raw data 1: haldataC (The operative time is continuous)

In[•]:=
```
haldataCitem = {{1, "dHt"}, {2, "dBw"}, {3, "dMale"}, {4, "dAge"},
   {5, "ArteryNumber"}, {6, "MaxRenalMedialFat"}, {7, "MedianMedialRenalFat"},
   {8, "MedianLateraRenallFat"}, {9, "AreaRenalFat"}, {10, "CTvalueRenalFat"},
   {11, "AreaSubcutaFat"}, {12, "ThicknessMidlineFat"}, {13, "TP"},
   {14, "Alb"}, {15, "TG"}, {16, "TC"}, {17, "OpeTime"}};
```

In[•]:=
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haldataCdata =
  {{173, 68, 1, 59, 1, 9.52`, 9.5`, 14.4`, 22.91`, -90.54`, 54.44`, 13.81`, 7,
    4, 150, 186, 195}, {155, 56, 0, 64, 1, 4.42`, 4.2`, 6.7`, 5.91`, -82.77`,
    96.63`, 19.9`, 6.7`, 4.1`, 220, 257, 150}, {164, 64, 1, 57, 2, 9.87`,
    8.7`, 12.1`, 17.05`, -83.21`, 73.75`, 17.1`, 6.6`, 4.4`, 125, 200, 210},
   {155, 45, 0, 55, 1, 4.73`, 4.2`, 10.4`, 7.46`, -78.16`, 65.74`,
    18.79`, 8, 4.4`, 227, 223, 120}, {149, 61, 0, 58, 1, 11.86`, 6.7`,
    18.7`, 21.35`, -98.19`, 202.24`, 37.63`, 7.8`, 4.8`, 57, 230, 140},
   {158, 55, 1, 65, 3, 5.12`, 2.3`, 5.8`, 8.34`, -76.93`, 38.65`,
    6.29`, 7.1`, 4.4`, 127, 243, 180}, {167, 67, 0, 47, 2, 5.71`,
    3.1`, 4, 5.47`, -74.49`, 106.08`, 20.65`, 7, 4.3`, 43, 164, 120},
   {170, 73, 1, 43, 2, 20.5`, 15.8`, 11.3`, 24.37`, -89.61`, 107.07`,
    21.58`, 7.3`, 4.8`, 202, 194, 210}, {159, 51, 0, 39, 1, 2.51`,
    1.9`, 4.2`, 1.64`, -58.86`, 39.79`, 5.25`, 7.3`, 4, 60, 194, 120},
   {145, 49, 0, 64, 1, 7.78`, 6.5`, 12.6`, 13.11`, -88.69`, 117.05`,
    27.87`, 6.5`, 3.8`, 118, 201, 140}, {153, 57, 0, 48, 2, 6.23`, 2.9`,
    5, 4.25`, -80.29`, 134.22`, 26.48`, 7.7`, 4.5`, 55, 163, 150},
   {166, 70, 1, 58, 2, 11.67`, 11.3`, 12.4`, 28.43`, -96.15`, 90.75`,
    22.96`, 7.2`, 4.5`, 227, 210, 150}, {153, 50, 0, 52, 1, 8.14`, 4.7`,
    11.3`, 11.18`, -96.46`, 100.84`, 22.95`, 7.1`, 3.7`, 105, 196, 130},
   {172, 66, 1, 52, 2, 16.93`, 12.7`, 20.4`, 22.57`, -87.61`, 74.68`,
    18.6`, 7.4`, 4.4`, 121, 187, 210}, {148, 59, 0, 57, 1, 8.64`, 5.6`,
    8.7`, 12.88`, -96.41`, 161.97`, 29.37`, 6.6`, 4.1`, 370, 229, 150},
   {163, 55, 0, 46, 1, 3.97`, 2.1`, 5.1`, 4.11`, -68.87`, 98.89`, 14.94`,
    7.2`, 4.2`, 35, 176, 120}, {157, 56, 1, 47, 2, 10.24`, 7.5`, 10.6`,
    14.27`, -93.47`, 100.44`, 19.54`, 7.4`, 4.4`, 124, 200, 150},
   {156, 56, 0, 45, 1, 3.63`, 5.9`, 8.3`, 6.2`, -83.11`, 112.43`, 22.04`,
    6.6`, 4.1`, 159, 197, 130}, {160, 51, 0, 58, 2, 4.84`, 1.9`,
    5.8`, 4.94`, -79.79`, 76.97`, 15.54`, 6.5`, 4.3`, 85, 210, 120},
   {163, 54, 1, 46, 1, 5.81`, 2.1`, 6.2`, 2.41`, -86.16`, 16.82`,
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    11.87`, -89, 151.83`, 23.16`, 7.3`, 4.4`, 228, 176, 160},
   {160, 80, 0, 57, 1, 15.93`, 15.6`, 23.2`, 45.39`, -95.03`, 230.49`,
    26.52`, 7.2`, 4.6`, 363, 239, 210}, {170, 73, 1, 57, 4, 8.94`, 8.4`,
    12.4`, 12.13`, -93.64`, 131.44`, 35.34`, 7.4`, 4.2`, 81, 181, 180},
   {156, 53, 0, 58, 1, 8.41`, 6.6`, 6.7`, 9.58`, -79.67`, 73.37`,
    18.35`, 7.3`, 4.4`, 102, 214, 150}, {159, 53, 0, 28, 1, 5.16`,
    3.4`, 4.2`, 2.31`, -88.59`, 78.2`, 19.59`, 8, 4.7`, 99, 165, 150},
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{158, 61, 0, 54, 2, 5.27`, 3.9`, 8.2`, 6.92`, -85.27`, 104.97`,
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6.6`, 4.3`, 46, 174, 150}, {156, 46, 0, 62, 1, 2.55`, 1.9`, 5.4`,
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7.91`, 6.8`, 4, 179, 203, 270}, {165, 71, 1, 70, 2, 9.44`, 7.6`,
20.7`, 23.63`, -99.53`, 86.21`, 7.64`, 7.1`, 3.9`, 304, 185, 160},
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14.2`, 18.76`, -90.03`, 56.35`, 16.45`, 6.2`, 3.7`, 245, 227, 130},
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7.2`, 4.1`, 60, 160, 150}, {165, 52, 1, 21, 1, 5, 3, 3.3`, 1.53`,
-76.58`, 21.9`, 6.01`, 7, 4.5`, 74, 219, 120}, {152, 53, 0, 55, 2,
4.94`, 5, 5.9`, 6.37`, -88.31`, 83.62`, 18.79`, 7.1`, 4, 50, 169, 130},
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22.34`, 7.5`, 4.4`, 264, 256, 250}, {150, 54, 0, 54, 1, 4.54`, 2.1`,
10.8`, 8.54`, -83.13`, 132.66`, 26.1`, 6.8`, 4.2`, 94, 216, 150},
{150, 60, 0, 70, 1, 9.38`, 7.6`, 18.2`, 13.59`, -92.121`, 118.39`,
22.19`, 7.6`, 4.3`, 84, 257, 120}, {173, 65, 1, 45, 1, 8.75`, 4.9`,
10.2`, 8.91`, -79.77`, 48.9`, 11.67`, 7.1`, 4.5`, 95, 221, 120},
{170, 50, 0, 48, 1, 3.11`, 1.2`, 3.2`, 1.51`, -70.36`, 55.68`, 13.04`,
6.9`, 4.2`, 133, 228, 100}, {157, 58, 1, 60, 1, 4.66`, 3.6`, 13.5`,
13.89`, -101.38`, 74.58`, 15.1`, 6.7`, 4.2`, 479, 194, 180},
{172, 79, 1, 41, 2, 11.51`, 7.4`, 17.3`, 25.83`, -92.19`, 99.83`,
19.57`, 7.5`, 4.3`, 84, 145, 210}, {159, 51, 0, 65, 1, 5.15`, 2.5`,
8.9`, 6.74`, -86.14`, 65.86`, 12.03`, 7, 4.3`, 90, 169, 110},
{165, 64, 1, 66, 2, 12.28`, 5.9`, 20.5`, 13.66`, -85.08`, 85.58`,
19.59`, 7.1`, 4, 193, 268, 150}, {154, 51, 0, 52, 1, 2.32`, 1.5`,
8.7`, 3.98`, -97.12`, 104.91`, 24.64`, 7.2`, 4.1`, 107, 201, 180},
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7.5`, 4.5`, 215, 269, 130}, {142, 44, 0, 66, 1, 4.04`, 1.9`,
6.6`, 3.32`, -85.93`, 45.4`, 9.32`, 6.9`, 4.3`, 60, 208, 100},
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3, 1.42`, -70.26`, 95.45`, 24.37`, 7.3`, 4.4`, 68, 198, 130},
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7, 4.5`, 151, 227, 160}, {160, 69, 0, 51, 1, 14.58`, 13.7`, 18.6`,
20.83`, -97.57`, 84.11`, 27.66`, 7.5`, 4.5`, 274, 234, 200},
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15.13`, 7, 4.5`, 106, 221, 170}, {170, 65, 1, 55, 2, 9.51`, 6.1`,
12.4`, 13.26`, -87.72`, 61.75`, 11.89`, 6.8`, 4.4`, 250, 238, 140},
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 18.24`, 7.3`, 4.4`, 140, 229, 210}, {157, 53, 0, 49, 1, 3.13`,
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 10.8`, 7.56`, -78.17`, 31.84`, 6.81`, 6.7`, 4.3`, 77, 171, 160},
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 7.1`, 4, 120, 165, 170}, {158, 52, 0, 52, 1, 7.94`, 6.2`, 12.2`,
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{160, 43, 1, 53, 1, 3.38`, 2.6`, 7.9`, 6.45`, -57.57`, 26.92`, 6.25`,
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 7.3`, 4.5`, 150, 240, 150}, {146, 43, 0, 47, 2, 6.23`, 7.43`, 10.88`,
 4.5134`, -81.925`, 81.3499`, 18.05`, 6.4`, 4.1`, 154, 223, 150},
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 25.66`, 7.6`, 4.3`, 120, 257, 90}, {169, 69, 1, 30, 3, 3.13`, 5.66`,
 12.02`, 6.4727`, -64.81`, 45.9508`, 7.53`, 7.2`, 4.2`, 55, 268, 180},
{159, 62, 1, 59, 1, 15.63`, 13.18`, 21.95`, 16.668`, -91.1`, 69.0157`,
 21.25`, 7, 4.3`, 239, 241, 120}, {161, 58, 0, 48, 1, 4, 2.5`, 7.53`,
 1.2226`, -60.32`, 90.0859`, 16.88`, 6.8`, 4.2`, 135, 245, 120},
{149, 53, 0, 57, 1, 5.66`, 4.55`, 14.86`, 5.8242`, -70.885`, 120.844`,
 23.75`, 7.4`, 4.4`, 83, 212, 150}, {167, 99, 1, 36, 2, 13.48`, 11.32`,
 30.66`, 21.5158`, -94.86`, 254.962`, 42.82`, 6.8`, 4.3`, 211, 237, 240},
{147, 61, 0, 73, 1, 9.88`, 10.63`, 17.24`, 14.2188`, -90.01`, 118.688`,
 15, 7.1`, 4, 104, 210, 150}, {155, 58, 0, 64, 1, 6.28`, 7.29`,
 17.41`, 12.4883`, -76.23`, 116.113`, 13.75`, 8, 4, 91, 233, 180},
{177, 77, 1, 52, 1, 10.72`, 10.97`, 19.02`, 24.739`, -96.16`, 82.9141`,
 16.1`, 7.3`, 4.6`, 80, 212, 180}, {156, 74, 1, 70, 2, 19.29`, 19.77`,
 21, 36.5941`, -92.56`, 101.389`, 16.64`, 6.6`, 4, 119, 189, 210},
{158, 59, 0, 52, 3, 4.58`, 5.04`, 12.68`, 5.3764`, -70.87`, 162.001`,
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 14.43`, 7.0862`, -97.73`, 103.106`, 19.11`, 6.6`, 4.1`, 87, 209, 150},
{156, 67, 0, 72, 2, 4.46`, 4.7`, 9.45`, 6.9252`, -75.21`, 147.305`,
 22.96`, 7, 4, 131, 164, 150}, {163, 71, 1, 72, 2, 10.74`, 10.7`,
 29, 24.61`, -97.13`, 65.13`, 7.79`, 6.6`, 4.1`, 129, 169, 130},
{162, 62, 1, 66, 2, 8.45`, 7.15`, 18.05`, 21.008`, -71.68`, 54.1798`,
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 17.8848`, -87.01`, 123.79`, 19.55`, 6.9`, 4.6`, 132, 225, 120},
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 19.04`, 24.1013`, -79.1`, 93.7155`, 7.03`, 7.3`, 4.5`, 538, 285, 180},
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{169, 60, 0, 50, 2, 3.44`, 2.53`, 8.64`, 4.5299`, -81.675`, 98.9548`,
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 22.5`, 7.2`, 4, 386, 239, 150}, {157, 63, 0, 63, 1, 6.99`, 5.9`, 8.5`,
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 15.04`, 7.5`, 4.5`, 82, 208, 360}, {155, 54, 0, 59, 1, 3.45`, 3.82`,
 8.89`, 3.6728`, -58.225`, 102.433`, 13.1`, 7.2`, 4.2`, 131, 183, 150},
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 17.09`, 6.8`, 4.2`, 49, 181, 210}, {160, 64, 1, 69, 2, 7.76`, 7.9`, 25.31`,
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{168, 58, 1, 42, 1, 3.98`, 2.6`, 3.2`, 1.88`, -55.18`, 21.19`, 7.45`,
 6.5`, 4.2`, 133, 230, 100}, {174, 88, 1, 57, 1, 17.76`, 17.59`,
 27.01`, 33.6881`, -94.18`, 130.14`, 26.68`, 7, 4.4`, 460, 203, 300},
{164, 55, 0, 54, 1, 7.15`, 5.04`, 12.19`, 5.3112`, -67.65`, 95.3306`,
 19.34`, 7.1`, 4.2`, 96, 291, 100}, {145, 65, 0, 67, 2, 19.63`, 18.82`,
 28.25`, 31.9832`, -93.36`, 174.909`, 22.57`, 6.8`, 4.2`, 123, 214, 210},
{170, 76, 1, 63, 1, 18.81`, 18.23`, 21.26`, 35.5802`, -97.14`, 60.3482`,
 13.52`, 7.6`, 4.6`, 189, 183, 180}, {175, 75, 1, 59, 2, 15.14`, 11.62`,
 20.23`, 21.6697`, -85.96`, 101.328`, 15.27`, 6.8`, 4.2`, 219, 202, 210},
{155, 43, 0, 52, 1, 6.61`, 6.94`, 8.68`, 4.5452`, -64.9033`, 48.6491`,
 8.78`, 6.6`, 3.9`, 42, 172, 100}, {146, 41, 0, 68, 1, 2.98`, 2.84`,
 6.41`, 1.733`, -67.205`, 66.7216`, 16.34`, 7.1`, 4.3`, 94, 186, 120},
{163, 59, 1, 69, 1, 8.22`, 6.68`, 15.38`, 16.2804`, -88.01`, 58.1747`,
 13.53`, 7.2`, 4.1`, 50, 189, 120}, {160, 47, 0, 45, 1, 4.96`, 3.53`,
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 12.02`, 7.2`, 4.2`, 118, 214, 150}, {153, 40, 0, 65, 1, 1.8`, 0.6`,
 4.1`, 3.42`, -67.88`, 37.15`, 8.59`, 7.2`, 4, 132, 178, 120},
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 11.27`, 12.1328`, -76.76`, 51.707`, 13.13`, 7, 4.4`, 66, 183, 130},
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 6.45`, 7, 4.2`, 104, 188, 120}, {179, 78, 1, 50, 1, 11.63`, 11.06`,
 17.88`, 25.9609`, -83.23`, 82.6015`, 13.13`, 7.8`, 4.9`, 196, 208, 160},
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 28.7491`, -100.05`, 132.3`, 21.23`, 8.6`, 4.7`, 98, 201, 150},
{180, 96, 1, 41, 1, 6.26`, 6.93`, 20.5`, 17.4407`, -84.59`, 97.3944`,
 15.33`, 6.6`, 4.1`, 187, 168, 160}, {160, 51, 0, 59, 1, 4.1`, 4.27`,
 12.54`, 7.0499`, -83.03`, 89.9458`, 18.18`, 6.6`, 4.1`, 58, 172, 150},
{160, 70, 1, 63, 1, 17.37`, 12.08`, 22.33`, 35.8158`, -90, 67.7041`,
 6.12`, 6.6`, 4.1`, 353, 182, 210}, {151, 50, 0, 37, 1, 7.1`, 3.82`,
 10.16`, 9.8021`, -98.1`, 120.847`, 27.3`, 7.5`, 4.6`, 69, 233, 130},
{159, 68, 1, 75, 3, 21.25`, 15.26`, 12.58`, 23.7383`, -101.48`, 83.5078`,
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 10.61`, 8.6445`, -80.55`, 124.496`, 23.75`, 7, 4.4`, 44, 160, 120},
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 14.12`, 7.7`, 4.6`, 154, 186, 270}, {165, 75, 0, 47, 1, 11.42`, 10.45`,
 15.51`, 14.7334`, -88.54`, 170.77`, 35.12`, 7.5`, 4.5`, 107, 207, 190},
{170, 70, 1, 70, 2, 16.97`, 13.45`, 12.35`, 21.2948`, -89.47`, 87.5651`,
 14.67`, 6.8`, 4.2`, 235, 276, 150}, {160, 54, 0, 46, 1, 5.15`, 4,
 8.3`, 9.29`, -80.84`, 83.46`, 23.34`, 6.6`, 3.9`, 65, 161, 100},
{160, 58, 1, 72, 1, 5.13`, 4.27`, 19.26`, 13.126`, -86.14`, 59.2863`,
 10.27`, 7, 4, 113, 150, 100}, {169, 69, 1, 63, 2, 9.29`, 8.95`, 12.14`,
 17.8828`, -100.62`, 68.5781`, 11.25`, 7.2`, 4.5`, 182, 207, 180},
{145, 47, 0, 75, 1, 7.5`, 6.34`, 13.83`, 14.6561`, -85.59`, 138.66`,
 22.27`, 7.5`, 4.2`, 165, 190, 100}, {166, 66, 1, 63, 1, 8.91`, 6.7`,
 12.1`, 16.04`, -91.66`, 73.73`, 15.21`, 6.7`, 4, 78, 163, 180}};
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raw data 2: haldataD (The operative time is dichotomous)

```
haldataDitems = {{1, "dHt"}, {2, "dBw"}, {3, "dMale"}, {4, "dAge"},
   {5, "ArteryNumber"}, {6, "MaxRenalMedialFat"}, {7, "MedianMedialRenalFat"},
   {8, "MedianLateraRenallFat"}, {9, "AreaRenalFat"}, {10, "CTvalueRenalFat"},
   {11, "AreaSubcutaFat"}, {12, "ThicknessMidlineFat"}, {13, "TP"},
   {14, "Alb"}, {15, "TG"}, {16, "TC"}, {17, "LongOpeTime"}};
```

In[•]:=
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haldataDdata =
  {{173, 68, 1, 59, 1, 9.52`, 9.5`, 14.4`, 22.91`, -90.54`, 54.44`, 13.81`, 7,
    4, 150, 186, 1}, {155, 56, 0, 64, 1, 4.42`, 4.2`, 6.7`, 5.91`, -82.77`,
    96.63`, 19.9`, 6.7`, 4.1`, 220, 257, 0}, {164, 64, 1, 57, 2, 9.87`,
    8.7`, 12.1`, 17.05`, -83.21`, 73.75`, 17.1`, 6.6`, 4.4`, 125, 200, 1},
  {155, 45, 0, 55, 1, 4.73`, 4.2`, 10.4`, 7.46`, -78.16`, 65.74`,
    18.79`, 8, 4.4`, 227, 223, 0}, {149, 61, 0, 58, 1, 11.86`, 6.7`,
    18.7`, 21.35`, -98.19`, 202.24`, 37.63`, 7.8`, 4.8`, 57, 230, 0},
  {158, 55, 1, 65, 3, 5.12`, 2.3`, 5.8`, 8.34`, -76.93`, 38.65`, 6.29`,
    7.1`, 4.4`, 127, 243, 1}, {167, 67, 0, 47, 2, 5.71`, 3.1`, 4, 5.47`,
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```

Creating classification model with NLDR using training data (N=89)
Accuracy with training data was 84.0%

In[•]:=
```
Optimize[]
```

■ Selection of the best combination of parameters for prediction by exploration of every possible parameter combination and estimation of discrimination rate by bootstrap simulation.

□ Phase 1 Reading in Data File

A spreadsheet named haldataC was read in.

Training data name: ORIGINALDATA, case count: 128, item count: 17

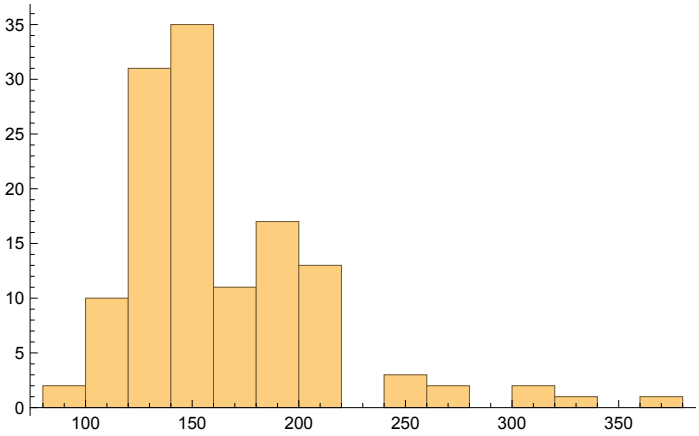
Training item name: ORIGINALNAMES, its length: 17

□Phase 2 Determination of TRAINING Data

◆ 1. Determination of the TARGET variable for assessment

◆ The TARGET varible is OpeTime. (The 17th column in the haldataC.)

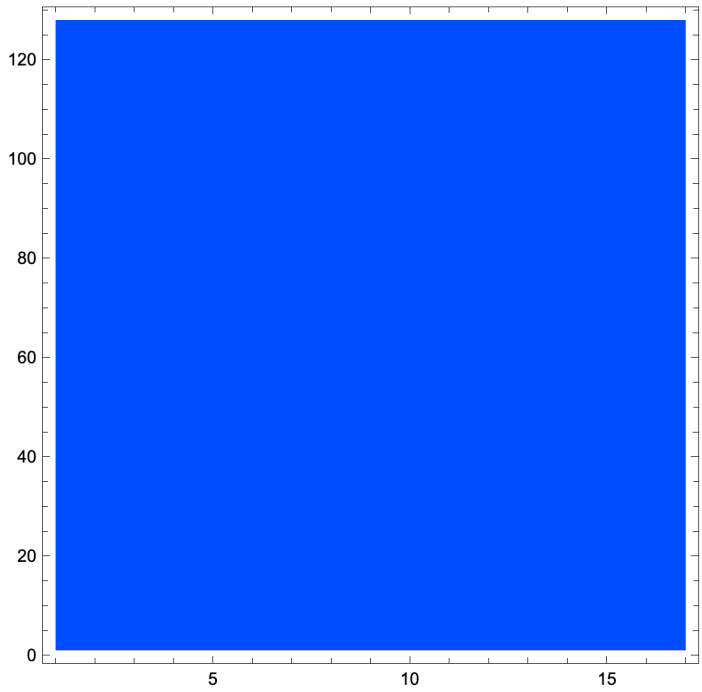
◇There are 20 kinds of entries in the target variable, OpeTime.



◆ The ORDER and NUMBERINGS of all parameters for the analysis:

```
{{1, dHt}, {2, dBw}, {3, dMale}, {4,
    dAge}, {5, ArteryNumber}, {6, MaxRenalMedialFat}, {7,
    MedianMedialRenalFat}, {8, MedianLateraRenallFat}, {9,
    AreaRenalFat}, {10, CTvalueRenalFat}, {11,
    AreaSubcutaFat}, {12, ThicknessMidlineFat}, {13,
    TP}, {14, Alb}, {15, TG}, {16, TC}, {17, OpeTime}}
```

◆ 2. Completeness Check of
the Training Data as to NUMERIC quality



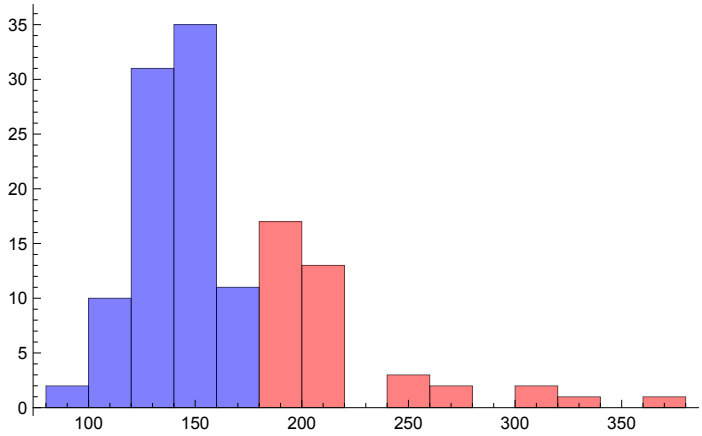
◇ **Blue: numeric data, Red: non-numeric data**

・The original Training Data is shown by evaluating the expression, TRAININGDATA.

◇ **All the data in ORIGINALDATA is numeric.**

◆ **3. Setting a THRESHOLD to**
divide the TARGET values into TWO subsets.

◇ **The data was divided into two subsets, 39 vs. 89.**



◇ **Traget value OpeTime ≥ threshold 180 in Red (n= 39),**
Target value OpeTime < threshold 180 in Blue (n= 89).

◆**The Target EVENT for prediction is chosen as the condition**
in which OpeTime is GREATER thatn 180.

□Phase 3 Elimination Round with All Possible Cominbations Explored

Direct caliculation of discrimination rate for training data with NLDR

◆ Step 1. Caliculation of Discrimination Rate with NLDR

◇ **File name of the Original Data: haldataC (128 cases, 17 parameters)**

◇ **Target parameter is OpeTime for its entry ≥ 180**

◇**Final data: 128 cases, 16 explanatory paramters**

◇ **16 factors are selected for the elimination round.**

They are {{1, dHt}, {2, dBw}, {3, dMale}, {4, dAge}, {5, ArteryNumber}, {6, MaxRenalMedialFat}, {7, MedianMedialRenalFat}, {8, MedianLateraRenallFat}, {9, AreaRenalFat}, {10, CTvalueRenalFat}, {11, AreaSubcutaFat}, {12, ThicknessMidlineFat}, {13, TP}, {14, Alb}, {15, TG}, {16, TC}}

◆ **There are 65535 combinations of predictive factors in the Elimination Round.**

Total number of subsets possible: 65535, Number of upper 1% of all: 655

```
Starting time: {2020, 1, 22, 21, 34, 3.371509}

Present time: {2020, 1, 22, 21, 34, 38.982610}
10% of process has been done.
Consumed time so far: 0 hour 0 min 36 sec
Time interval: 0 hour 0 min 36 sec

Present time: {2020, 1, 22, 21, 35, 16.944376}
20% of process has been done.
Consumed time so far: 0 hour 1 min 14 sec
Time interval: 0 hour 0 min 38 sec
Estimated finishing time: {2020, 1, 22, 21, 50, 16.0056}
Estimated remaining time: 0 hour 14 min 59 sec
```

```
Present time: {2020, 1, 22, 21, 35, 59.283506}
30% of process has been done.
Consumed time so far: 0 hour 1 min 56 sec
Time interval: 0 hour 0 min 42 sec
Estimated finishing time: {2020, 1, 22, 21, 42, 58.2236}
Estimated remaining time: 0 hour 6 min 59 sec

Present time: {2020, 1, 22, 21, 36, 41.595440}
40% of process has been done.
Consumed time so far: 0 hour 2 min 38 sec
Time interval: 0 hour 0 min 42 sec
Estimated finishing time: {2020, 1, 22, 21, 41, 46.6495}
Estimated remaining time: 0 hour 5 min 5 sec

Present time: {2020, 1, 22, 21, 37, 30.891554}
50% of process has been done.
Consumed time so far: 0 hour 3 min 28 sec
Time interval: 0 hour 0 min 49 sec
Estimated finishing time: {2020, 1, 22, 21, 42, 17.4785}
Estimated remaining time: 0 hour 4 min 47 sec

Present time: {2020, 1, 22, 21, 38, 19.745881}
60% of process has been done.
Consumed time so far: 0 hour 4 min 16 sec
Time interval: 0 hour 0 min 49 sec
Estimated finishing time: {2020, 1, 22, 21, 42, 9.8535}
Estimated remaining time: 0 hour 3 min 50 sec

Present time: {2020, 1, 22, 21, 39, 11.778650}
70% of process has been done.
Consumed time so far: 0 hour 5 min 8 sec
Time interval: 0 hour 0 min 52 sec
Estimated finishing time: {2020, 1, 22, 21, 42, 6.3361}
Estimated remaining time: 0 hour 2 min 55 sec

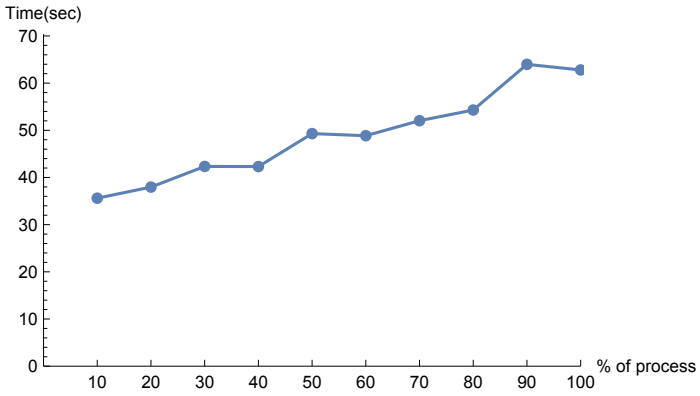
Present time: {2020, 1, 22, 21, 40, 6.078150}
80% of process has been done.
Consumed time so far: 0 hour 6 min 3 sec
```

```
Time interval: 0 hour 0 min 54 sec
Estimated finishing time: {2020, 1, 22, 21, 42, 4.2065}
Estimated remaining time: 0 hour 1 min 58 sec

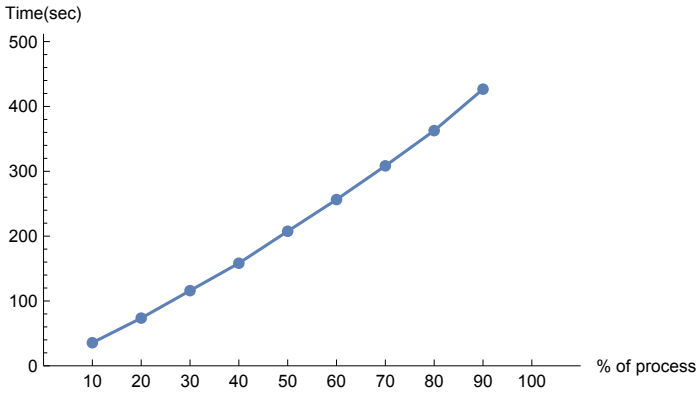
Present time: {2020, 1, 22, 21, 41, 10.054395}
90% of process has been done.
Consumed time so far: 0 hour 7 min 7 sec
Time interval: 0 hour 1 min 4 sec
Estimated finishing time: {2020, 1, 22, 21, 42, 10.2645}
Estimated remaining time: 0 hour 1 min 0 sec

Ending time: {2020, 1, 22, 21, 42, 12.844607}
Consumbed time: 0 hour 8 min 9 sec

Line plot of time interval of each 10% of proccess
```




```
Line plot of real caliculation time
```



Top 10 cases with highest Positive predictive rate:

	Combination of Variables
1	{dMale}
2	{dBw, dMale, MaxRenalMedialFat, MedianLateraRenallFat, AreaRenalFat, AreaSubcu
3	{dBw, MaxRenalMedialFat, MedianLateraRenallFat, AreaRenalFat, CTvalueRenalFat, Are
4	{dBw, MaxRenalMedialFat, MedianLateraRenallFat, AreaRenalFat, AreaSubcutaFa
5	{dBw, dMale, dAge, MaxRenalMedialFat, MedianLateraRenallFat, AreaRenalFat, AreaSu
6	{dBw, dMale, MaxRenalMedialFat, MedianLateraRenallFat, AreaRenalFat, AreaSubcut
7	{dBw, dMale, MaxRenalMedialFat, MedianLateraRenallFat, AreaRenalFat, AreaSubcut
8	{dBw, MaxRenalMedialFat, MedianLateraRenallFat, AreaRenalFat, CTvalueRenalFat, AreaS
9	{dBw, MaxRenalMedialFat, MedianLateraRenallFat, AreaRenalFat, CTvalueRenalFat, AreaS
10	{dBw, MaxRenalMedialFat, MedianLateraRenallFat, AreaRenalFat, CTvalueRenalFat, AreaS

Top 10 cases with highest Negative predictive rate:

	Combination of Variables
1	{AreaSubcutaFat, ThicknessMidlineFat}
2	{AreaSubcutaFat, Alb}
3	{AreaSubcutaFat, ThicknessMidlineFat, TP}
4	{AreaSubcutaFat, ThicknessMidlineFat, Alb}
5	{AreaSubcutaFat, TP, Alb}
6	{AreaSubcutaFat, Alb, TC}
7	{AreaSubcutaFat, ThicknessMidlineFat, TP, Alb}
8	{AreaSubcutaFat, TP, Alb, TC}
9	{dAge, MaxRenalMedialFat, AreaRenalFat, CTvalueRenalFat, AreaSubcutaFat, ThicknessMi
10	{dAge, MaxRenalMedialFat, AreaRenalFat, AreaSubcutaFat, ThicknessMidlineFat, T

Top 10 cases with highest Total hit rate (accuracy):

	Combination of Variables
1	{dAge, MaxRenalMedialFat, AreaRenalFat, CTvalueRenalFat, AreaSubcutaFat, Thickne
2	{dAge, MaxRenalMedialFat, AreaRenalFat, AreaSubcutaFat, ThicknessMidlineFa
3	{dAge, MaxRenalMedialFat, AreaRenalFat, AreaSubcutaFat, ThicknessMidlineFa
4	{dAge, MaxRenalMedialFat, AreaRenalFat, CTvalueRenalFat, AreaSubcutaFat, Thickness
5	{dAge, MaxRenalMedialFat, AreaRenalFat, AreaSubcutaFat, ThicknessMidlineFat
6	{dAge, MaxRenalMedialFat, AreaRenalFat, CTvalueRenalFat, AreaSubcutaFat, ThicknessMi
7	{dHt, MaxRenalMedialFat, AreaRenalFat, AreaSubcutaFat, ThicknessMidlin
8	{dAge, MaxRenalMedialFat, AreaRenalFat, AreaSubcutaFat, ThicknessMidli
9	{dHt, dAge, MaxRenalMedialFat, AreaRenalFat, AreaSubcutaFat, ThicknessMic
10	{dHt, dAge, MedianMedialRenalFat, AreaRenalFat, AreaSubcutaFat, ThicknessM

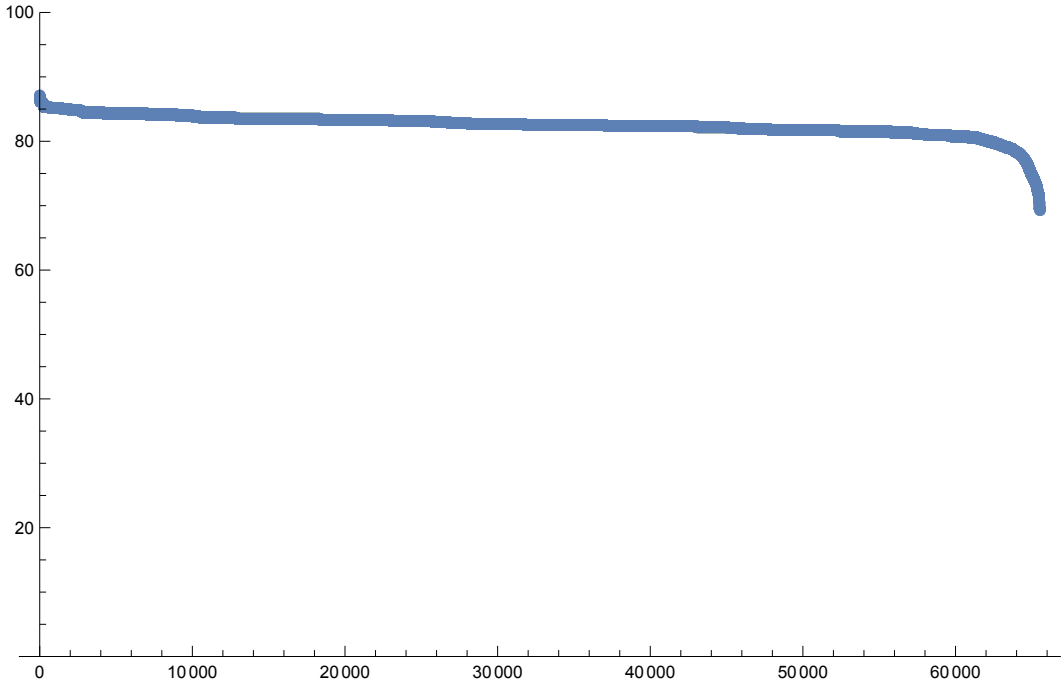
The mean value of Positive predictive rates in best 1 % cases(N=655): 85.62 ± 0.4406 %

The mean value of Negative predictive rates in best 1 % cases(N=655): 90.87 ± 3.284 %

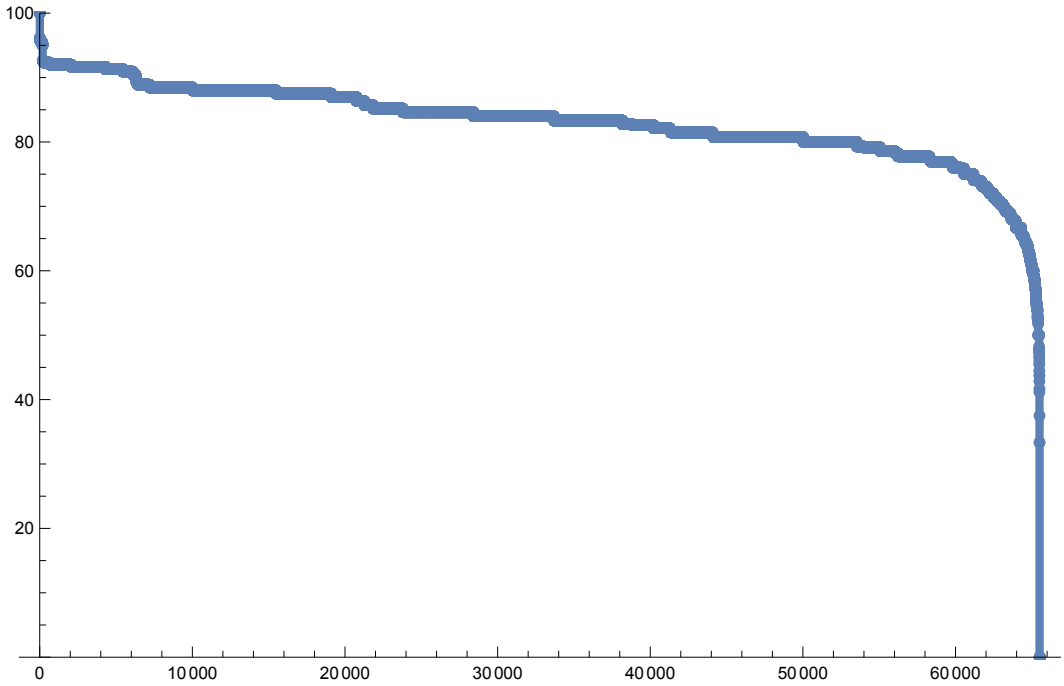
The mean value of Total hit rates (accuracy) in best 1 % cases(N=655): 86.68 ± 0.8756 %

◆ Discrimination rates in the descending order for 65535 combinations out of 16 paramters

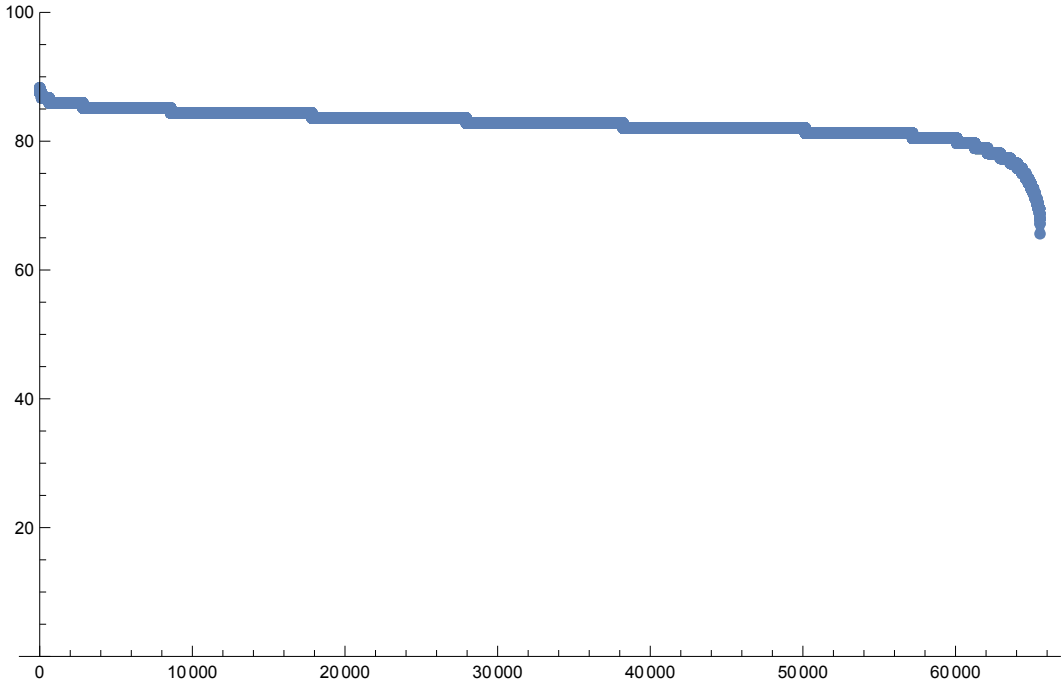
◇ Discrimination rates predicting for OpeTime to be ≥ 180



◇ Discrimination rates predicting for OpeTime to be < 180



◇ Discrimination rates predicting total accuracy for OpeTime



◇ **Results are expressed as follows.**

```
Top 10 of Positive predictive cases = TOP10E
Top 10 of Negative predictive cases = TOP10D
Top 10 of Overall Accuracy = TOP10T
Top 1% of Positive predictive = TOP1PE
Top 1% of Negative predictive = TOP1PD
Top 1% of Overall Accuracy = TOP1PT
All Positive Predictive result sorted = SORTEDPOS
All Negative Predictive resultsorted = SORTEDNEG
All Overall Accuracy result sorted = SORTEDTOTAL
```

◆ **Step 2. Narrowing Down of Candidates by Selecting Top Ranks**

◆ **65535 all possible combinations of factors were examined**

◇ **100 sets of predictive factors are chosen for the final round.**

□Phase 4 Final round for selecting the BEST combination of factors

Estimation of discrimination rate for future data with the .632 Estimator

◇ The Bootsrap count is 200 in the .632 Estimator for each combination of predictive factors.

```
Starting time: {2020, 1, 22, 21, 43, 0.581241}

1.% completed.  Time elapsed: 0 hour 1 min 14 sec
  (present time: {2020, 1, 22, 21, 44, 14.955107})

2.% completed.  Time elapsed: 0 hour 2 min 30 sec
  (present time: {2020, 1, 22, 21, 45, 30.664519})

3.% completed.  Time elapsed: 0 hour 3 min 42 sec
  (present time: {2020, 1, 22, 21, 46, 42.749566})

4.% completed.  Time elapsed: 0 hour 4 min 59 sec
  (present time: {2020, 1, 22, 21, 47, 59.148308})

5.% completed.  Time elapsed: 0 hour 6 min 17 sec
  (present time: {2020, 1, 22, 21, 49, 17.713615})

6.% completed.  Time elapsed: 0 hour 7 min 43 sec
  (present time: {2020, 1, 22, 21, 50, 43.940536})

7.% completed.  Time elapsed: 0 hour 8 min 44 sec
  (present time: {2020, 1, 22, 21, 51, 44.275845})

8.% completed.  Time elapsed: 0 hour 9 min 45 sec
  (present time: {2020, 1, 22, 21, 52, 45.437838})

9.% completed.  Time elapsed: 0 hour 10 min 50 sec
  (present time: {2020, 1, 22, 21, 53, 50.437108})

10.% completed.  Time elapsed:
  0 hour 11 min 55 sec   (present time: {2020, 1, 22, 21, 54, 55.136479})

11.% completed.  Time elapsed:
  0 hour 12 min 60 sec   (present time: {2020, 1, 22, 21, 56, 0.432109})

12.% completed.  Time elapsed:
  0 hour 14 min 4 sec   (present time: {2020, 1, 22, 21, 57, 4.957996})

13.% completed.  Time elapsed:
  0 hour 15 min 9 sec   (present time: {2020, 1, 22, 21, 58, 9.602664})
```

```
14.% completed.  Time elapsed:
  0 hour 16 min 14 sec   (present time: {2020, 1, 22, 21, 59, 14.114937})

15.% completed.  Time elapsed:
  0 hour 17 min 18 sec   (present time: {2020, 1, 22, 22, 0, 18.316017})

16.% completed.  Time elapsed:
  0 hour 18 min 23 sec   (present time: {2020, 1, 22, 22, 1, 23.296730})

17.% completed.  Time elapsed:
  0 hour 19 min 28 sec   (present time: {2020, 1, 22, 22, 2, 28.678023})

18.% completed.  Time elapsed:
  0 hour 20 min 44 sec   (present time: {2020, 1, 22, 22, 3, 44.580044})

19.% completed.  Time elapsed:
  0 hour 21 min 51 sec   (present time: {2020, 1, 22, 22, 4, 51.726265})

20.% completed.  Time elapsed:
  0 hour 22 min 56 sec   (present time: {2020, 1, 22, 22, 5, 56.691112})

21.% completed.  Time elapsed:
  0 hour 24 min 5 sec   (present time: {2020, 1, 22, 22, 7, 5.503960})

22.% completed.  Time elapsed:
  0 hour 25 min 26 sec   (present time: {2020, 1, 22, 22, 8, 26.462472})

23.% completed.  Time elapsed:
  0 hour 26 min 43 sec   (present time: {2020, 1, 22, 22, 9, 43.334619})

24.% completed.  Time elapsed:
  0 hour 28 min 4 sec   (present time: {2020, 1, 22, 22, 11, 4.630557})

25.% completed.  Time elapsed:
  0 hour 29 min 19 sec   (present time: {2020, 1, 22, 22, 12, 19.318965})

26.% completed.  Time elapsed:
  0 hour 30 min 39 sec   (present time: {2020, 1, 22, 22, 13, 39.190012})

27.% completed.  Time elapsed:
  0 hour 31 min 53 sec   (present time: {2020, 1, 22, 22, 14, 53.566629})
```

```
28.% completed.  Time elapsed:
  0 hour 33 min 6 sec   (present time: {2020, 1, 22, 22, 16, 6.745196})

29.% completed.  Time elapsed:
  0 hour 34 min 28 sec   (present time: {2020, 1, 22, 22, 17, 28.510128})

30.% completed.  Time elapsed:
  0 hour 35 min 44 sec   (present time: {2020, 1, 22, 22, 18, 44.447974})

31.% completed.  Time elapsed:
  0 hour 36 min 57 sec   (present time: {2020, 1, 22, 22, 19, 57.955442})

32.% completed.  Time elapsed:
  0 hour 38 min 12 sec   (present time: {2020, 1, 22, 22, 21, 12.955319})

33.% completed.  Time elapsed:
  0 hour 39 min 25 sec   (present time: {2020, 1, 22, 22, 22, 26.024919})

34.% completed.  Time elapsed:
  0 hour 40 min 39 sec   (present time: {2020, 1, 22, 22, 23, 39.861327})

35.% completed.  Time elapsed:
  0 hour 41 min 53 sec   (present time: {2020, 1, 22, 22, 24, 53.633012})

36.% completed.  Time elapsed:
  0 hour 43 min 10 sec   (present time: {2020, 1, 22, 22, 26, 10.831110})

37.% completed.  Time elapsed:
  0 hour 44 min 25 sec   (present time: {2020, 1, 22, 22, 27, 25.617031})

38.% completed.  Time elapsed:
  0 hour 45 min 40 sec   (present time: {2020, 1, 22, 22, 28, 40.821700})

39.% completed.  Time elapsed:
  0 hour 46 min 54 sec   (present time: {2020, 1, 22, 22, 29, 55.078448})

40.% completed.  Time elapsed:
  0 hour 48 min 7 sec   (present time: {2020, 1, 22, 22, 31, 8.029573})

41.% completed.  Time elapsed:
  0 hour 49 min 20 sec   (present time: {2020, 1, 22, 22, 32, 20.157486})
```

```
42.% completed.  Time elapsed:
  0 hour 50 min 34 sec   (present time: {2020, 1, 22, 22, 33, 34.133031})

43.% completed.  Time elapsed:
  0 hour 51 min 46 sec   (present time: {2020, 1, 22, 22, 34, 46.879356})

44.% completed.  Time elapsed:
  0 hour 52 min 59 sec   (present time: {2020, 1, 22, 22, 36, 0.011086})

45.% completed.  Time elapsed:
  0 hour 54 min 11 sec   (present time: {2020, 1, 22, 22, 37, 11.300076})

46.% completed.  Time elapsed:
  0 hour 55 min 22 sec   (present time: {2020, 1, 22, 22, 38, 22.561969})

47.% completed.  Time elapsed:
  0 hour 56 min 34 sec   (present time: {2020, 1, 22, 22, 39, 34.370450})

48.% completed.  Time elapsed:
  0 hour 57 min 49 sec   (present time: {2020, 1, 22, 22, 40, 49.956789})

49.% completed.  Time elapsed:
  0 hour 59 min 6 sec   (present time: {2020, 1, 22, 22, 42, 6.984876})

50.% completed.  Time elapsed:
  1 hour 0 min 41 sec   (present time: {2020, 1, 22, 22, 43, 41.213629})

51.% completed.  Time elapsed:
  1 hour 2 min 9 sec   (present time: {2020, 1, 22, 22, 45, 9.174359})

52.% completed.  Time elapsed:
  1 hour 3 min 45 sec   (present time: {2020, 1, 22, 22, 46, 45.413506})

53.% completed.  Time elapsed:
  1 hour 5 min 7 sec   (present time: {2020, 1, 22, 22, 48, 7.497893})

54.% completed.  Time elapsed:
  1 hour 6 min 36 sec   (present time: {2020, 1, 22, 22, 49, 36.496269})

55.% completed.  Time elapsed:
  1 hour 7 min 58 sec   (present time: {2020, 1, 22, 22, 50, 58.924522})
```

```
56.% completed.  Time elapsed:
  1 hour 9 min 21 sec   (present time: {2020, 1, 22, 22, 52, 22.019375})

57.% completed.  Time elapsed:
  1 hour 10 min 47 sec   (present time: {2020, 1, 22, 22, 53, 47.764767})

58.% completed.  Time elapsed:
  1 hour 12 min 11 sec   (present time: {2020, 1, 22, 22, 55, 11.877585})

59.% completed.  Time elapsed:
  1 hour 13 min 34 sec   (present time: {2020, 1, 22, 22, 56, 35.039098})

60.% completed.  Time elapsed:
  1 hour 14 min 55 sec   (present time: {2020, 1, 22, 22, 57, 56.051165})

61.% completed.  Time elapsed:
  1 hour 16 min 17 sec   (present time: {2020, 1, 22, 22, 59, 17.476050})

62.% completed.  Time elapsed:
  1 hour 17 min 40 sec   (present time: {2020, 1, 22, 23, 0, 40.271719})

63.% completed.  Time elapsed:
  1 hour 19 min 1 sec   (present time: {2020, 1, 22, 23, 2, 1.214720})

64.% completed.  Time elapsed:
  1 hour 20 min 32 sec   (present time: {2020, 1, 22, 23, 3, 32.596583})

65.% completed.  Time elapsed:
  1 hour 21 min 54 sec   (present time: {2020, 1, 22, 23, 4, 54.939714})

66.% completed.  Time elapsed:
  1 hour 23 min 15 sec   (present time: {2020, 1, 22, 23, 6, 16.033507})

67.% completed.  Time elapsed:
  1 hour 24 min 40 sec   (present time: {2020, 1, 22, 23, 7, 40.244945})

68.% completed.  Time elapsed:
  1 hour 26 min 3 sec   (present time: {2020, 1, 22, 23, 9, 3.452157})

69.% completed.  Time elapsed:
  1 hour 27 min 34 sec   (present time: {2020, 1, 22, 23, 10, 34.272859})
```

```
70.% completed.  Time elapsed:
  1 hour 29 min 8 sec   (present time: {2020, 1, 22, 23, 12, 8.628485})

71.% completed.  Time elapsed:
  1 hour 30 min 40 sec   (present time: {2020, 1, 22, 23, 13, 40.323332})

72.% completed.  Time elapsed:
  1 hour 32 min 0 sec   (present time: {2020, 1, 22, 23, 15, 0.948978})

73.% completed.  Time elapsed:
  1 hour 33 min 24 sec   (present time: {2020, 1, 22, 23, 16, 24.448987})

74.% completed.  Time elapsed:
  1 hour 34 min 57 sec   (present time: {2020, 1, 22, 23, 17, 57.196421})

75.% completed.  Time elapsed:
  1 hour 36 min 22 sec   (present time: {2020, 1, 22, 23, 19, 22.409932})

76.% completed.  Time elapsed:
  1 hour 37 min 44 sec   (present time: {2020, 1, 22, 23, 20, 44.211907})

77.% completed.  Time elapsed:
  1 hour 39 min 4 sec   (present time: {2020, 1, 22, 23, 22, 4.874557})

78.% completed.  Time elapsed:
  1 hour 40 min 23 sec   (present time: {2020, 1, 22, 23, 23, 23.522466})

79.% completed.  Time elapsed:
  1 hour 41 min 45 sec   (present time: {2020, 1, 22, 23, 24, 45.731771})

80.% completed.  Time elapsed:
  1 hour 43 min 4 sec   (present time: {2020, 1, 22, 23, 26, 4.355751})

81.% completed.  Time elapsed:
  1 hour 44 min 30 sec   (present time: {2020, 1, 22, 23, 27, 30.380236})

82.% completed.  Time elapsed:
  1 hour 45 min 49 sec   (present time: {2020, 1, 22, 23, 28, 49.574499})

83.% completed.  Time elapsed:
  1 hour 47 min 7 sec   (present time: {2020, 1, 22, 23, 30, 8.071008})
```

```
84.% completed.  Time elapsed:
  1 hour 48 min 26 sec   (present time: {2020, 1, 22, 23, 31, 26.593486})

85.% completed.  Time elapsed:
  1 hour 49 min 47 sec   (present time: {2020, 1, 22, 23, 32, 47.316128})

86.% completed.  Time elapsed:
  1 hour 51 min 5 sec   (present time: {2020, 1, 22, 23, 34, 5.541017})

87.% completed.  Time elapsed:
  1 hour 52 min 24 sec   (present time: {2020, 1, 22, 23, 35, 24.375941})

88.% completed.  Time elapsed:
  1 hour 53 min 45 sec   (present time: {2020, 1, 22, 23, 36, 45.572505})

89.% completed.  Time elapsed:
  1 hour 55 min 11 sec   (present time: {2020, 1, 22, 23, 38, 11.247596})

90.% completed.  Time elapsed:
  1 hour 56 min 41 sec   (present time: {2020, 1, 22, 23, 39, 41.967311})

91.% completed.  Time elapsed:
  1 hour 58 min 6 sec   (present time: {2020, 1, 22, 23, 41, 6.363413})

92.% completed.  Time elapsed:
  1 hour 59 min 27 sec   (present time: {2020, 1, 22, 23, 42, 27.536786})

93.% completed.  Time elapsed:
  2 hour 0 min 52 sec   (present time: {2020, 1, 22, 23, 43, 52.868726})

94.% completed.  Time elapsed:
  2 hour 2 min 14 sec   (present time: {2020, 1, 22, 23, 45, 14.637124})

95.% completed.  Time elapsed:
  2 hour 3 min 40 sec   (present time: {2020, 1, 22, 23, 46, 41.077731})

96.% completed.  Time elapsed:
  2 hour 5 min 4 sec   (present time: {2020, 1, 22, 23, 48, 4.486513})

97.% completed.  Time elapsed:
  2 hour 6 min 26 sec   (present time: {2020, 1, 22, 23, 49, 26.253878})
```

```
98.% completed.  Time elapsed:
  2 hour 7 min 50 sec   (present time: {2020, 1, 22, 23, 50, 50.305597})

99.% completed.  Time elapsed:
  2 hour 9 min 12 sec   (present time: {2020, 1, 22, 23, 52, 12.463597})

100.% completed.  Time elapsed:
  2 hour 10 min 35 sec   (present time: {2020, 1, 22, 23, 53, 35.539841})

Output = A list of {{A selected set of predictive factors},{{Total Accuracy,
  Positive Predictive rate, Negative Predictive rate, Sensitivity, Specificity},
  0.632*{∈1-err, ∈2-perr, ∈3-perrd, ∈4-perrse, ∈5-perrsp},{various parameters}}
```

◇ **The result of 100 sets of predictive factors estimated by The .632 Estimator is expressed as FINALRESULT.**

■ The BEST 5 Combinations of factors for prediction and their Discrimination rates

No 1. {dAge, MaxRenalMedialFat, AreaRenalFat, CTvalueRenalFat, AreaSubcutaFat, ThicknessMidlineFat, TP, Alb}
Total Estimated Accuracy 84.04%, Positive Predictive rate 83.8%,
Negative Predictive rate 84.89%, Sensitivity 95.6%, Specificity 57.43%

No 2. {dAge, MaxRenalMedialFat, AreaRenalFat, CTvalueRenalFat, AreaSubcutaFat, ThicknessMidlineFat, Alb}
Total Estimated Accuracy 84.02%, Positive Predictive rate 84.02%,
Negative Predictive rate 84.01%, Sensitivity 95.19%, Specificity 58.31%

No 3. {dAge, MaxRenalMedialFat, AreaRenalFat, CTvalueRenalFat, AreaSubcutaFat, ThicknessMidlineFat, Alb, TC}
Total Estimated Accuracy 83.98%, Positive Predictive rate 83.66%,
Negative Predictive rate 85.21%, Sensitivity 95.7%, Specificity 57.03%

No 4. {dHt, dAge, MaxRenalMedialFat, AreaRenalFat, AreaSubcutaFat, ThicknessMidlineFat, Alb}
Total Estimated Accuracy 83.8%, Positive Predictive rate 83.65%,
Negative Predictive rate 84.25%, Sensitivity 95.43%, Specificity 56.98%

No 5. {dAge, MaxRenalMedialFat, AreaRenalFat, AreaSubcutaFat, ThicknessMidlineFat, Alb}
Total Estimated Accuracy 83.76%, Positive Predictive rate 83.05%,
Negative Predictive rate 86.51%, Sensitivity 96.19%, Specificity 55.9%

□ The Final Explanatory data is expressed as SAMPLEDATA.

◆ The output is {predictive variables, variable names, response sign, response name, response variable, {3 paramters}}
The are expressed as BESTDATA, BESTITEMS, BESTSIGN, TARGETNAME, RESPONSEDATA.
The output in total is expressed as BESTDATASET.

The output created by the function Optimize[]

In[•]:=
```
result = {{{59, 9.52`, 22.91`, -90.54`, 54.44`, 13.81`, 7, 4},
    {64, 4.42`, 5.91`, -82.77`, 96.63`, 19.9`, 6.7`, 4.1`},
    {57, 9.87`, 17.05`, -83.21`, 73.75`, 17.1`, 6.6`, 4.4`},
    {55, 4.73`, 7.46`, -78.16`, 65.74`, 18.79`, 8, 4.4`},
    {58, 11.86`, 21.35`, -98.19`, 202.24`, 37.63`, 7.8`, 4.8`},
    {65, 5.12`, 8.34`, -76.93`, 38.65`, 6.29`, 7.1`, 4.4`},
    {47, 5.71`, 5.47`, -74.49`, 106.08`, 20.65`, 7, 4.3`},
    {43, 20.5`, 24.37`, -89.61`, 107.07`, 21.58`, 7.3`, 4.8`},
```

```
{39, 2.51`, 1.64`, -58.86`, 39.79`, 5.25`, 7.3`, 4},
{64, 7.78`, 13.11`, -88.69`, 117.05`, 27.87`, 6.5`, 3.8`},
{48, 6.23`, 4.25`, -80.29`, 134.22`, 26.48`, 7.7`, 4.5`},
{58, 11.67`, 28.43`, -96.15`, 90.75`, 22.96`, 7.2`, 4.5`},
{52, 8.14`, 11.18`, -96.46`, 100.84`, 22.95`, 7.1`, 3.7`},
{52, 16.93`, 22.57`, -87.61`, 74.68`, 18.6`, 7.4`, 4.4`},
{57, 8.64`, 12.88`, -96.41`, 161.97`, 29.37`, 6.6`, 4.1`},
{46, 3.97`, 4.11`, -68.87`, 98.89`, 14.94`, 7.2`, 4.2`},
{47, 10.24`, 14.27`, -93.47`, 100.44`, 19.54`, 7.4`, 4.4`},
{45, 3.63`, 6.2`, -83.11`, 112.43`, 22.04`, 6.6`, 4.1`},
{58, 4.84`, 4.94`, -79.79`, 76.97`, 15.54`, 6.5`, 4.3`},
{46, 5.81`, 2.41`, -86.16`, 16.82`, 3.06`, 7.1`, 4.4`},
{56, 9, 11.87`, -89, 151.83`, 23.16`, 7.3`, 4.4`},
{57, 15.93`, 45.39`, -95.03`, 230.49`, 26.52`, 7.2`, 4.6`},
{57, 8.94`, 12.13`, -93.64`, 131.44`, 35.34`, 7.4`, 4.2`},
{58, 8.41`, 9.58`, -79.67`, 73.37`, 18.35`, 7.3`, 4.4`},
{28, 5.16`, 2.31`, -88.59`, 78.2`, 19.59`, 8, 4.7`},
{54, 5.27`, 6.92`, -85.27`, 104.97`, 20.89`, 7.3`, 4.4`},
{67, 6.78`, 5.85`, -79.71`, 69.17`, 14.97`, 7, 4.6`},
{76, 8.12`, 14.55`, -88.72`, 86.2`, 20.67`, 6.6`, 4.3`},
{62, 2.55`, 2.89`, -72.22`, 70.25`, 18.35`, 6.7`, 4.1`},
{57, 17.58`, 39.93`, -96.34`, 78.36`, 7.91`, 6.8`, 4},
{70, 9.44`, 23.63`, -99.53`, 86.21`, 7.64`, 7.1`, 3.9`},
{59, 7.13`, 25.76`, -103.37`, 114.51`, 15.04`, 7.8`, 4.4`},
{66, 8.01`, 18.76`, -90.03`, 56.35`, 16.45`, 6.2`, 3.7`},
{41, 5.13`, 7.46`, -69.525`, 41.13`, 9.72`, 7.2`, 4.1`},
{21, 5, 1.53`, -76.58`, 21.9`, 6.01`, 7, 4.5`},
{55, 4.94`, 6.37`, -88.31`, 83.62`, 18.79`, 7.1`, 4},
{68, 12.89`, 26.48`, -94.42`, 97.06`, 22.34`, 7.5`, 4.4`},
{54, 4.54`, 8.54`, -83.13`, 132.66`, 26.1`, 6.8`, 4.2`},
{70, 9.38`, 13.59`, -92.121`, 118.39`, 22.19`, 7.6`, 4.3`},
{45, 8.75`, 8.91`, -79.77`, 48.9`, 11.67`, 7.1`, 4.5`},
{48, 3.11`, 1.51`, -70.36`, 55.68`, 13.04`, 6.9`, 4.2`},
{60, 4.66`, 13.89`, -101.38`, 74.58`, 15.1`, 6.7`, 4.2`},
{41, 11.51`, 25.83`, -92.19`, 99.83`, 19.57`, 7.5`, 4.3`},
{65, 5.15`, 6.74`, -86.14`, 65.86`, 12.03`, 7, 4.3`},
{66, 12.28`, 13.66`, -85.08`, 85.58`, 19.59`, 7.1`, 4},
{52, 2.32`, 3.98`, -97.12`, 104.91`, 24.64`, 7.2`, 4.1`},
{65, 6.49`, 11.21`, -83.86`, 103.3`, 23.76`, 7.5`, 4.5`},
{66, 4.04`, 3.32`, -85.93`, 45.4`, 9.32`, 6.9`, 4.3`},
{55, 11.03`, 22.36`, -96.57`, 93.42`, 14.89`, 7.2`, 4.5`},
{49, 6.94`, 1.42`, -70.26`, 95.45`, 24.37`, 7.3`, 4.4`},
{47, 5.65`, 13.01`, -85.81`, 53.24`, 11.07`, 7, 4.5`},
{51, 14.58`, 20.83`, -97.57`, 84.11`, 27.66`, 7.5`, 4.5`},
{38, 10.14`, 18.12`, -85.35`, 103.37`, 15.13`, 7, 4.5`},
{55, 9.51`, 13.26`, -87.72`, 61.75`, 11.89`, 6.8`, 4.4`},
{58, 7.37`, 13.72`, -96.27`, 86.63`, 20.06`, 6.8`, 4.3`},
```

```
{69, 13.62`, 34.08`, -99.4`, 97.31`, 14.41`, 6.7`, 3.6`},
{61, 1.88`, 3.23`, -68.28`, 44.52`, 7.17`, 7.1`, 4.4`},
{62, 10.6`, 24.29`, -88.87`, 71.84`, 11.16`, 6.8`, 3.8`},
{66, 6.73`, 11.15`, -96.83`, 91.4`, 18.24`, 7.3`, 4.4`},
{49, 3.13`, 4.07`, -70.5`, 95.39`, 18.79`, 6.7`, 4.3`},
{28, 8.17`, 11.43`, -87.75`, 75.12`, 18.73`, 7, 4.9`},
{62, 12.33`, 30.74`, -96.34`, 76.62`, 22.33`, 7.2`, 4.4`},
{63, 2.54`, 5.4`, -83.29`, 126.53`, 23.79`, 8, 4.7`},
{56, 3.79`, 7.56`, -78.17`, 31.84`, 6.81`, 6.7`, 4.3`},
{71, 1.9`, 1.23`, -52.39`, 33.24`, 2.69`, 7.1`, 4},
{52, 7.94`, 14.83`, -85.86`, 90.93`, 18.77`, 7.5`, 4.1`},
{53, 3.38`, 6.45`, -57.57`, 26.92`, 6.25`, 6.7`, 4.1`},
{54, 5.17`, 5.27`, -75.65`, 85.67`, 5.96`, 7.2`, 4.2`},
{56, 6.13`, 10.89`, -86.69`, 113.71`, 21.38`, 7.3`, 4.5`},
{47, 6.23`, 4.5134`, -81.925`, 81.3499`, 18.05`, 6.4`, 4.1`},
{54, 4.88`, 8.5828`, -77.29`, 120.537`, 25.66`, 7.6`, 4.3`},
{30, 3.13`, 6.4727`, -64.81`, 45.9508`, 7.53`, 7.2`, 4.2`},
{59, 15.63`, 16.668`, -91.1`, 69.0157`, 21.25`, 7, 4.3`},
{48, 4, 1.2226`, -60.32`, 90.0859`, 16.88`, 6.8`, 4.2`},
{57, 5.66`, 5.8242`, -70.885`, 120.844`, 23.75`, 7.4`, 4.4`},
{36, 13.48`, 21.5158`, -94.86`, 254.962`, 42.82`, 6.8`, 4.3`},
{73, 9.88`, 14.2188`, -90.01`, 118.688`, 15, 7.1`, 4},
{64, 6.28`, 12.4883`, -76.23`, 116.113`, 13.75`, 8, 4},
{52, 10.72`, 24.739`, -96.16`, 82.9141`, 16.1`, 7.3`, 4.6`},
{70, 19.29`, 36.5941`, -92.56`, 101.389`, 16.64`, 6.6`, 4},
{52, 4.58`, 5.3764`, -70.87`, 162.001`, 25.26`, 6.5`, 4.4`},
{55, 4.67`, 7.0862`, -97.73`, 103.106`, 19.11`, 6.6`, 4.1`},
{72, 4.46`, 6.9252`, -75.21`, 147.305`, 22.96`, 7, 4},
{72, 10.74`, 24.61`, -97.13`, 65.13`, 7.79`, 6.6`, 4.1`},
{66, 8.45`, 21.008`, -71.68`, 54.1798`, 8.2`, 6.6`, 4},
{55, 6.21`, 17.8848`, -87.01`, 123.79`, 19.55`, 6.9`, 4.6`},
{42, 5.76`, 11.8398`, -87.25`, 148.699`, 31.25`, 7.9`, 4.7`},
{36, 15.42`, 24.1013`, -79.1`, 93.7155`, 7.03`, 7.3`, 4.5`},
{50, 3.44`, 4.5299`, -81.675`, 98.9548`, 22.07`, 6.7`, 4.3`},
{59, 17.38`, 33.2769`, -103.02`, 143.557`, 21.69`, 7.1`, 4},
{67, 5.38`, 18.4258`, -92.39`, 120.672`, 22.5`, 7.2`, 4},
{63, 6.99`, 10.9492`, -85.24`, 166.504`, 29.38`, 7.4`, 4.2`},
{61, 22.61`, 55.1903`, -102.95`, 105.17`, 15.04`, 7.5`, 4.5`},
{59, 3.45`, 3.6728`, -58.225`, 102.433`, 13.1`, 7.2`, 4.2`},
{55, 21.72`, 28.9446`, -82.2`, 82.9366`, 17.09`, 6.8`, 4.2`},
{69, 7.76`, 34.6464`, -102.45`, 66.8613`, 12.67`, 6.7`, 4.1`},
{42, 3.98`, 1.88`, -55.18`, 21.19`, 7.45`, 6.5`, 4.2`},
{57, 17.76`, 33.6881`, -94.18`, 130.14`, 26.68`, 7, 4.4`},
{54, 7.15`, 5.3112`, -67.65`, 95.3306`, 19.34`, 7.1`, 4.2`},
{67, 19.63`, 31.9832`, -93.36`, 174.909`, 22.57`, 6.8`, 4.2`},
{63, 18.81`, 35.5802`, -97.14`, 60.3482`, 13.52`, 7.6`, 4.6`},
{59, 15.14`, 21.6697`, -85.96`, 101.328`, 15.27`, 6.8`, 4.2`},
```

```
 {52, 6.61`, 4.5452`, -64.9033`, 48.6491`, 8.78`, 6.6`, 3.9`},
 {68, 2.98`, 1.733`, -67.205`, 66.7216`, 16.34`, 7.1`, 4.3`},
 {69, 8.22`, 16.2804`, -88.01`, 58.1747`, 13.53`, 7.2`, 4.1`},
 {45, 4.96`, 2.5533`, -51.615`, 53.3821`, 12.12`, 6.5`, 3.9`},
 {50, 6.16`, 8.6094`, -63.32`, 55.3515`, 12.02`, 7.2`, 4.2`},
 {65, 1.8`, 3.42`, -67.88`, 37.15`, 8.59`, 7.2`, 4},
 {54, 2, 2.99`, -64.545`, 96.4404`, 24.93`, 6.5`, 4.5`},
 {61, 3.84`, 12.1328`, -76.76`, 51.707`, 13.13`, 7, 4.4`},
 {50, 5.4`, 3.4999`, -54.955`, 34.2625`, 6.45`, 7, 4.2`},
 {50, 11.63`, 25.9609`, -83.23`, 82.6015`, 13.13`, 7.8`, 4.9`},
 {52, 1.89`, 2.27`, -68.69`, 95.09`, 17.04`, 7, 4.1`},
 {71, 11.51`, 28.7491`, -100.05`, 132.3`, 21.23`, 8.6`, 4.7`},
 {41, 6.26`, 17.4407`, -84.59`, 97.3944`, 15.33`, 6.6`, 4.1`},
 {59, 4.1`, 7.0499`, -83.03`, 89.9458`, 18.18`, 6.6`, 4.1`},
 {63, 17.37`, 35.8158`, -90, 67.7041`, 6.12`, 6.6`, 4.1`},
 {37, 7.1`, 9.8021`, -98.1`, 120.847`, 27.3`, 7.5`, 4.6`},
 {75, 21.25`, 23.7383`, -101.48`, 83.5078`, 14.39`, 7.2`, 4.1`},
 {49, 4.88`, 8.6445`, -80.55`, 124.496`, 23.75`, 7, 4.4`},
 {52, 19.94`, 43.792`, -90.05`, 110.686`, 14.12`, 7.7`, 4.6`},
 {47, 11.42`, 14.7334`, -88.54`, 170.77`, 35.12`, 7.5`, 4.5`},
 {70, 16.97`, 21.2948`, -89.47`, 87.5651`, 14.67`, 6.8`, 4.2`},
 {46, 5.15`, 9.29`, -80.84`, 83.46`, 23.34`, 6.6`, 3.9`},
 {72, 5.13`, 13.126`, -86.14`, 59.2863`, 10.27`, 7, 4},
 {63, 9.29`, 17.8828`, -100.62`, 68.5781`, 11.25`, 7.2`, 4.5`},
 {75, 7.5`, 14.6561`, -85.59`, 138.66`, 22.27`, 7.5`, 4.2`},
 {63, 8.91`, 16.04`, -91.66`, 73.73`, 15.21`, 6.7`, 4}},
{{1, "dAge"}, {2, "MaxRenalMedialFat"}, {3, "AreaRenalFat"},
 {4, "CTvalueRenalFat"}, {5, "AreaSubcutaFat"},
 {6, "ThicknessMidlineFat"}, {7, "TP"}, {8, "Alb"}},
{1, 0, 1, 0, 0, 1, 0, 1, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 0,
 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 1, 1, 0, 0, 1, 0, 0, 0, 0, 0,
 1, 0, 0, 0, 1, 0, 1, 1, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 1, 0,
 1, 1, 1, 0, 0, 0, 0, 1, 0, 0, 1, 0, 1, 0, 1, 1, 0, 1, 1, 0, 1, 0, 1, 1, 1, 0,
 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 1, 0, 1, 1, 0, 0, 0, 1, 0, 1},
"OpeTime", {195, 150, 210, 120, 140, 180, 120, 210, 120, 140, 150, 150,
 130, 210, 150, 120, 150, 130, 120, 120, 160, 210, 180, 150, 150, 150, 100,
 150, 150, 270, 160, 170, 130, 150, 120, 130, 250, 150, 120, 120, 100, 180,
 210, 110, 150, 180, 130, 100, 120, 130, 160, 200, 170, 140, 160, 300, 120,
 240, 210, 130, 120, 180, 140, 160, 170, 150, 120, 140, 150, 150, 90, 180,
 120, 120, 150, 240, 150, 180, 180, 210, 150, 150, 150, 130, 180, 120, 150,
 180, 150, 330, 150, 180, 360, 150, 210, 180, 100, 300, 100, 210, 180, 210,
 100, 120, 120, 160, 150, 120, 90, 130, 120, 160, 150, 150, 160, 150, 210,
 130, 210, 120, 270, 190, 150, 100, 100, 180, 100, 180}, {0, 180, 1}};
```

iDiscrimante[] function for figuring out accuracy

for a set of test data

```
iDiscriminate[ptlist_, resofoptimize_] :=
  Module[ {set0, set1, S01, μ0, μ1,
    nlist, tlist, Set0, Set1, posexval, postarget, threa,
            ξ, x, mu0, mu1, δ, CM, CM0, CM1, mu, newvec, newtime,
                DR, fullresult, interdata, output, scores, variablenames,
                TE, FE, TD,
    FD, Ecount, nresult, TP, FP, FN, TN, len, bars = {},
                TPid, FPid, FNid, TNid, ϕ, sensitivity, specificity, newname,
                PPV, NPV, likelihoodR,
    Dxefficiency, accuracy, inaccuracy, i, graph,
                nPPV, nNPV, list, vec, tail, threshold = 0,
    list0, tail0, vec0, newitems,
            dim, dim0, listnames, listnames0, responsenumb,
    idadd, righimma, earlies, featurenumb, list1, tags, list2,
            address, list3, list4, sign, qinput,
    responsevariable, stand, head, bodies,
            list5, mean, sd, judge, result, Bvalue, Qpoint,
    Bpoint, q25, q75, heads, tails, targetname,
            Tmean, Tsd, Tmax, Tmin, easies, diffs, nE,
    nD, maxE, minE, maxD, minD, editems, responsename,
            mopeE, sopeE, mopeD, sopeD, qopeE, qopeD,
    q25E, q75E, q25D, q75D, edeff, ptid, featurenames,
            erank, drank, leng, bars1 = {}, bars2 = {},
    bars3 = {}, disc, easc, selectnumb, bw, ht, bmi,
            nb, comm, graph1, graph2, graph3, boxgraph,
    boxmargin, checker, lengt1, lengt2, lengt3, dimen,
            featurevariables, listdata, listdata2, dicho,
    thres, glsign, rawres, fontsize, targets,
            variables, answers},

   (* ptlist: a matrix of test data or the like
     that has the same diminsions as the training data had. *)
   (* posexval: a vector of integers of coulumn numbers for addresses
     of selected explanatory variables in the original list. *)
   (* postarget: an integer for an addres of a column number
     for the target variable in the original list *)
   (* thres: a number of the threshold of the target
     value between the two classes *)
   (* resofoptimize: the output made by the function Optimize[] =
    {BESTDATA, BESTITEMS, BESTSIGN, TARGETNAME, RESPONSEDATA} *)

   If[ Length@resofoptimize =!= 8 || ListQ@ptlist === False || Depth@ptlist =!= 3,
    Print[1]; Goto["discriminateending"]];
```

```
(* ------------- Phase 1 Loading Optimal Dataset ------
 ------------------------------------------------------------------- *)

If[
 (* Optimize[] の bestoutput を直接入力する場合 *)
 list = ToExpression[ptlist];
 ListQ[resofoptimize] &&
  Depth[resofoptimize ] === 4 && Length[resofoptimize] === 8,

 bodies = resofoptimize[[1]]; Global`BODIES = bodies;
 variablenames = resofoptimize[[2]];
 Global`VARIABLENAMES = variablenames;
 judge = resofoptimize[[3]]; Global`JUDGE = judge;
 targetname = resofoptimize[[4]];
 Global`TARGETNAME = targetname;
 tails = resofoptimize[[5]]; Global`TAILS = tails;
 dicho = resofoptimize[[6, 1]]; Global`DICHO = dicho;
 thres = resofoptimize[[6, 2]]; Global`THRES = thres;
 glsign = resofoptimize[[6, 3]]; Global`GLSIGN = glsign;
 featurenumb = Range[Length[variablenames]];
 Global`FEATURENUMB = featurenumb;

 (* training dataから作成されたモデルの情報 *)
 listdata = Fuse[bodies, tails];
 listnames = Numberings[Join[ variablenames[[All, 2]] , {targetname}]];
 Global`LISTDATA = listdata;
 Global`LISTNAMES = listnames; Global`FEATURENUMB = featurenumb;
 Global`BODIES = bodies; Global`JUDGE = judge;
 Global`TAILS = tails; Global`TARGETNAME = targetname;

 (* test dataの情報 *)
 posexval = resofoptimize[[7]]; postarget = resofoptimize[[8]];
 threa = resofoptimize[[6, 2]];
 variables = list[[All, posexval]];
 Global`VARIABLES = variables;
 targets = list[[All, postarget]];
 Global`TARGETS = targets;
 Global`THREA = threa;
 If[ NMin@targets > threa || NMax@targets < threa,
  Print[3]; Goto["discriminateending"]],

 ErrorMessage["Unexpected error."];
 Goto["discriminateending"] ];


(* ---------------- Phase 2 Assessment of a new patient dataset -----
 ------------------------------------------------------------------- *)
```

```
(* Creating the model for prediction *)
nlist = MakeTwin[ bodies, tails];
Global`NLIST = nlist;
leng = Length[nlist];
set0 = Part[ bodies, Flatten[ Position[ judge, 0 ] ] ];
Global`SET0 = set0;
set1 = Part[ bodies, Flatten[ Position[ judge, 1 ] ] ];
Global`SET1 = set1;

S01 = N[Covariance[bodies]]; Global`COVARIANCEMATRIX = S01;
μ0 = Map[ NMean, Transpose[ set0]]; Global`MEANE = μ0;
μ1 = Map[ NMean, Transpose[ set1]]; Global`MEAND = μ1;

δ[x_, mu_, CM_] := (x - mu).Inverse[CM].(x - mu);
ξ[x_, {mu0_, CM0_}, {mu1_, CM1_}] := -(δ[x, mu1, CM1] - δ[x, mu0, CM0]);
DR[x_] := If[ NumberQ[x[[1]]] && x[[1]] ≤ threshold, 0, 1, ERROR];

answers = Which[
  dicho === 1 , targets,
  dicho === 0 && glsign === 1,
           Map[Which[# === Null, Null, NumberQ@# === False,
      Null, # ≥ thres, 1, # < thres, 0, True, Null] &, targets],
  dicho === 0 && glsign === 0,
           Map[Which[# === Null, Null, NumberQ@# === False,
      Null, # ≥ thres, 0, # < thres, 1, True, Null] &, targets],
  True,
       Print[5]; Goto["discriminateending"]
 ]; Global`ANSWERS = answers;

tlist = MakeTwin[variables, answers]; Global`TLIST = tlist;

interdata = Map[ {ξ[#[[1]], { μ0, S01}, {μ1, S01}], #[[2]]} &, tlist];
(* EDRATIOで {難易度係数,手術時間} が取り出せる *)
Global`EDRATIO = interdata; Global`INTERDATA = interdata;
 (*  Global`EDEFF=edeff;  *) (* EDRATIO= interdata *)
scores = Map[ DR, interdata]; Global`SCORES = scores;
If[ MemberQ[ scores, ERROR], Ecount = Count[scores, ERROR];
         Print[StringForm["There were `` cases of allocation errors2.",
                                  Ecount ]] ];
fullresult = MakeTwin[ scores, answers ];
Global`JUDGES = fullresult;
(* JUDGES=fullresultで,{0,1}などの判定結果が取り出せる *)
nresult = Fuse[ interdata[[All, 1]], MakeTwin[ fullresult, targets]];
(* NRESULTで,{難易度係数, {0,1}等の判定, 手術時間} が取り出せる*)
Global`NRESULT = nresult;
{TE, FE, FD, TD} = {Count[fullresult, {0, 0}], Count[fullresult, {0, 1}],
```

```
  Count[fullresult, {1, 0}], Count[fullresult, {1, 1}]};
TP = If[ MemberQ[ fullresult, {0, 0}],
      Part[ tlist, Flatten[ Position[ fullresult, {0, 0}]]], {}];
TPid = Map[ Last, TP]; Global`TRUEE = TP;
FP = If[ MemberQ[ fullresult, {0, 1}],
      Part[ tlist, Flatten[ Position[ fullresult, {0, 1}]]], {}];
FPid = Map[ Last, FP]; Global`FALSEE = FP;
FN = If[ MemberQ[ fullresult, {1, 0}],
      Part[ tlist, Flatten[ Position[ fullresult, {1, 0}]]], {}];
FNid = Map[ Last, FN]; Global`FALSED = FN;
TN = If[ MemberQ[ fullresult, {1, 1}],
      Part[ tlist, Flatten[ Position[ fullresult, {1, 1}]]], {}];
TNid = Map[ Last, TN]; Global`TRUED = TN;
ϕ = N[(TE * TD - FE * FD) / Sqrt[(TE + FE) (FD + TD) (TE + FD) (FE + TD)] ];
sensitivity = 100 * N[TE / (TE + FD)];
specificity = 100 * N[TD / (FE + TD)];
PPV = 100 * N[TE / (TE + FE)]; NPV = 100 * N[TD / (FD + TD)];
nPPV = 100 * N[FE / (TE + FE)]; nNPV = 100 * N[FD / (FD + TD)];
accuracy = 100 * N[(TE + TD) / (TE + FE + TD + FD)];
inaccuracy = 100 * N[(FE + FD) / (TE + FE + TD + FD)];
likelihoodR =
 If[ TE + FD =!= 0 && FE =!= 0,  N[(TE / (TE + FD)) / (FE / (FE + TD))], Null];
Dxefficiency = N[sensitivity * specificity / 10 000];

(* { {誤識別率,易手術誤識別率,難手術誤識別率},
 {EE,ED,DE,DD},                    *)
(*   {{易手術判別率,難手術判別率},{易手術感度,易手術特異度},判別的中率}   *)
(*   {TPid, FPid, FNid, TNid},{TP, FP, FN, TN}   *)
(*   {ϕ相関係数, 尤度比, 診断効率}   *)
(* 難易度係数は EDRATIO で取り出せる *)

output = {{ inaccuracy, nPPV, nNPV }, {TE, FE, FD, TD},
  {{PPV, NPV}, {sensitivity, specificity }, accuracy},
  {TPid, FPid, FNid, TNid},
  {TP, FP, FN, TN}, {ϕ, likelihoodR, Dxefficiency} };

Label["discriminateending"];
output
];
```

Accuracy with test data (N=39) was 79.5%
figured out with iDicriminate function

1. PDADATA (the output by the Optimize[] function)

In[•]:= **PDADATA**

Out[•]= {{{59, 9.52, 22.91, -90.54, 54.44, 13.81, 7, 4},
{64, 4.42, 5.91, -82.77, 96.63, 19.9, 6.7, 4.1},
{57, 9.87, 17.05, -83.21, 73.75, 17.1, 6.6, 4.4},
{55, 4.73, 7.46, -78.16, 65.74, 18.79, 8, 4.4},
{58, 11.86, 21.35, -98.19, 202.24, 37.63, 7.8, 4.8},
{65, 5.12, 8.34, -76.93, 38.65, 6.29, 7.1, 4.4},
{47, 5.71, 5.47, -74.49, 106.08, 20.65, 7, 4.3},
{43, 20.5, 24.37, -89.61, 107.07, 21.58, 7.3, 4.8},
{39, 2.51, 1.64, -58.86, 39.79, 5.25, 7.3, 4},
{64, 7.78, 13.11, -88.69, 117.05, 27.87, 6.5, 3.8},
{48, 6.23, 4.25, -80.29, 134.22, 26.48, 7.7, 4.5},
{58, 11.67, 28.43, -96.15, 90.75, 22.96, 7.2, 4.5},
{52, 8.14, 11.18, -96.46, 100.84, 22.95, 7.1, 3.7},
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 {5, AreaSubcutaFat}, {6, ThicknessMidlineFat}, {7, TP}, {8, Alb}},
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2. test data

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testdata
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Out[•]=
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3. The Accuracy of the created model by the NLDR method with test data Accuracy = 79.5%

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    {{59, 17.38, 33.2769, -103.02, 143.557, 21.69, 7.1, 4}, 1},
    {{55, 21.72, 28.9446, -82.2, 82.9366, 17.09, 6.8, 4.2}, 1},
    {{59, 15.14, 21.6697, -85.96, 101.328, 15.27, 6.8, 4.2}, 1},
    {{47, 11.42, 14.7334, -88.54, 170.77, 35.12, 7.5, 4.5}, 1},
    {{75, 21.25, 23.7383, -101.48, 83.5078, 14.39, 7.2, 4.1}, 1},
    {{52, 16.93, 22.57, -87.61, 74.68, 18.6, 7.4, 4.4}, 1},
    {{67, 19.63, 31.9832, -93.36, 174.909, 22.57, 6.8, 4.2}, 1},
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