674  265.48618          0.02243988
## X598            0.001629127  613.82556          0.02707293
## X599            0.001549364  645.42597          0.02763874
## X600            0.001841351  543.07951          0.02552444
## X601            0.001650137  606.01018          0.02688149
## X602            0.002216655  451.13019          0.02407272
## X603            0.002295001  435.72971          0.02388786
## X604            0.001732337  577.25485          0.02738259
## X605            0.002742744  364.59839          0.02245597
## X606            0.001922842  520.06364          0.02421406
## X607            0.003329190  300.37337          0.02185462
## X608            0.001746427  572.59782          0.02608012
## X609            0.002036556  491.02497          0.02480735
## X610            0.002076583  481.56026          0.02461356
## X611            0.002210985  452.28713          0.02422370
## X612            0.003068695  325.87137          0.02191861
## X613            0.002008294  497.93503          0.02461154
## X614            0.002519556  396.89527          0.02272171
## X615            0.002126445  470.26836          0.02407698
## X616            0.002088203  478.88071          0.02497651
## X617            0.001914804  522.24664          0.02551261
## X618            0.002197806  454.99929          0.02445488
## X619            0.005551457  180.13288          0.02071610
## X620            0.002321800  430.70026          0.02376027
## X621            0.001799161  555.81467          0.02567220
## X622            0.006753214  148.07764          0.02051253
## X623            0.002551817  391.87757          0.02323055
## X624            0.003374431  296.34624          0.02211555
## X625            0.003624197  275.92319          0.02175963
## X626            0.001819786  549.51505          0.02561865
## X627            0.004004289  249.73224          0.02138574
## X628            0.002081953  480.31824          0.02481278
## X629            0.001504092  664.85294          0.02822220
## X630            0.006879314  145.36333          0.02058841
## X631            0.006798842  147.08387          0.02062254
## X632            0.005918264  168.96847          0.02907727
## X633            0.002024309  493.99571          0.02474084
## X634            0.006664378  150.05151          0.02059696
## X635            0.007068889  141.46494          0.02063394
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## X636                0.002057300  486.07407    0.02457724
## X637                0.002222083  450.02813    0.02377621
## X638                0.002291176  436.45709    0.02384087
## X639                0.003143971  318.06910    0.02376824
## X640                0.003794766  263.52085    0.02222512
## X641                0.001850291  540.45552    0.02541320
## X642                0.002601347  384.41623    0.02300829
## X643                0.002487036  402.08498    0.02349122
## X644                0.001956715  511.06069    0.02522391
## X645                0.001738245  575.29283    0.02704704
## X646                0.001621991  616.52614    0.02776206
## X647                0.001618665  617.79298    0.02809042
## X648                0.002268843  440.75322    0.02346744
## X649                0.001689729  591.81075    0.03023494
## X650                0.001630548  613.29091    0.02794135
## X651                0.002305690  433.70962    0.02335632
## X652                0.001807096  553.37412    0.02647355
## X653                0.001877784  532.54249    0.02684778
## X654                0.002025446  493.71853    0.02507551
## X655                0.001464260  682.93889    0.03158091
## X656                0.002288476  436.97195    0.02823991
## X657                0.003578127  279.47584    0.02184443
## X658                0.001795547  556.93322    0.02535960
## X659                0.001507942  663.15565    0.02893735
## X660                0.002314460  432.06617    0.02359634
## X661                0.002071736  482.68707    0.02467063
## X662                0.001616476  618.62980    0.02938890
## X663                0.002003846  499.04043    0.02568785
## X664                0.001508209  663.03812    0.02885298
## X665                0.003950169  253.15376    0.02150312
## X666                0.002179887  458.73931    0.02387159
## X667                0.004043160  247.33131    0.02150584
## X668                0.001438907  694.97188    0.02917415
## X669                0.002389064  418.57389    0.02352670
## X670                0.001720422  581.25282    0.02614974
## X671                0.001336064  748.46725    0.02920511
## X672                0.002021951  494.57188    0.02438101
## X673                0.001653433  604.80237    0.02632932
## X674                0.006273689  159.39585    0.02477040
## X675                0.003324751  300.77439    0.02191750
## X676                0.003162571  316.19847    0.02215755
## X677                0.007152789  139.80561    0.02450109
## X678                0.001684740  593.56346    0.02751511
## X679                0.002205976  453.31415    0.02365536
## X680                0.002513508  397.85040    0.02356435
## X681                0.002618434  381.90766    0.02290263
## X682                0.002428338  411.80424    0.02406872
## X683                0.001632278  612.64060    0.02702762
## X684                0.001729863  578.08034    0.02603839
## X685                0.002562876  390.18670    0.02314567
```

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## X686            0.001723165   580.32762        0.02693954
## X687            0.001251315   799.15928        0.03487563
## X688            0.002393015   417.88292        0.02354071
## X689            0.004260907   234.69180        0.02122776
## X690            0.003904792   256.09557        0.02141025
## X691            0.002247183   445.00168        0.02336227
## X692            0.002427460   411.95321        0.02297175
## X693            0.002136390   468.07923        0.02399183
## X694            0.001895446   527.58031        0.02486856
## X695            0.002053035   487.08375        0.02417425
## X696            0.002063399   484.63715        0.02502657
## X697            0.004541293   220.20160        0.02121500
## X698            0.002240041   446.42043        0.02399132
## X699            0.004331505   230.86662        0.02134513
## X700            0.003087784   323.85680        0.03075428
## X701            0.002622692   381.28767        0.02294418
## X702            0.002407023   415.45092        0.02345263
## X703            0.001843727   542.37967        0.02573070
## X704            0.001792842   557.77369        0.02585980
## X705            0.002499512   400.07806        0.02325653
## X706            0.003773050   265.03754        0.02182758
## X707            0.003684194   271.42982        0.02161685
## X708            0.002552931   391.70665        0.02354565
## X709            0.001942769   514.72916        0.02463152
## X710            0.001479223   676.03049        0.02769180
## X711            0.001717520   582.23495        0.02735929
## X712            0.001724011   580.04270        0.02570853
## X713            0.001724440   579.89846        0.02713547
## X714            0.003582308   279.14964        0.02144914
## X715            0.001882885   531.09979        0.02439763
## X716            0.003931322   254.36738        0.02129643
## X717            0.002252393   443.97217        0.02332032
## X718            0.002052709   487.16108        0.02616552
## X719            0.002605857   383.75088        0.02289750
## X720            0.002999575   333.38059        0.02367283
## X721            0.002688700   371.92697        0.02249012
## X722            0.002449911   408.17810        0.02298143
## X723            0.003382134   295.67135        0.02182095
## X724            0.005313627   188.19536        0.02108029
## X725            0.001915732   521.99377        0.02487642
## X726            0.001743514   573.55449        0.02556036
## X727            0.004583166   218.18978        0.02113220
## X728            0.002515585   397.52182        0.02332922
## X729            0.001476889   677.09893        0.03047941
## X730            0.001976822   505.86249        0.02548412
## X731            0.004498335   222.30446        0.02114778
## X732            0.001746447   572.59115        0.02864449
## X733            0.004628198   216.06681        0.02108814
## X734            0.006798521   147.09081        0.02063976
## X735            0.001620316   617.16351        0.02887048
```

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## X736             0.002446200  408.79727         0.02292903
## X737             0.007138464  140.08616         0.02141608
## X738             0.002361875  423.39252         0.02368175
## X739             0.002671616  374.30529         0.02389598
## X740             0.003510563  284.85461         0.02638613
## X741             0.002253024  443.84789         0.02408825
## X742             0.002939818  340.15715         0.02206205
## X743             0.003162983  316.15724         0.02191048
## X744             0.002250053  444.43399         0.02410272
## X745             0.002357137  424.24351         0.02352306
## X746             0.001787770  559.35602         0.02643181
## X747             0.001688982  592.07261         0.02608849
## X748             0.002320266  430.98505         0.02346382
## X749             0.001626344  614.87613         0.02612056
## X750             0.001735206  576.30049         0.02681193
## X751             0.003239793  308.66165         0.02551135
## X752             0.003498770  285.81471         0.02530753
## X753             0.002252057  444.03854         0.02331215
## X754             0.002753294  363.20126         0.02264912
## X755             0.002439839  409.86303         0.02362263
## X756             0.002759031  362.44606         0.02265686
## X757             0.002129824  469.52241         0.02490938
## X758             0.001505017  664.44411         0.02889220
## X759             0.001496571  668.19411         0.02943934
## X760             0.001677633  596.07808         0.02669108
## X761             0.002247181  445.00192         0.02328609
## X762             0.001845678  541.80623         0.02594668
## X763             0.003484406  286.99300         0.02197145
## X764             0.001779464  561.96693         0.02552301
## X765             0.003495298  286.09865         0.02181621
## X766             0.001421670  703.39823         0.02929512
## X767             0.001824313  548.15166         0.02653802
## X768             0.001981598  504.64313         0.02444211
## X769             0.002257119  443.04269         0.02376614
## X770             0.004538036  220.35965         0.02122046
## X771             0.005322459  187.88308         0.02105937
## X772             0.001807876  553.13526         0.02673242
## X773             0.001528825  654.09697         0.02751511
## X774             0.002389853  418.43569         0.02267047
## X775             0.002306161  433.62101         0.02367328
## X776             0.002120435  471.60134         0.02432318
## X777             0.001295541  771.87846         0.04407723
## X778             0.001376631  726.41084         0.03345236
## X779             0.003280560  304.82596         0.02194387
## X780             0.004943890  202.26987         0.02095203
## X781             0.002646797  377.81522         0.02232900
## X782             0.001860864  537.38489         0.02603466
## X783             0.002775356  360.31408         0.02217644
## X784             0.002666213  375.06378         0.02232918
## X785             0.001823819  548.29988         0.02637289
```

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## X786              0.002643355    378.30705             0.02260303
## X787              0.002808850    356.01759             0.02260118
## X788              0.003585554    278.89692             0.02144894
## X789              0.003741307    267.28626             0.02137558
## X790              0.001436392    696.18879             0.02832728
## X791              0.004918814    203.30102             0.02115654
## X792              0.004942526    202.32568             0.02258747
## X793              0.003979861    251.26503             0.02139531
## X794              0.001741139    574.33675             0.02571148
## X795              0.001694808    590.03724             0.02607074
## X796              0.003600338    277.75172             0.02197432
## X797              0.002003832    499.04373             0.02461321
## X798              0.003933626    254.21839             0.02141124
## X799              0.001440863    694.02842             0.02978451
## X800              0.003457812    289.20019             0.02252331
## X801              0.001547536    646.18850             0.03068045
## X802              0.001771035    564.64149             0.02678514
## X803              0.001747589    572.21706             0.02693170
## X804              0.004387740    227.90775             0.02159187
## X805              0.003356673    297.91400             0.02197462
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## X807              0.002546591    392.68179             0.02259010
## X808              0.003496917    285.96616             0.02166282
## X809              0.001529549    653.78769             0.02903737
## X810              0.001496886    668.05354             0.02809026
## X811              0.004232846    236.24770             0.02149146
## X812              0.002890523    345.95812             0.02296557
## X813              0.004373479    228.65092             0.02161267
## X814              0.002737435    365.30553             0.02300026
## X815              0.004535901    220.46338             0.02134976
## X816              0.002462393    406.10909             0.02487006
## X817              0.003573256    279.85683             0.02245622
## X818              0.004873011    205.21193             0.02121267
## X819              0.002996573    333.71451             0.02230649
## X820              0.003449073    289.93293             0.02178109
## X821              0.002163088    462.30199             0.02569139
## X822              0.003479622    287.38757             0.02195820
## X823              0.003532313    283.10061             0.02175484
## X824              0.003166484    315.80772             0.02209869
## X825              0.003500503    285.67324             0.02170742
## X826              0.001612028    620.33679             0.02789233
## X827              0.001516748    659.30538             0.02853803
## X828              0.001731704    577.46599             0.02698141
## X829              0.001685280    593.37334             0.02670475
## X830              0.002710552    368.92849             0.02285134
## X831              0.002458794    406.70351             0.02361869
## X832              0.002343403    426.72976             0.02439366
## X833              0.002871181    348.28871             0.02254410
## X834              0.004168123    239.91612             0.02141931
## X835              0.004214024    237.30289             0.02132242
```

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## X836            0.002874687  347.86391        0.02253512
## X837            0.002259499  442.57589        0.02426298
## X838            0.002281952  438.22136        0.02407995
## X839            0.005293251  188.91980        0.02087279
## X840            0.002908627  343.80479        0.02237963
## X841            0.005016579  199.33902        0.02107122
## X842            0.003833578  260.85289        0.02143759
## X843            0.003152875  317.17085        0.02191937
## X844            0.003324902  300.76076        0.02388610
## X845            0.003063690  326.40379        0.02228865
## X846            0.003727680  268.26334        0.02157555
## X847            0.001763450  567.07020        0.02687178
## X848            0.002129016  469.70053        0.02492308
## X849            0.003339451  299.45043        0.02248180
## X850            0.003382926  295.60211        0.02232929
## X851            0.002543061  393.22684        0.02295811
## X852            0.001834534  545.09755        0.02613815
## X853            0.002839190  352.21319        0.02263205
## X854            0.001834522  545.10127        0.02785075
## X855            0.001683965  593.83642        0.02723836
## X856            0.001808026  553.08933        0.02640241
## X857            0.001674532  597.18168        0.02639973
## X858            0.001580061  632.88690        0.02637248
## X859            0.001442386  693.29579        0.02832081
## X860            0.001691827  591.07703        0.02587359
## X861            0.002662151  375.63614        0.02262243
## X862            0.003161840  316.27153        0.02527926
## X863            0.003021603  330.95015        0.02228606
## X864            0.002332743  428.67983        0.02325140
## X865            0.004347848  229.99885        0.02199397
## X866            0.006174355  161.96025        0.02061595
## X867            0.006050788  165.26773        0.02068956
## X868            0.004419718  226.25880        0.02160934
## X869            0.002366313  422.59832        0.02331174
## X870            0.002223935  449.65350        0.02403095
## X871            0.002401002  416.49275        0.02332369
## X872            0.002156392  463.73767        0.02412698
## X873            0.001310299  763.18471        0.03265587
## X874            0.001749297  571.65819        0.02953017
## X875            0.001935724  516.60260        0.02602169
## X876            0.001926133  519.17496        0.02541656
## X877            0.001272513  785.84651        0.03471508
## X878            0.001820794  549.21091        0.02521479
## X879            0.003098637  322.72258        0.02223264
## X880            0.003060266  326.76895        0.02227453
## X881            0.002220428  450.36361        0.02400268
## X882            0.004376501  228.49305        0.02148415
## X883            0.004352267  229.76533        0.02167406
## X884            0.001783797  560.60182        0.02597763
## X885            0.002862108  349.39285        0.02257036
```

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## X886           0.001740724   574.47352            0.02578012
## X887           0.003197250   312.76878            0.02202371
## X888           0.002560929   390.48331            0.02314014
## X889           0.001589368   629.18100            0.02707399
## X890           0.001734969   576.37918            0.02547751
## X891           0.001601008   624.60645            0.02642396
## X892           0.002746547   364.09354            0.02228233
## X893           0.002648933   377.51043            0.02293547
## X894           0.002898023   345.06277            0.02215440
## X895           0.002563272   390.12630            0.02311953
## X896           0.002481415   402.99583            0.02337002
## X897           0.002908060   343.87184            0.02237688
## X898           0.002867404   348.74747            0.02304840
## X899           0.001788368   559.16893            0.02588292
## X900           0.001736955   575.72013            0.02543592
## X901           0.003008259   332.41819            0.02232042
## X902           0.005651474   176.94497            0.02090627
## X903           0.004050884   246.85968            0.02154383
## X904           0.001894420   527.86612            0.02541925
## X905           0.002294447   435.83477            0.02322308
## X906           0.002095883   477.12591            0.02477697
## X907           0.002141762   466.90531            0.02359872
## X908           0.003267046   306.08686            0.02208539
## X909           0.003012850   331.91168            0.02223367
## X910           0.001494001   669.34343            0.03094177
## X911           0.001691102   591.33035            0.02623651
## X912           0.001331132   751.24010            0.03333029
## X913           0.001718943   581.75295            0.02633564
## X914           0.002400772   416.53260            0.02311579
## X915           0.001281302   780.45593            0.03688590
## X916           0.002643713   378.25589            0.02273450
## X917           0.002024776   493.88179            0.02447032
## X918           0.002143130   466.60729            0.02361447
## X919           0.001214779   823.19499            0.03422655
## X920           0.001769599   565.09988            0.02592052
## X921           0.002311082   432.69784            0.02311435
## X922           0.005364497   186.41077            0.02078347
## X923           0.002276039   439.35979            0.02326165
## X924           0.005713959   175.01001            0.02088419
## X925           0.005875888   170.18703            0.02081458
## X926           0.005955906   167.90056            0.02070512
## X927           0.006292800   158.91176            0.02077905
## X928           0.009113641   109.72563            0.02054594
## X929           0.009120941   109.63781            0.02093878
## X930           0.005676938   176.15129            0.02090358
## X931           0.001959004   510.46350            0.02745332
## X932           0.002981300   335.42418            0.02271442
## X933           0.001791688   558.13290            0.02531517
## X934           0.002426203   412.16662            0.02315093
## X935           0.003803982   262.88242            0.02188882
```

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## X936             0.003099073 322.67709   0.02196620
## X937             0.001619279 617.55891   0.02694922
## X938             0.003666782 272.71873   0.02167358
## X939             0.001663782 601.04031   0.02579641
## X940             0.002310287 432.84663   0.02362313
## X941             0.001615688 618.93146   0.02648970
## X942             0.001903447 525.36271   0.02549285
## X943             0.002038924 490.45487   0.02452535
## X944             0.003280855 304.79862   0.02193155
## X945             0.002387614 418.82814   0.02298667
## X946             0.002570675 389.00292   0.02283691
## X947             0.004482441 223.09275   0.02347186
## X948             0.003168980 315.55891   0.02207399
## X949             0.002005573 498.61062   0.02538474
## X950             0.004900651 204.05452   0.02278905
## X951             0.002215810 451.30228   0.02418731
## X952             0.001865620 536.01474   0.02541086
## X953             0.001902540 525.61301   0.02560212
## X954             0.002157258 463.55132   0.02374152
## X955             0.002308012 433.27333   0.02330780
## X956             0.001611491 620.54336   0.02896486
## X957             0.001753424 570.31277   0.02709564
## X958             0.002612748 382.73876   0.02297175
## X959             0.002423842 412.56817   0.02336227
## X960             0.002376251 420.83097   0.02516520
## X961             0.002619131 381.80600   0.02412507
## X962             0.001512558 661.13146   0.02848894
## X963             0.001457593 686.06251   0.02873744
## X964             0.002823295 354.19607   0.02226893
## X965             0.002901371 344.66469   0.02222332
## X966             0.001958065 510.70827   0.02519949
## X967             0.001741116 574.34411   0.02687851
## X968             0.001971710 507.17407   0.02518559
## X969             0.001951524 512.42008   0.02528558
## X970             0.002568338 389.35682   0.02290737
## X971             0.002354629 424.69543   0.02431166
## X972             0.001920288 520.75516   0.02587663
## X973             0.003368997 296.82425   0.02181249
## X974             0.003639172 274.78779   0.02159182
## X975             0.001736623 575.83008   0.02539527
## X976             0.002026992 493.34190   0.02464225
## X977             0.001823854 548.28957   0.02611795
## X978             0.004323410 231.29888   0.02144828
## X979             0.005465531 182.96483   0.02095111
## X980             0.004094665 244.22022   0.02151647
## X981             0.005749686 173.92254   0.02104987
## X982             0.001598357 625.64229   0.02987654
## X983             0.001833306 545.46255   0.02618518
## X984             0.002971493 336.53115   0.02237191
## X985             0.001704785 586.58409   0.02737293
```

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## X986           0.003984382  250.97992           0.02139071
## X987           0.004183824  239.01582           0.02141177
## X988           0.004173923  239.58278           0.02118698
## X989           0.006440202  155.27464           0.02088050
## X990           0.004493641  222.53668           0.02187538
## X991           0.005856901  170.73876           0.02085909
## X992           0.002588458  386.33034           0.02302009
## X993           0.001544622  647.40769           0.03067422
## X994           0.002352913  425.00505           0.02382021
## X995           0.001956422  511.13722           0.02450689
## X996           0.002054053  486.84225           0.02423814
## X997           0.003495293  286.09908           0.02246938
## X998           0.003284967  304.41708           0.02206257
## X999           0.005349693  186.92662           0.02078614
## X1000          0.004419122  226.28930           0.02109912
## X1001          0.003466101  288.50858           0.02149640
## X1002          0.005733929  174.40049           0.02080355
## X1003          0.002681990  372.85740           0.02359266
## X1004          0.002332657  428.69576           0.02347613
## X1005          0.006628123  150.87229           0.02111608
## X1006          0.002370829  421.79337           0.02286248
## X1007          0.002570807  388.98290           0.02285406
## X1008          0.003085079  324.14078           0.02183076
## X1009          0.002523730  396.23891           0.02266571
## X1010          0.002055788  486.43142           0.02468754
## X1011          0.001902174  525.71415           0.02560670
## X1012          0.001884655  530.60117           0.02561567
## X1013          0.002026553  493.44868           0.02513291
## X1014          0.003264327  306.34185           0.02199538
## X1015          0.004926301  202.99206           0.02101836
## X1016          0.002000554  499.86150           0.02515853
## X1017          0.002940130  340.12100           0.02240949
## X1018          0.003040484  328.89505           0.02193180
## X1019          0.001310298  763.18534           0.04510361
## X1020          0.003057495  327.06512           0.02221394
## X1021          0.003249699  307.72085           0.02167628
## X1022          0.001234349  810.14349           0.04133914
## X1023          0.001752206  570.70911           0.02667648
## X1024          0.003117645  320.75491           0.02213245
## X1025          0.002712835  368.61813           0.02232849
## X1026          0.002737330  365.31950           0.02254692
## X1027          0.002015660  496.11533           0.02410506
## X1028          0.002129597  469.57251           0.02380207
## X1029          0.004996542  200.13842           0.02107324
## X1030          0.003930158  254.44272           0.02160320
## X1031          0.004922966  203.12958           0.02115607
## X1032          0.003695251  270.61758           0.02184730
## X1033          0.002776670  360.14369           0.02258215
## X1034          0.002343057  426.79285           0.02323708
## X1035          0.003290197  303.93317           0.02198246
```

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## X1036          0.003184538  314.01731           0.02202510
## X1037          0.002354629  424.69542           0.02451921
## X1038          0.001721925  580.74554           0.02679538
## X1039          0.002286238  437.39976           0.02363123
## X1040          0.001413357  707.53556           0.03166693
## X1041          0.002555078  391.37753           0.02259883
## X1042          0.004967568  201.30575           0.02116100
## X1043          0.005001760  199.92962           0.02131782
## X1044          0.003009178  332.31671           0.02218560
## X1045          0.003054095  327.42928           0.02219993
## X1046          0.004777375  209.31995           0.02095569
## X1047          0.005013586  199.45802           0.02095724
## X1048          0.001827152  547.29995           0.02721235
## X1049          0.002082236  480.25289           0.02523061
## X1050          0.001764523  566.72527           0.02636332
## X1051          0.002663410  375.45854           0.02322069
## X1052          0.002374884  421.07329           0.02428416
## X1053          0.001978191  505.51225           0.02491461
## X1054          0.001457238  686.22976           0.02917115
## X1055          0.003416656  292.68381           0.02217917
## X1056          0.001439778  694.55174           0.03087146
## X1057          0.002281296  438.34738           0.02384966
## X1058          0.002636505  379.28994           0.02316271
## X1059          0.002512028  398.08481           0.02379805
## X1060          0.002743585  364.48659           0.02256336
## X1061          0.002374423  421.15499           0.02379809
## X1062          0.002552608  391.75621           0.02265087
## X1063          0.002190871  456.43945           0.02414311
## X1064          0.002462443  406.10074           0.02280894
## X1065          0.004610885  216.87811           0.02370204
## X1066          0.003133794  319.10200           0.02197655
## X1067          0.001936125  516.49551           0.02512330
## X1068          0.002265424  441.41847           0.02364824
## X1069          0.002443670  409.22055           0.02470376
## X1070          0.002440458  409.75920           0.02336091
## X1071          0.001722171  580.66251           0.02669153
## X1072          0.002235319  447.36336           0.02399648
## X1073          0.001781006  561.48055           0.02582588
## X1074          0.001535118  651.41580           0.02751693
## X1075          0.001754355  570.01014           0.02577664
## X1076          0.003503681  285.41408           0.02166876
## X1077          0.001784287  560.44793           0.02639628
## X1078          0.003767415  265.43399           0.02170948
## X1079          0.001735742  576.12233           0.02652974
## X1080          0.002686356  372.25147           0.02327479
## X1081          0.002666704  374.99476           0.02341419
## X1082          0.001711138  584.40629           0.02654971
## X1083          0.001563607  639.54708           0.02739979
## X1084          0.001565886  638.61593           0.02754353
## X1085          0.001541271  648.81522           0.02699202
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## X1086            0.002657734  376.26036           0.02263028
## X1087            0.004127660  242.26800           0.02471942
## X1088            0.003060344  326.76067           0.02201419
## X1089            0.003619978  276.24477           0.02152354
## X1090            0.002008298  497.93396           0.02482316
## X1091            0.002146701  465.83112           0.02415338
## X1092            0.003003123  332.98673           0.02261373
## X1093            0.002927579  341.57918           0.02207627
## X1094            0.003295901  303.40718           0.02210224
## X1095            0.003581311  279.22739           0.02161204
## X1096            0.001798721  555.95056           0.02697933
## X1097            0.001897578  526.98760           0.02512183
## X1098            0.001658275  603.03617           0.02740277
## X1099            0.001886733  530.01679           0.02509033
## X1100            0.002722775  367.27237           0.02273008
## X1101            0.002502998  399.52083           0.02321704
## X1102            0.001546069  646.80159           0.03006142
## X1103            0.001564013  639.38088           0.02770258
## X1104            0.001720044  581.38044           0.02571316
## X1105            0.002396915  417.20287           0.02309923
## X1106            0.004266418  234.38864           0.02130606
## X1107            0.001900495  526.17861           0.02453468
## X1108            0.004140810  241.49867           0.02128741
## X1109            0.004156124  240.60882           0.02142650
## X1110            0.002929728  341.32861           0.02234131
## X1111            0.002476891  403.73191           0.02327280
## X1112            0.002147589  465.63847           0.02424013
## X1113            0.002730490  366.23457           0.02270504
## X1114            0.002276765  439.21968           0.02369938
## X1115            0.002459922  406.51701           0.02343599
## X1116            0.002657783  376.25350           0.02287878
## X1117            0.002286122  437.42201           0.02400668
## X1118            0.004581291  218.27911           0.02117423
## X1119            0.002419302  413.34228           0.02356305
## X1120            0.002294273  435.86792           0.02354081
## X1121            0.002892186  345.75928           0.02212633
## X1122            0.003126593  319.83692           0.02191706
## X1123            0.002196095  455.35379           0.02364775
## X1124            0.001868244  535.26203           0.02464109
## X1125            0.004668119  214.21903           0.02384252
## X1126            0.002422574  412.78411           0.02360213
## X1127            0.003419873  292.40855           0.02253773
## X1128            0.003866361  258.64113           0.02278548
## X1129            0.003564653  280.53218           0.02219868
## X1130            0.002703662  369.86868           0.02341008
## X1131            0.002525377  395.98041           0.02353198
## X1132            0.002067694  483.63063           0.02505004
## X1133            0.002787996  358.68062           0.02374945
## X1134            0.002818466  354.80287           0.02279208
## X1135            0.002412072  414.58131           0.02341885
```

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## X1136          0.001545469   647.05270    0.02746296
## X1137          0.001590150   628.87151    0.02744039
## X1138          0.005813594   172.01064    0.02075530
## X1139          0.006372629   156.92111    0.02074912
## X1140          0.002550551   392.07220    0.02267408
## X1141          0.003944816   253.49724    0.02130270
## X1142          0.002794702   357.81994    0.02233132
## X1143          0.003788766   263.93815    0.02133120
## X1144          0.002454923   407.34480    0.02278815
## X1145          0.002225873   449.26194    0.02359734
## X1146          0.004080028   245.09635    0.02123325
## X1147          0.002278591   438.86769    0.02408417
## X1148          0.003598978   277.85667    0.02151216
## X1149          0.003331847   300.13385    0.02179865
## X1150          0.003156336   316.82308    0.02225371
## X1151          0.004461155   224.15720    0.02105173
## X1152          0.002936077   340.59047    0.02213463
## X1153          0.002785680   358.97873    0.02234986
## X1154          0.003920318   255.08137    0.02126354
## X1155          0.003585238   278.92151    0.02157938
## X1156          0.003739459   267.41838    0.02145818
## X1157          0.003087181   323.92010    0.02214972
## X1158          0.003122181   320.28894    0.02203351
## X1159          0.003364211   297.24648    0.02161136
## X1160          0.002938388   340.32264    0.02220535
## X1161          0.002820854   354.50260    0.02224163
## X1162          0.003730909   268.03118    0.02405724
## X1163          0.003013163   331.87715    0.02182991
## X1164          0.003888524   257.16697    0.02439182
## X1165          0.003172573   315.20157    0.02165535
## X1166          0.004715291   212.07597    0.02084678
## X1167          0.003770674   265.20458    0.02135899
## X1168          0.002897052   345.17846    0.02201352
## X1169          0.002771855   360.76928    0.02211109
## X1170          0.002916174   342.91503    0.02199326
## X1171          0.002635038   379.50112    0.02228387
## X1172          0.003433993   291.20620    0.02397772
## X1173          0.003489622   286.56395    0.02388692
## X1174          0.002685299   372.39805    0.02256264
## X1175          0.004379047   228.36021    0.02093444
## X1176          0.004920384   203.23616    0.02089295
## X1177          0.002573892   388.51671    0.02275489
## X1178          0.003383775   295.52796    0.02158159
## X1179          0.003533030   283.04315    0.02155483
## X1180          0.003995575   250.27684    0.02124138
## X1181          0.003502437   285.51549    0.02167879
## X1182          0.003937704   253.95508    0.02127198
## X1183          0.003998030   250.12318    0.02129242
## X1184          0.003755317   266.28913    0.02152620
## X1185          0.003565164   280.49199    0.02152635
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## X1186          0.004022910  248.57629    0.02434663
## X1187          0.003621950  276.09438    0.02162901
## X1188          0.003698079  270.41069    0.02153657
## X1189          0.003850081  259.73478    0.02143238
## X1190          0.003294776  303.51080    0.02187160
## X1191          0.003508110  285.05378    0.02158680
## X1192          0.005105804  195.85556    0.02087737
## X1193          0.004370956  228.78290    0.02108298
## X1194          0.002587901  386.41348    0.02271527
## X1195          0.002332348  428.75242    0.02316190
## X1196          0.006482394  154.26398    0.02085060
## X1197          0.006723322  148.73601    0.02052510
## X1198          0.003265884  306.19584    0.02168422
## X1199          0.006611308  151.25599    0.02064437
## X1200          0.006989379  143.07423    0.02044985
## X1201          0.003265223  306.25779    0.02172380
## X1202          0.003378188  296.01664    0.02203437
## X1203          0.003173156  315.14370    0.02154891
## X1204          0.004909495  203.68693    0.02339564
## X1205          0.005694681  175.60247    0.02205389
## X1206          0.004329603  230.96806    0.02125774
## X1207          0.002799833  357.16411    0.02250559
## X1208          0.003439485  290.74117    0.02158920
## X1209          0.003519197  284.15570    0.02350527
## X1210          0.003263600  306.41006    0.02316660
## X1211          0.005011030  199.55978    0.02095536
## X1212          0.005125608  195.09879    0.02087970
## X1213          0.004834118  206.86297    0.02095184
## X1214          0.004037544  247.67534    0.02179607
## X1215          0.004227853  236.52666    0.02120274
## X1216          0.006698794  149.28061    0.02056993
## X1217          0.006185685  161.66359    0.02071282
## X1218          0.003386412  295.29780    0.02194319
## X1219          0.002591271  385.91105    0.02263780
## X1220          0.003128726  319.61891    0.02194905
## X1221          0.005068628  197.29207    0.02082437
## X1222          0.006360697  157.21548    0.02055681
## X1223          0.002946293  339.40954    0.02183682
## X1224          0.003168723  315.58457    0.02326229
## X1225          0.002902187  344.56779    0.02186208
## X1226          0.002864569  349.09266    0.02192196
## X1227          0.003269439  305.86287    0.02181484
## X1228          0.003186259  313.84765    0.02193511
## X1229          0.003407917  293.43435    0.02168423
## X1230          0.003531184  283.19116    0.02158235
## X1231          0.002263092  441.87328    0.02447294
## X1232          0.001955352  511.41688    0.02549374
## X1233          0.004014905  249.07190    0.02120467
## X1234          0.004030249  248.12365    0.02119819
## X1235          0.002315861  431.80479    0.02377688
```

```
## X1236              0.002041838   489.75488         0.02497434
## X1237              0.003068540   325.88783         0.02181616
## X1238              0.003027892   330.26281         0.02269046
## X1239              0.002594270   385.46491         0.02290297
## X1240              0.002488519   401.84545         0.02315920
## X1241              0.002490489   401.52754         0.02305562
## X1242              0.003473761   287.87239         0.02141984
## X1243              0.002648083   377.63169         0.02269862
## X1244              0.003031936   329.82228         0.02192797
## X1245              0.001633488   612.18687         0.02800153
## X1246              0.001653726   604.69515         0.02722794
## X1247              0.002546812   392.64777         0.02295049
## X1248              0.001444109   692.46861         0.02967062
## X1249              0.001791353   558.23721         0.02486579
## X1250              0.001682184   594.46525         0.02566710
## X1251              0.001644163   608.21226         0.02691696
## X1252              0.002175209   459.72590         0.02398148
## X1253              0.002668111   374.79704         0.02223094
## X1254              0.001491015   670.68385         0.02983031
## X1255              0.001456382   686.63285         0.03135665
## X1256              0.004021225   248.68043         0.02136773
## X1257              0.002319637   431.10186         0.02352902
## X1258              0.002077381   481.37533         0.02459526
## X1259              0.002389629   418.47500         0.02339579
## X1260              0.002310686   432.77189         0.02364078
## X1261              0.002302811   434.25186         0.02391513
## X1262              0.002234576   447.51223         0.02393275
## X1263              0.002293278   436.05710         0.02398712
## X1264              0.002158242   463.34010         0.02455527
## X1265              0.002315127   431.94172         0.02325018
## X1266              0.002389837   418.43867         0.02303567
## X1267              0.002065451   484.15573         0.02385103
## X1268              0.002104071   475.26921         0.02439568
## X1269              0.003111031   321.43690         0.02285619
## X1270              0.001875320   533.24239         0.02502449
## X1271              0.002829724   353.39138         0.02284587
## X1272              0.001668780   599.24014         0.02853266
## X1273              0.003842419   260.25274         0.02177675
## X1274              0.003600792   277.71666         0.02212752
## X1275              0.001663014   601.31795         0.02642058
## X1276              0.002684667   372.48573         0.02238203
## X1277              0.002922785   342.13938         0.02206518
## X1278              0.004061659   246.20478         0.02144770
## X1279              0.002965891   337.16683         0.02207268
## X1280              0.005082988   196.73466         0.02728269
## X1281              0.002650297   377.31615         0.02266352
## X1282              0.001904336   525.11734         0.02553196
## X1283              0.002027509   493.21604         0.02461051
## X1284              0.001903472   525.35590         0.02517895
## X1285              0.002148309   465.48246         0.02472295
```

```
## X1286               0.002679002   373.27333                0.02291487
## X1287               0.002745029   364.29485                0.02225434
## X1288               0.002644733   378.11003                0.02242469
## X1289               0.003945591   253.44749                0.02133979
## X1290               0.002347549   425.97622                0.02432313
## X1291               0.001879537   532.04604                0.02585092
## X1292               0.001658717   602.87569                0.02742838
## X1293               0.004283125   233.47441                0.02127576
## X1294               0.001775642   563.17644                0.02511043
## X1295               0.001756120   569.43704                0.02661273
## X1296               0.002296748   435.39824                0.02360956
## X1297               0.002607867   383.45515                0.02395351
## X1298               0.002827593   353.65773                0.02275064
## X1299               0.002341621   427.05454                0.02404024
## X1300               0.002432463   411.10602                0.02337719
## X1301               0.002065975   484.03299                0.02474731
## X1302               0.002748505   363.83417                0.02200445
## X1303               0.002436762   410.38067                0.02275279
## X1304               0.002392484   417.97564                0.02322588
## X1305               0.002521822   396.53873                0.02286025
## X1306               0.002473261   404.32450                0.02311297
## X1307               0.001958926   510.48368                0.02496062
## X1308               0.001431361   698.63581                0.03012414
## X1309               0.001442363   693.30691                0.02905075
## X1310               0.003281825   304.70855                0.02182480
## X1311               0.003934758   254.14523                0.02134859
##
## $usekernel
## [1] TRUE
##
## $varnames
## [1] "BrestDensity"          "CalcType"                "CalcDistribution"
## [4] "LesionVolume"          "LesionArea"
"SphericalDisproportion"
## [7] "Sphericity"            "SurfaceToVolumeRatio"
##
## $xNames
## [1] "BrestDensity"          "CalcType"                "CalcDistribution"
## [4] "LesionVolume"          "LesionArea"
"SphericalDisproportion"
## [7] "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] 0.7019590 0.7454545 0.6680871 0.6492537 0.7012593 0.6385261
## 0.5979334
##   [8] 0.6480186 0.7030303 0.6156142 0.6854191 0.7126866 0.7724455
## 0.7248134
##  [15] 0.6642992 0.7072331 0.5932836 0.5878788 0.7097902 0.6676136
## 0.7621269
##  [22] 0.5941725 0.6907003 0.6819030 0.6944056 0.6797203 0.5835701
## 0.6467803
##  [29] 0.6805970 0.6916188 0.6259328 0.5792910 0.6511194 0.7150402
## 0.6142191
##  [36] 0.6368937 0.6669776 0.6786381 0.6282051 0.6855478 0.7329757
## 0.7410038
##  [43] 0.7483428 0.7113662 0.5972028 0.7040184 0.6699301 0.6618470
## 0.6410914
##  [50] 0.7198622 0.6865672 0.6201026 0.6666667 0.6771527 0.6903409
## 0.7322618
##  [57] 0.6391608 0.7104640 0.6875000 0.6396270 0.6803674 0.6877367
## 0.6809701
##  [64] 0.7440559 0.6060606 0.5678530 0.7221445 0.6436567 0.7069129
## 0.6291619
##  [71] 0.6590485 0.7378731 0.6468427 0.7375431 0.6969001 0.6264205
## 0.6791045
##  [78] 0.5671329 0.6659564 0.5729944 0.6541511 0.6233675 0.6717949
## 0.6907649
##  [85] 0.6734788 0.6902411 0.7244755 0.7303504 0.6129261 0.7244546
## 0.7143513
##  [92] 0.7572905 0.6751399 0.6129261 0.7922108 0.6004662 0.6385261
## 0.7340987
##  [99] 0.6331002 0.6785304

## Cross-Validated (10 fold, repeated 10 times) Confusion Matrix
##
## (entries are percentual average cell counts across resamples)
##
##           Reference
## Prediction  BENIGN MALIGNANT
##    BENIGN     40.0      27.9
##    MALIGNANT   9.2      22.9
##
##  Accuracy (average) : 0.6294
```

Confusion Matrix nb
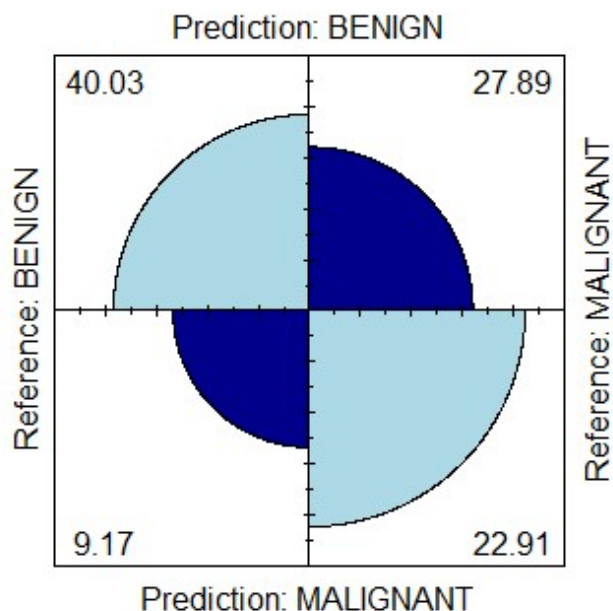

```
## [1] 0.4509009

## [1] 0.8136434

## [1] 0.6293669
```

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 : 1110
##
## Objective Function Value : -1102.263
## Training error : 0.393593
## Probability model included.

##   [1] 0.6777052 0.5772675 0.6762238 0.6623134 0.7177156 0.6190814
0.6243004
##   [8] 0.6389925 0.6272727 0.6335247 0.7271455 0.6833022 0.6833525
0.5480186
##  [15] 0.6155303 0.5797203 0.6349024 0.6808266 0.6744792 0.5641325
0.7235431
##  [22] 0.7989739 0.5970149 0.6230769 0.5686553 0.6140069 0.6119403
```

```
0.6483209
##  [29] 0.6228438 0.6268657 0.6529138 0.5771780 0.6169920 0.6012127
0.6084960
##  [36] 0.6387593 0.6676772 0.6734266 0.7137784 0.6698048 0.6636051
0.6219683
##  [43] 0.6466884 0.6102564 0.6679104 0.7206439 0.5981352 0.6466200
0.6086754
##  [50] 0.6330654 0.6119792 0.6891572 0.6060606 0.6560168 0.6433984
0.7070034
##  [57] 0.5846549 0.6463835 0.6895522 0.6429924 0.5899767 0.6389678
0.6769231
##  [64] 0.5740528 0.6222015 0.6215844 0.6751399 0.7774971 0.6338619
0.6053504
##  [71] 0.6578089 0.6344697 0.6532183 0.6146958 0.6608496 0.6140392
0.6787405
##  [78] 0.6392257 0.6072261 0.6454650 0.6545455 0.6311553 0.5533800
0.5946828
##  [85] 0.6159049 0.6777052 0.6264064 0.6946023 0.6514351 0.7283582
0.6406250
##  [92] 0.6212121 0.7063146 0.6339839 0.5336174 0.6613088 0.6424907
0.7168843
##  [99] 0.6611474 0.6200466

## Cross-Validated (10 fold, repeated 10 times) Confusion Matrix
##
## (entries are percentual average cell counts across resamples)
##
##            Reference
## Prediction  BENIGN MALIGNANT
##    BENIGN      37.5      26.2
##    MALIGNANT   11.7      24.6
##
##  Accuracy (average) : 0.6202
```

Confusion Matrix svm-l

Prediction: BENIGN

37.45	26.23
11.75	24.57

Reference: BENIGN (left axis) / Reference: MALIGNANT (right axis)

Prediction: MALIGNANT
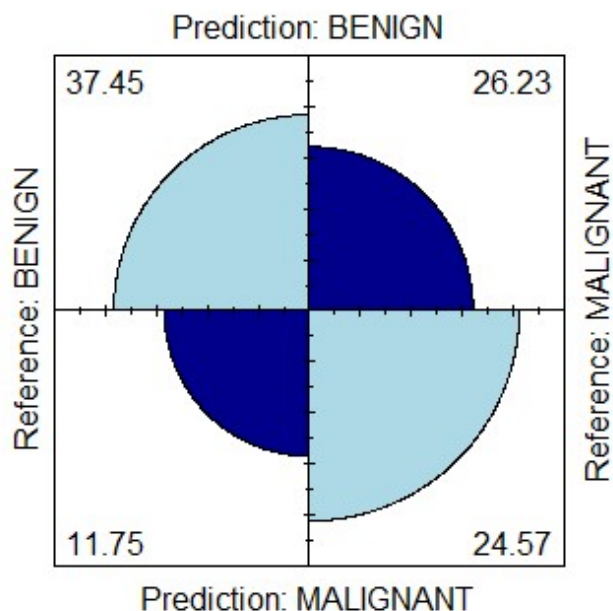
```
## [1] 0.4836336
```

```
## [1] 0.7612403
```

```
## [1] 0.6202136
```

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 =  0.258105254629504
##
## Number of Support Vectors : 965
##
## Objective Function Value : -840.5499
## Training error : 0.26926
## Probability model included.

##   [1] 0.8388060 0.7258741 0.7194030 0.7845149 0.7400568 0.7560634
0.6888993
##   [8] 0.7095571 0.8004662 0.7028918 0.6799082 0.7840485 0.7424242
0.7740528
##  [15] 0.8102564 0.7250466 0.7507102 0.8080019 0.7148106 0.6471549
0.7489510
```

```
##   [22] 0.7236474 0.7566434 0.7874126 0.7628014 0.8498134 0.6875000
0.6884328
##   [29] 0.7765786 0.7230769 0.7355410 0.7762238 0.7118845 0.7981352
0.6735322
##   [36] 0.7393466 0.8309659 0.7448909 0.7414918 0.7673938 0.7154851
0.7714552
##   [43] 0.7526980 0.7488340 0.7621125 0.7458022 0.6615385 0.7552239
0.7210821
##   [50] 0.6991604 0.7122201 0.7398601 0.7310023 0.7977038 0.7259795
0.7308239
##   [57] 0.7258324 0.7855114 0.7113662 0.7111742 0.7543054 0.6966705
0.7505828
##   [64] 0.7526042 0.7779564 0.7793561 0.7882893 0.7817164 0.7377622
0.7791045
##   [71] 0.7104640 0.6808266 0.7824337 0.7252799 0.7266791 0.6899767
0.7428904
##   [78] 0.7442021 0.8002296 0.7400689 0.8104011 0.7244546 0.7638695
0.7216992
##   [85] 0.7478693 0.6747159 0.7460354 0.6941447 0.6976690 0.7213542
0.7590951
##   [92] 0.7028918 0.7944056 0.7866138 0.7017257 0.7111742 0.7623601
0.8456157
##   [99] 0.7891791 0.6634033

## Cross-Validated (10 fold, repeated 10 times) Confusion Matrix
## 
## (entries are percentual average cell counts across resamples)
## 
##            Reference
## Prediction  BENIGN MALIGNANT
##    BENIGN      37.3      18.7
##    MALIGNANT   11.9      32.1
## 
##  Accuracy (average) : 0.6936
```

Confusion Matrix svm-r

Prediction: BENIGN

| 37.31 | | 18.75 |

Reference: BENIGN

Reference: MALIGNANT

| 11.89 | | 32.05 |

Prediction: MALIGNANT
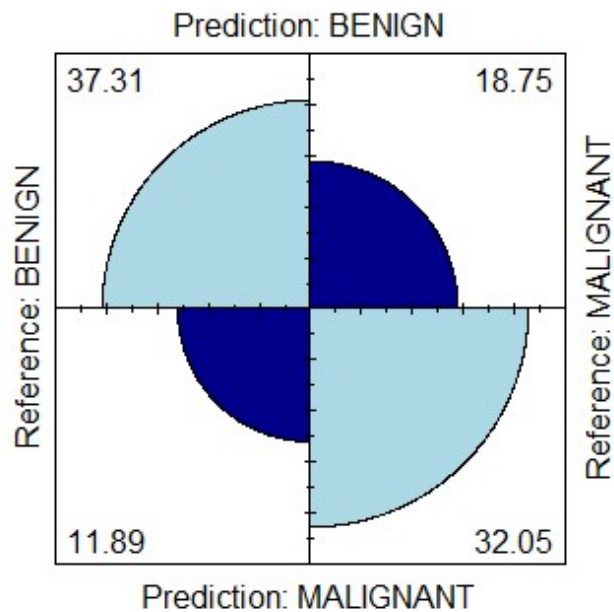
```
## [1] 0.6309309

## [1] 0.7582946

## [1] 0.6935927
```

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: 8
##
##         OOB estimate of  error rate: 26.85%
## Confusion matrix:
##           BENIGN MALIGNANT class.error
## BENIGN       479       166   0.2573643
## MALIGNANT    186       480   0.2792793

##    [1] 0.8103330 0.8136364 0.8102181 0.8259095 0.8065814 0.8322062
0.7995569
##    [8] 0.7909091 0.7969697 0.7951259 0.7626866 0.7915112 0.8103730
0.8514351
##   [15] 0.8493007 0.8107509 0.8496686 0.8565341 0.7629162 0.7105877
0.8168998
##   [22] 0.7503498 0.7602564 0.8292541 0.7895522 0.8517957 0.7999067
```

```
0.8076026
##  [29] 0.8228473 0.8648680 0.8052705 0.8113054 0.8283617 0.8657343
0.7642045
##  [36] 0.8135653 0.8355824 0.7991963 0.8214452 0.8396096 0.8247435
0.7961754
##  [43] 0.8210103 0.8225280 0.8393800 0.7539646 0.8000000 0.8231917
0.7988573
##  [50] 0.7628265 0.7480177 0.7698135 0.7702797 0.8531573 0.8559935
0.8548769
##  [57] 0.7938002 0.8246922 0.7796785 0.7791193 0.8004592 0.8079219
0.8311189
##  [64] 0.7946259 0.8291619 0.8154593 0.8608496 0.8129664 0.7988345
0.8337543
##  [71] 0.7940341 0.7626866 0.8212595 0.8116838 0.7776353 0.6917249
0.7828671
##  [78] 0.8014925 0.8212400 0.7601607 0.8417677 0.8198622 0.8182984
0.8219288
##  [85] 0.7961648 0.7479877 0.7707556 0.7600459 0.7850816 0.8223248
0.8582090
##  [92] 0.7676073 0.8051282 0.8652052 0.7965252 0.7626657 0.8322062
0.8606576
##  [99] 0.8937733 0.7459207

## Cross-Validated (10 fold, repeated 10 times) Confusion Matrix
##
## (entries are percentual average cell counts across resamples)
##
##            Reference
## Prediction  BENIGN MALIGNANT
##   BENIGN      36.1      14.2
##   MALIGNANT   13.1      36.6
##
##  Accuracy (average) : 0.7272
```

Confusion Matrix rf

Prediction: BENIGN

36.13	14.21
13.07	36.59

Prediction: MALIGNANT

(Reference: BENIGN / Reference: MALIGNANT)
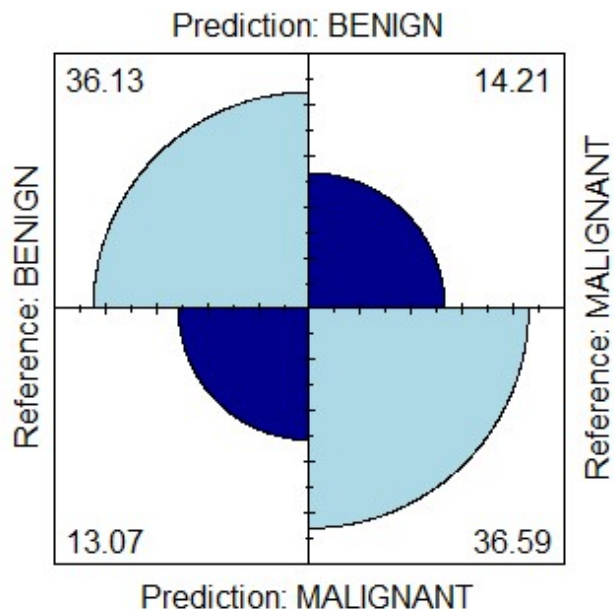
```
## [1] 0.7202703
## [1] 0.7344186
## [1] 0.7272311
```

Specificity	0.7202703
Sensitivity	0.7344186
Accuracy	0.7272311

Let us display ROC curves for the all created ML methods:
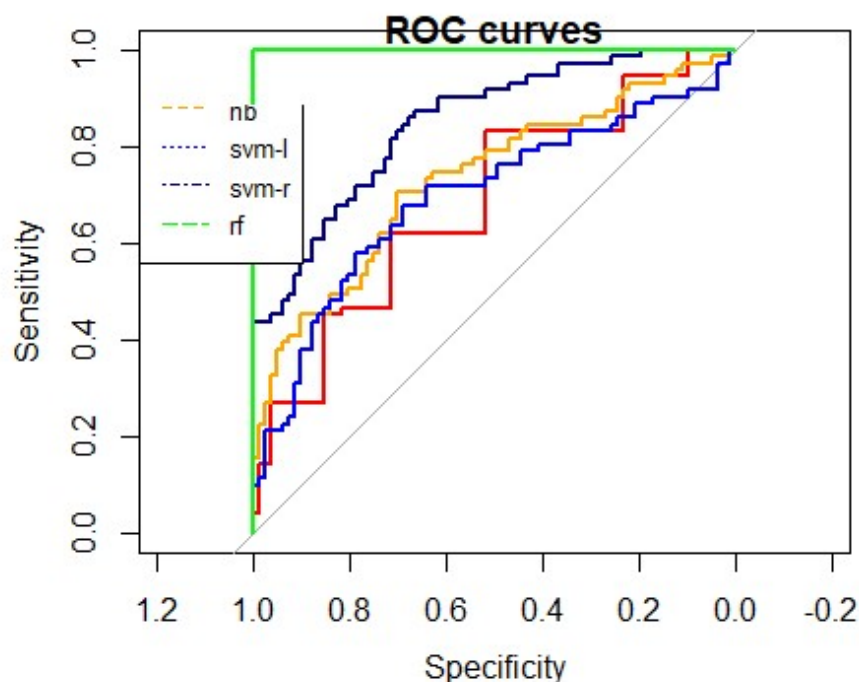
Compare ROC values of all models:

```
##         Resample  k-nn~ROC k-nn~Sens k-nn~Spec    nb~ROC    nb~Sens
nb~Spec
## 1   Fold01.Rep01 0.6778218 0.6875000 0.5522388 0.7012593 0.8593750
0.4179104
## 2   Fold01.Rep02 0.7316931 0.6406250 0.6567164 0.7126866 0.8593750
0.4925373
## 3   Fold01.Rep03 0.6275058 0.4769231 0.6666667 0.7097902 0.9076923
0.3636364
## 4   Fold01.Rep04 0.6245921 0.6000000 0.6212121 0.6797203 0.7846154
0.5000000
## 5   Fold01.Rep05 0.6117107 0.6153846 0.5671642 0.7040184 0.8307692
0.4626866
## 6   Fold01.Rep06 0.6774384 0.6562500 0.6060606 0.6666667 0.8437500
0.3636364
## 7   Fold01.Rep07 0.5979021 0.5076923 0.6212121 0.6396270 0.7692308
0.4090909
## 8   Fold01.Rep08 0.6486014 0.6307692 0.6212121 0.7221445 0.8000000
0.4848485
## 9   Fold01.Rep09 0.6837995 0.7230769 0.5606061 0.7244755 0.8769231
0.4848485
## 10  Fold01.Rep10 0.6253551 0.6562500 0.5151515 0.6129261 0.8750000
0.3787879
## 11  Fold02.Rep01 0.6161883 0.6153846 0.5671642 0.5979334 0.8000000
0.3731343
## 12  Fold02.Rep02 0.6985774 0.5937500 0.6865672 0.7248134 0.8437500
```

```
      0.4776119
## 13   Fold02.Rep03 0.7817164 0.7031250 0.7611940 0.7621269 0.9375000
      0.5522388
## 14   Fold02.Rep04 0.6289062 0.6250000 0.5303030 0.6467803 0.7968750
      0.4242424
## 15   Fold02.Rep05 0.6793377 0.7187500 0.4925373 0.6618470 0.8750000
      0.4029851
## 16   Fold02.Rep06 0.5867661 0.6250000 0.5303030 0.6903409 0.8750000
      0.4696970
## 17   Fold02.Rep07 0.7676373 0.7187500 0.6969697 0.6877367 0.8125000
      0.4848485
## 18   Fold02.Rep08 0.5872396 0.4843750 0.5303030 0.7069129 0.8125000
      0.4545455
## 19   Fold02.Rep09 0.6239347 0.6093750 0.5454545 0.6264205 0.7968750
      0.3636364
## 20   Fold02.Rep10 0.5775058 0.6461538 0.4545455 0.6004662 0.8769231
      0.3636364
## 21   Fold03.Rep01 0.6178322 0.4769231 0.5909091 0.7030303 0.8461538
      0.4848485
## 22   Fold03.Rep02 0.6331803 0.6000000 0.6567164 0.7072331 0.8307692
      0.4776119
## 23   Fold03.Rep03 0.5979334 0.6615385 0.5522388 0.6907003 0.8307692
      0.3880597
## 24   Fold03.Rep04 0.6344432 0.5538462 0.5671642 0.6916188 0.9076923
      0.3582090
## 25   Fold03.Rep05 0.5903685 0.5781250 0.5522388 0.6669776 0.8437500
      0.4029851
## 26   Fold03.Rep06 0.6300699 0.5230769 0.5606061 0.6391608 0.7538462
      0.4848485
## 27   Fold03.Rep07 0.6779720 0.6769231 0.6363636 0.7440559 0.8153846
      0.4848485
## 28   Fold03.Rep08 0.6562500 0.5468750 0.6716418 0.6590485 0.8125000
      0.4925373
## 29   Fold03.Rep09 0.5686480 0.4615385 0.5454545 0.5671329 0.8153846
      0.3787879
## 30   Fold03.Rep10 0.6678530 0.5692308 0.6716418 0.7340987 0.8461538
      0.5223881
## 31   Fold04.Rep01 0.6326959 0.6250000 0.5820896 0.7019590 0.8750000
      0.4776119
## 32   Fold04.Rep02 0.6374126 0.6153846 0.5606061 0.5878788 0.7538462
      0.4090909
## 33   Fold04.Rep03 0.6118881 0.6153846 0.5757576 0.6944056 0.8000000
      0.4545455
## 34   Fold04.Rep04 0.5650653 0.5156250 0.6567164 0.5792910 0.6562500
      0.4328358
## 35   Fold04.Rep05 0.6066434 0.5230769 0.5606061 0.6282051 0.7692308
      0.4545455
## 36   Fold04.Rep06 0.6288479 0.6406250 0.5671642 0.6875000 0.8125000
      0.4776119
## 37   Fold04.Rep07 0.6087256 0.7230769 0.4179104 0.5678530 0.8615385
```

```
0.2985075
## 38  Fold04.Rep08 0.6190586 0.5692308 0.5820896 0.6468427 0.8307692
0.3880597
## 39  Fold04.Rep09 0.5722948 0.6093750 0.5671642 0.5729944 0.7812500
0.3283582
## 40  Fold04.Rep10 0.6575201 0.6615385 0.5820896 0.6785304 0.8000000
0.4328358
## 41  Fold05.Rep01 0.6955711 0.6307692 0.6515152 0.7454545 0.8153846
0.5303030
## 42  Fold05.Rep02 0.6374290 0.5937500 0.6060606 0.6676136 0.6875000
0.5303030
## 43  Fold05.Rep03 0.5105350 0.4218750 0.5757576 0.5835701 0.7500000
0.3787879
## 44  Fold05.Rep04 0.6153846 0.6307692 0.5522388 0.7150402 0.8615385
0.4328358
## 45  Fold05.Rep05 0.6473881 0.5312500 0.6417910 0.7329757 0.8125000
0.5522388
## 46  Fold05.Rep06 0.6466131 0.4923077 0.6865672 0.6803674 0.7538462
0.5373134
## 47  Fold05.Rep07 0.5670476 0.6250000 0.5074627 0.6436567 0.7812500
0.4776119
## 48  Fold05.Rep08 0.6613088 0.6307692 0.5373134 0.6969001 0.8307692
0.4776119
## 49  Fold05.Rep09 0.6444729 0.6250000 0.6119403 0.6233675 0.7656250
0.4179104
## 50  Fold05.Rep10 0.6210938 0.5468750 0.6060606 0.6129261 0.7968750
0.3484848
## 51  Fold06.Rep01 0.6712831 0.6562500 0.6212121 0.6680871 0.8125000
0.3484848
## 52  Fold06.Rep02 0.5504662 0.5846154 0.5303030 0.5941725 0.8000000
0.3939394
## 53  Fold06.Rep03 0.7324914 0.6769231 0.6119403 0.6805970 0.8153846
0.4925373
## 54  Fold06.Rep04 0.6640625 0.7031250 0.5671642 0.6368937 0.8281250
0.3582090
## 55  Fold06.Rep05 0.7026515 0.6406250 0.6515152 0.7483428 0.8437500
0.4696970
## 56  Fold06.Rep06 0.6497130 0.6769231 0.5223881 0.7198622 0.9538462
0.2985075
## 57  Fold06.Rep07 0.6529277 0.7230769 0.5522388 0.6291619 0.8000000
0.4477612
## 58  Fold06.Rep08 0.6468050 0.8281250 0.4477612 0.6791045 0.9062500
0.4029851
## 59  Fold06.Rep09 0.6691931 0.6250000 0.6567164 0.6907649 0.8281250
0.4925373
## 60  Fold06.Rep10 0.6842710 0.6153846 0.6716418 0.7143513 0.8769231
0.4477612
## 61  Fold07.Rep01 0.6724580 0.6093750 0.6268657 0.6492537 0.7656250
0.5223881
## 62  Fold07.Rep02 0.6889782 0.5538462 0.7462687 0.6854191 0.8307692
```

```
0.4626866
## 63   Fold07.Rep03 0.5852379 0.5312500 0.5223881 0.6259328 0.7187500
0.4626866
## 64   Fold07.Rep04 0.6820196 0.7187500 0.5671642 0.6786381 0.8593750
0.4328358
## 65   Fold07.Rep05 0.6244755 0.5230769 0.6060606 0.5972028 0.7692308
0.4393939
## 66   Fold07.Rep06 0.6406250 0.5312500 0.6716418 0.6201026 0.7656250
0.4029851
## 67   Fold07.Rep07 0.5865205 0.5156250 0.5671642 0.7378731 0.8593750
0.5970149
## 68   Fold07.Rep08 0.6364820 0.5625000 0.6666667 0.6659564 0.7500000
0.4545455
## 69   Fold07.Rep09 0.6167623 0.5846154 0.5522388 0.6902411 0.8769231
0.3582090
## 70   Fold07.Rep10 0.6373601 0.6250000 0.6119403 0.6751399 0.7812500
0.4179104
## 71   Fold08.Rep01 0.6105410 0.5625000 0.6119403 0.6385261 0.8125000
0.3731343
## 72   Fold08.Rep02 0.7019518 0.6923077 0.6119403 0.7724455 0.9076923
0.5223881
## 73   Fold08.Rep03 0.6041278 0.6875000 0.5373134 0.6511194 0.7968750
0.3880597
## 74   Fold08.Rep04 0.6284382 0.6000000 0.5606061 0.6855478 0.8769231
0.3484848
## 75   Fold08.Rep05 0.6552448 0.5230769 0.6969697 0.6699301 0.8153846
0.5303030
## 76   Fold08.Rep06 0.6470723 0.6307692 0.5522388 0.6771527 0.8615385
0.4179104
## 77   Fold08.Rep07 0.6967853 0.6307692 0.6417910 0.7375431 0.8615385
0.4626866
## 78   Fold08.Rep08 0.6670942 0.5937500 0.6119403 0.6541511 0.7812500
0.4477612
## 79   Fold08.Rep09 0.5891335 0.4843750 0.6363636 0.7303504 0.7968750
0.4242424
## 80   Fold08.Rep10 0.7602612 0.6875000 0.7014925 0.7922108 0.9218750
0.5671642
## 81   Fold09.Rep01 0.6729604 0.6615385 0.6363636 0.6480186 0.8000000
0.5151515
## 82   Fold09.Rep02 0.5801373 0.5781250 0.5151515 0.6642992 0.8437500
0.4393939
## 83   Fold09.Rep03 0.6020979 0.5692308 0.5303030 0.6142191 0.8307692
0.4242424
## 84   Fold09.Rep04 0.7001657 0.6093750 0.6666667 0.7410038 0.8437500
0.5606061
## 85   Fold09.Rep05 0.6359608 0.5625000 0.5671642 0.6410914 0.7656250
0.4776119
## 86   Fold09.Rep06 0.6758898 0.6153846 0.6417910 0.7322618 0.8615385
0.4925373
## 87   Fold09.Rep07 0.6255830 0.5312500 0.6567164 0.6809701 0.8437500
```

```
0.4925373
## 88  Fold09.Rep08 0.6243590 0.5692308 0.6212121 0.6717949 0.8000000
0.5151515
## 89  Fold09.Rep09 0.6022962 0.5692308 0.5970149 0.7244546 0.8153846
0.5074627
## 90  Fold09.Rep10 0.6126399 0.5781250 0.6119403 0.6385261 0.6562500
0.5522388
## 91  Fold10.Rep01 0.5873708 0.5846154 0.5671642 0.6156142 0.7538462
0.4776119
## 92  Fold10.Rep02 0.5573694 0.5781250 0.4925373 0.5932836 0.6406250
0.4776119
## 93  Fold10.Rep03 0.6142724 0.6250000 0.5820896 0.6819030 0.8593750
0.4776119
## 94  Fold10.Rep04 0.6011481 0.6000000 0.5373134 0.7113662 0.8000000
0.4776119
## 95  Fold10.Rep05 0.6703789 0.6769231 0.5820896 0.6865672 0.9538462
0.2985075
## 96  Fold10.Rep06 0.5870028 0.6250000 0.5000000 0.7104640 0.7968750
0.4393939
## 97  Fold10.Rep07 0.6102036 0.5937500 0.5757576 0.6060606 0.7187500
0.5000000
## 98  Fold10.Rep08 0.6063146 0.5692308 0.6268657 0.6734788 0.3384615
0.7910448
## 99  Fold10.Rep09 0.7779564 0.7538462 0.6716418 0.7572905 0.8923077
0.5522388
## 100 Fold10.Rep10 0.5770396 0.5692308 0.5000000 0.6331002 0.7384615
0.3939394
##      svm-l~ROC svm-l~Sens svm-l~Spec svm-r~ROC svm-r~Sens svm-r~Spec
rf~ROC
## 1    0.6777052  0.7968750  0.4477612 0.7250466  0.7500000  0.5970149
0.8107509
## 2    0.7271455  0.8437500  0.5074627 0.7560634  0.7968750  0.6417910
0.8322062
## 3    0.7235431  0.7384615  0.5454545 0.7566434  0.7692308  0.6969697
0.7602564
## 4    0.6529138  0.7384615  0.5151515 0.7310023  0.7384615  0.6515152
0.7702797
## 5    0.6636051  0.7846154  0.5223881 0.7526980  0.8461538  0.5671642
0.8210103
## 6    0.6119792  0.7656250  0.3939394 0.7118845  0.7656250  0.5757576
0.8283617
## 7    0.5899767  0.7384615  0.4545455 0.7505828  0.8000000  0.6666667
0.8311189
## 8    0.6578089  0.7230769  0.5454545 0.7944056  0.7230769  0.6666667
0.8051282
## 9    0.6545455  0.8000000  0.5303030 0.7638695  0.7692308  0.6363636
0.8182984
## 10   0.6406250  0.7968750  0.3787879 0.7824337  0.8125000  0.6515152
0.8212595
## 11   0.5772675  0.7538462  0.4477612 0.7148106  0.6461538  0.6268657
```

```
0.7629162
## 12  0.6833022  0.7812500  0.4925373 0.7845149  0.7812500  0.6417910
0.8259095
## 13  0.7989739  0.9062500  0.6119403 0.8498134  0.8125000  0.7313433
0.8517957
## 14  0.5771780  0.7343750  0.4696970 0.7308239  0.6875000  0.6666667
0.8548769
## 15  0.6219683  0.8281250  0.4477612 0.7458022  0.9062500  0.4626866
0.7539646
## 16  0.6891572  0.8125000  0.3939394 0.7393466  0.7968750  0.5454545
0.8135653
## 17  0.6389678  0.7968750  0.4545455 0.7793561  0.7812500  0.6818182
0.8154593
## 18  0.6344697  0.7031250  0.5000000 0.7111742  0.6406250  0.6666667
0.7626657
## 19  0.6311553  0.7031250  0.4545455 0.6747159  0.7031250  0.6363636
0.7479877
## 20  0.6212121  0.8461538  0.3636364 0.6899767  0.7384615  0.4696970
0.6917249
## 21  0.6762238  0.8153846  0.4848485 0.8004662  0.7384615  0.7272727
0.7969697
## 22  0.6833525  0.6769231  0.6119403 0.8388060  0.8153846  0.7313433
0.8103330
## 23  0.5970149  0.7846154  0.4179104 0.7765786  0.7692308  0.7014925
0.8228473
## 24  0.6169920  0.6615385  0.5074627 0.7113662  0.6615385  0.5671642
0.7796785
## 25  0.6466884  0.7656250  0.5074627 0.7210821  0.7812500  0.6119403
0.7988573
## 26  0.6060606  0.8153846  0.4545455 0.7414918  0.7076923  0.6666667
0.8214452
## 27  0.6769231  0.7538462  0.5454545 0.7377622  0.7692308  0.6363636
0.7988345
## 28  0.6532183  0.7656250  0.5522388 0.7891791  0.8125000  0.7164179
0.8937733
## 29  0.5533800  0.7384615  0.3787879 0.6976690  0.8153846  0.5000000
0.7850816
## 30  0.7063146  0.8153846  0.5671642 0.8002296  0.7076923  0.7761194
0.8212400
## 31  0.6623134  0.8125000  0.4925373 0.7840485  0.8593750  0.5223881
0.7915112
## 32  0.5480186  0.7538462  0.3939394 0.7258741  0.8000000  0.5151515
0.8136364
## 33  0.6230769  0.7692308  0.5000000 0.7762238  0.8307692  0.6212121
0.8113054
## 34  0.6012127  0.6250000  0.5223881 0.7236474  0.6406250  0.6716418
0.7503498
## 35  0.6102564  0.7230769  0.4090909 0.7398601  0.7538462  0.6666667
0.7698135
## 36  0.6560168  0.7500000  0.5223881 0.7714552  0.7656250  0.6567164
```

```
0.7961754
## 37  0.5740528  0.8000000  0.3432836 0.6808266  0.8153846  0.5223881
0.7626866
## 38  0.6146958  0.7384615  0.4029851 0.6966705  0.6769231  0.5970149
0.8079219
## 39  0.5946828  0.7187500  0.4029851 0.7028918  0.7343750  0.5820896
0.7676073
## 40  0.6339839  0.7384615  0.4626866 0.7244546  0.7230769  0.5671642
0.8198622
## 41  0.7177156  0.7692308  0.5909091 0.8102564  0.8000000  0.6818182
0.8493007
## 42  0.6155303  0.6406250  0.5606061 0.7400568  0.6875000  0.6515152
0.8065814
## 43  0.5686553  0.6406250  0.5000000 0.6735322  0.7656250  0.5606061
0.7642045
## 44  0.6084960  0.7846154  0.4179104 0.7628014  0.8153846  0.5970149
0.7895522
## 45  0.6679104  0.7187500  0.5820896 0.7259795  0.7031250  0.6865672
0.8559935
## 46  0.6433984  0.7076923  0.5373134 0.7621125  0.8153846  0.6865672
0.8393800
## 47  0.6222015  0.7187500  0.5522388 0.7266791  0.7500000  0.6268657
0.7776353
## 48  0.6608496  0.7538462  0.5223881 0.7779564  0.7846154  0.7014925
0.8291619
## 49  0.6159049  0.7656250  0.4328358 0.7017257  0.6875000  0.5671642
0.7965252
## 50  0.5336174  0.6562500  0.4848485 0.7478693  0.7031250  0.6818182
0.7961648
## 51  0.6190814  0.7187500  0.4090909 0.8080019  0.8125000  0.6666667
0.8565341
## 52  0.5797203  0.7076923  0.4090909 0.7095571  0.7230769  0.6212121
0.7909091
## 53  0.6140069  0.7538462  0.4626866 0.7448909  0.7846154  0.5970149
0.7991963
## 54  0.6387593  0.8281250  0.4029851 0.6884328  0.7812500  0.5671642
0.8076026
## 55  0.7206439  0.8281250  0.5151515 0.7855114  0.8125000  0.6818182
0.8246922
## 56  0.7070034  0.8615385  0.4626866 0.7552239  0.7692308  0.5970149
0.8231917
## 57  0.6215844  0.6923077  0.4328358 0.7442021  0.7692308  0.5820896
0.8014925
## 58  0.6140392  0.8281250  0.4029851 0.7817164  0.8906250  0.4925373
0.8129664
## 59  0.6777052  0.7656250  0.5223881 0.8456157  0.8281250  0.7761194
0.8606576
## 60  0.6613088  0.8000000  0.4776119 0.6941447  0.7384615  0.5522388
0.7600459
## 61  0.6243004  0.7500000  0.5074627 0.6888993  0.6875000  0.6567164
```

```
0.7995569
## 62  0.6349024  0.8307692  0.4179104 0.6799082  0.6615385  0.6119403
0.7626866
## 63  0.6119403  0.7187500  0.4925373 0.7154851  0.7031250  0.7164179
0.8247435
## 64  0.6676772  0.8281250  0.4477612 0.7355410  0.8125000  0.5373134
0.8052705
## 65  0.5981352  0.7384615  0.4242424 0.7489510  0.8000000  0.6666667
0.8168998
## 66  0.5846549  0.7500000  0.4477612 0.7122201  0.7968750  0.5671642
0.7480177
## 67  0.6751399  0.7812500  0.5820896 0.8104011  0.7656250  0.7164179
0.8417677
## 68  0.6787405  0.7343750  0.4696970 0.7104640  0.7343750  0.5606061
0.7940341
## 69  0.6264064  0.7384615  0.4776119 0.7543054  0.6923077  0.6716418
0.8004592
## 70  0.6424907  0.7500000  0.4626866 0.7590951  0.7343750  0.6716418
0.8582090
## 71  0.6389925  0.7812500  0.3283582 0.7028918  0.7343750  0.5820896
0.7951259
## 72  0.6808266  0.8153846  0.4626866 0.7740528  0.8153846  0.6417910
0.8514351
## 73  0.6483209  0.7343750  0.4179104 0.7488340  0.7968750  0.5820896
0.8225280
## 74  0.6734266  0.8153846  0.5454545 0.7981352  0.8615385  0.6818182
0.8657343
## 75  0.6466200  0.8000000  0.5606061 0.7874126  0.7538462  0.6818182
0.8292541
## 76  0.6463835  0.7538462  0.5373134 0.7977038  0.8153846  0.6716418
0.8531573
## 77  0.7774971  0.8615385  0.4776119 0.7216992  0.7230769  0.5970149
0.8219288
## 78  0.6392257  0.7343750  0.4776119 0.7252799  0.7812500  0.6119403
0.8116838
## 79  0.6946023  0.7656250  0.5757576 0.7526042  0.8281250  0.6515152
0.7946259
## 80  0.7168843  0.8437500  0.5970149 0.7866138  0.7031250  0.7611940
0.8652052
## 81  0.6272727  0.7076923  0.5454545 0.7424242  0.7384615  0.6666667
0.8103730
## 82  0.6744792  0.7812500  0.5454545 0.7507102  0.7343750  0.6363636
0.8496686
## 83  0.6228438  0.7846154  0.4696970 0.6615385  0.7076923  0.5606061
0.8000000
## 84  0.7137784  0.8125000  0.5303030 0.8309659  0.7656250  0.7575758
0.8355824
## 85  0.6086754  0.7187500  0.4626866 0.6875000  0.6875000  0.5970149
0.7999067
## 86  0.6895522  0.7846154  0.5223881 0.7258324  0.6923077  0.6716418
```

```
0.7938002
## 87  0.6338619  0.7812500  0.5074627 0.7460354  0.7500000  0.6567164
0.7707556
## 88  0.6072261  0.7384615  0.5454545 0.7428904  0.7384615  0.6515152
0.7828671
## 89  0.6514351  0.7384615  0.5671642 0.7882893  0.8000000  0.6865672
0.8608496
## 90  0.6611474  0.6562500  0.5522388 0.7623601  0.7343750  0.6716418
0.8322062
## 91  0.6335247  0.7230769  0.5223881 0.7194030  0.7384615  0.5820896
0.8102181
## 92  0.5641325  0.7656250  0.3880597 0.6471549  0.7031250  0.5671642
0.7105877
## 93  0.6268657  0.7656250  0.4776119 0.6991604  0.6875000  0.5820896
0.7628265
## 94  0.6698048  0.7692308  0.4776119 0.7673938  0.8000000  0.6865672
0.8396096
## 95  0.6330654  0.7230769  0.4776119 0.7230769  0.7538462  0.6567164
0.8648680
## 96  0.6429924  0.6718750  0.5000000 0.7111742  0.6562500  0.6666667
0.7791193
## 97  0.6053504  0.7343750  0.5151515 0.7213542  0.7812500  0.5454545
0.8223248
## 98  0.6454650  0.8153846  0.4776119 0.7400689  0.8615385  0.5373134
0.7601607
## 99  0.7283582  0.8769231  0.5223881 0.7791045  0.7230769  0.7164179
0.8337543
## 100 0.6200466  0.6923077  0.4090909 0.6634033  0.7076923  0.5454545
0.7459207
##       rf~Sens   rf~Spec
## 1    0.7656250 0.7164179
## 2    0.7656250 0.7014925
## 3    0.6461538 0.6969697
## 4    0.7692308 0.6969697
## 5    0.7230769 0.7313433
## 6    0.7187500 0.7575758
## 7    0.7538462 0.7878788
## 8    0.7538462 0.7575758
## 9    0.7692308 0.7575758
## 10   0.8281250 0.7272727
## 11   0.7538462 0.6567164
## 12   0.6875000 0.8059701
## 13   0.7656250 0.7164179
## 14   0.8593750 0.7424242
## 15   0.6562500 0.6865672
## 16   0.7500000 0.7272727
## 17   0.7812500 0.7424242
## 18   0.6562500 0.6969697
## 19   0.6875000 0.6666667
## 20   0.6307692 0.6212121
```

```
## 21   0.6769231 0.6818182
## 22   0.6923077 0.7761194
## 23   0.7846154 0.7014925
## 24   0.6923077 0.7014925
## 25   0.7812500 0.6716418
## 26   0.7230769 0.7272727
## 27   0.7538462 0.7121212
## 28   0.8593750 0.7611940
## 29   0.7846154 0.5909091
## 30   0.6769231 0.7611940
## 31   0.7656250 0.6865672
## 32   0.8000000 0.6818182
## 33   0.6769231 0.7272727
## 34   0.6875000 0.7014925
## 35   0.6923077 0.6515152
## 36   0.7656250 0.6865672
## 37   0.7538462 0.6417910
## 38   0.7846154 0.6865672
## 39   0.7187500 0.6567164
## 40   0.6923077 0.7910448
## 41   0.6923077 0.8181818
## 42   0.7968750 0.6666667
## 43   0.7500000 0.6818182
## 44   0.6769231 0.7164179
## 45   0.7343750 0.8059701
## 46   0.7076923 0.7313433
## 47   0.7031250 0.6865672
## 48   0.6923077 0.7761194
## 49   0.7500000 0.7014925
## 50   0.7968750 0.6666667
## 51   0.7812500 0.8181818
## 52   0.6923077 0.7424242
## 53   0.8000000 0.6567164
## 54   0.7968750 0.6865672
## 55   0.6875000 0.8484848
## 56   0.7538462 0.7014925
## 57   0.6923077 0.7313433
## 58   0.7812500 0.7014925
## 59   0.6406250 0.8358209
## 60   0.7230769 0.6567164
## 61   0.6718750 0.7014925
## 62   0.6307692 0.7313433
## 63   0.6875000 0.8208955
## 64   0.8281250 0.7164179
## 65   0.8307692 0.6515152
## 66   0.6562500 0.7014925
## 67   0.7343750 0.8208955
## 68   0.7500000 0.6969697
## 69   0.6769231 0.7313433
## 70   0.7968750 0.7761194
```

```
## 71  0.7343750 0.7014925
## 72  0.8000000 0.7611940
## 73  0.7812500 0.7014925
## 74  0.7230769 0.7878788
## 75  0.7384615 0.7575758
## 76  0.7230769 0.7761194
## 77  0.7230769 0.7462687
## 78  0.7031250 0.7462687
## 79  0.7968750 0.6818182
## 80  0.7187500 0.7910448
## 81  0.7538462 0.7424242
## 82  0.7812500 0.7878788
## 83  0.8153846 0.6969697
## 84  0.7187500 0.7575758
## 85  0.7031250 0.6268657
## 86  0.6923077 0.6865672
## 87  0.6250000 0.6865672
## 88  0.7846154 0.6666667
## 89  0.7230769 0.8358209
## 90  0.6562500 0.7462687
## 91  0.7846154 0.6567164
## 92  0.7343750 0.5970149
## 93  0.7187500 0.6567164
## 94  0.7538462 0.7611940
## 95  0.7538462 0.8059701
## 96  0.6562500 0.7424242
## 97  0.7968750 0.7121212
## 98  0.6615385 0.6865672
## 99  0.7692308 0.7462687
## 100 0.7230769 0.6060606
##
## 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  0.5105350 0.6065612 0.6313829 0.6379236 0.6694895 0.7817164    0
## nb    0.5671329 0.6385261 0.6785842 0.6725092 0.7078724 0.7922108    0
## svm-l 0.5336174 0.6145316 0.6389802 0.6428316 0.6707103 0.7989739    0
## svm-r 0.6471549 0.7141630 0.7426573 0.7439215 0.7763125 0.8498134    0
## rf    0.6917249 0.7884346 0.8102755 0.8066898 0.8285618 0.8937733    0
##
## Sens
##             Min.   1st Qu.    Median      Mean   3rd Qu.      Max. NA's
## k-nn  0.4218750 0.5675481 0.6093750 0.6060649 0.6420072 0.8281250    0
## nb    0.3384615 0.7837740 0.8153846 0.8135938 0.8593750 0.9538462    0
```

```
## svm-l 0.6250000 0.7315505 0.7597356 0.7612115 0.8000000 0.9062500      0
## svm-r 0.6406250 0.7192308 0.7656250 0.7582813 0.8000000 0.9062500      0
## rf    0.6250000 0.6923077 0.7343750 0.7344567 0.7812500 0.8593750      0
##
## Spec
##              Min.    1st Qu.    Median      Mean   3rd Qu.      Max. NA's
## k-nn  0.4179104 0.5522388 0.5820896 0.5923112 0.6377205 0.7611940      0
## nb    0.2985075 0.4029851 0.4545455 0.4508480 0.4925373 0.7910448      0
## svm-l 0.3283582 0.4477612 0.4812302 0.4836228 0.5243668 0.6119403      0
## svm-r 0.4626866 0.5820896 0.6417910 0.6309498 0.6716418 0.7761194      0
## rf    0.5909091 0.6865672 0.7142696 0.7202510 0.7575758 0.8484848      0
```

Obtained results can be visualized:

ROC

Confidence Level: 0.95
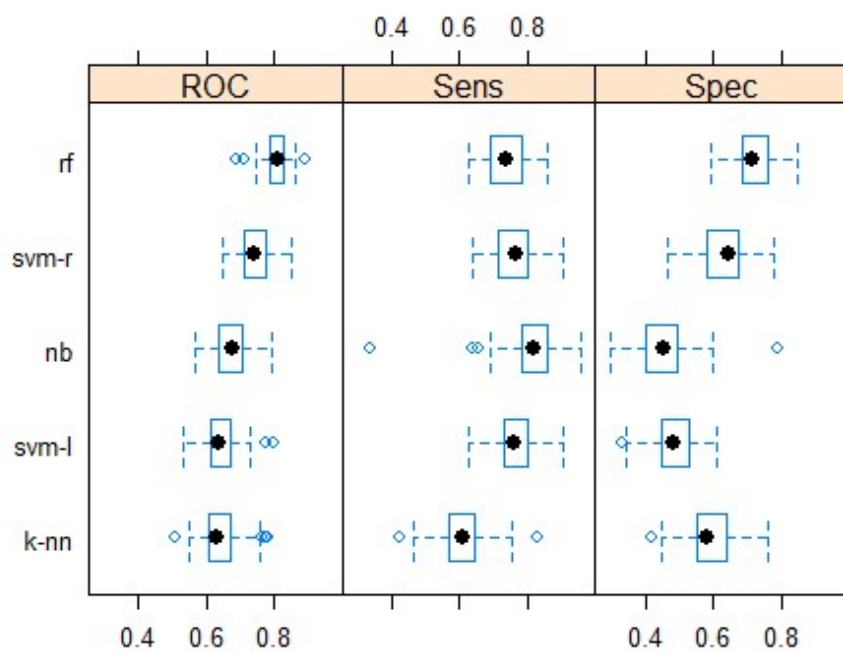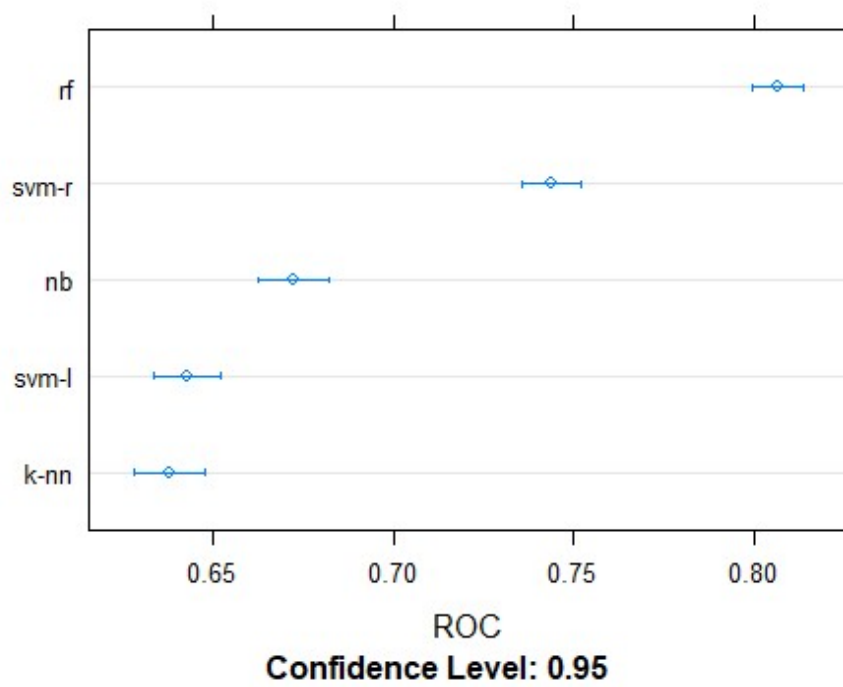
Moreover, calculated ROC distributions should be visualized:
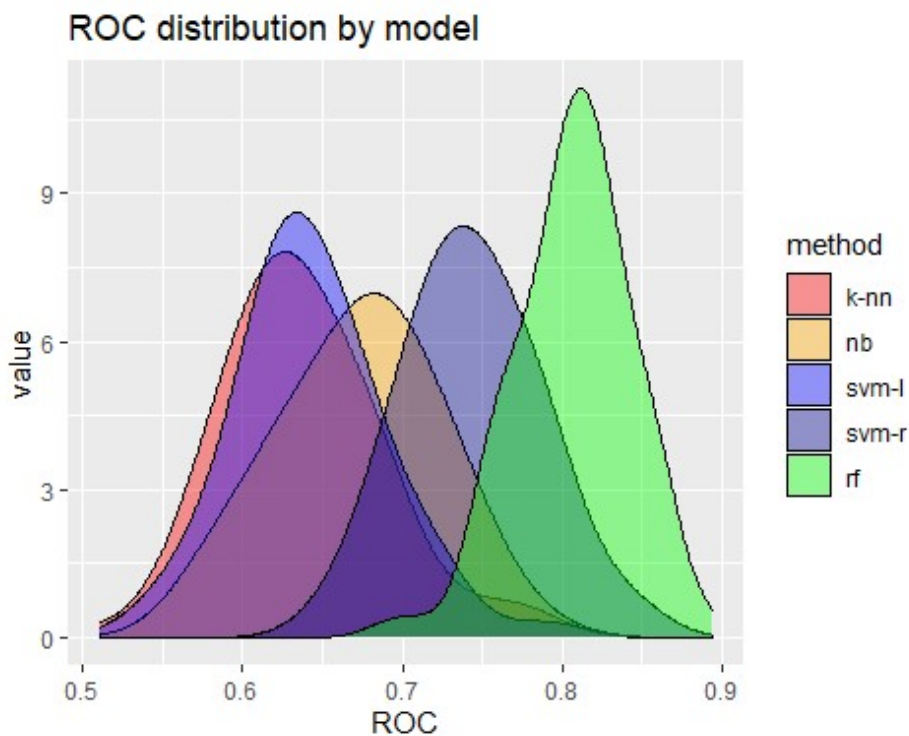
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