

Guangqing Yuan

Computer Vision

Section:CSCI381-224

Project 1A

Bi-means automatic threshold selection

Due date: 2/20/24

***** IV. Main (...) *****

Step 0: inFile1, outFile1, outFile2, debugFile open via args []

Step 1: numRows, numCols, minVal, maxVal read from inFile1.

***> histHeight loadHist (histAry, inFile) // loadHist () returns the largest value of input histogram. dynamically allocate histAry, GaussAry, Graph with proper size and proper initializations.

Step 2: outFile1 "in main (), below is the input histogram" dispHist (histAry, outFile1)

Step 3: plotHist (histAry, Graph) debugFile "In main (), below is the Graph after plotting the histogram onto Graph" debugFile print the Graph to debugFile.

Step 4: BiGaussThrVal biGaussian (histAry, GaussAry, maxHeight, minVal, maxVal, Graph, debugFile)

Step 5: outFile2 "The BiGaussThrVal is" print BiGaussThrVal

Step 6: plotGaussCurves (histAry, histHeight, BiGaussThrVal, minVal, maxVal, Graph, debugFile)

Step 7: outFile2 "In main(). Below is the graph showing the histogram, the best fitted Gaussian curves and the gap" outFile2 output Graph

Step 8: close all files

Source Code

```
#include <iostream>
```

```
#include <fstream>
```

```
#include <cmath>
```

```
#include <cstring>
```

```
using namespace std;
```

```
class thresholdSelection {
```

```
public:
```

```
    int numRows, numCols, minVal, maxVal; //image header
```

```
    int BiGaussThrVal; // the auto selected threshold value by the Bi-Gaussian method
```

```
    int histHeight; //The largest hist[i] in the input histogram.
```

```
    int maxHeight; //The largest hist[i] within a given range of the histogram.
```

```
    int* histAry; //a 1D integer array (size of maxVal + 1) to store the histogram.
```

```
    int* GaussAry; // a 1D integer array (size of maxVal + 1) to store the "modified" Gaussian curve values.
```

```
    int* bestFitGaussAry; // to store the best biGaussian curves.
```

```
    char** Graph; /// a 2-D char array size of maxVal+1 by histHeight+1, initialize to blank,
```

```
thresholdSelection(int nRows, int nCols, int minV, int maxV)
```

```
    : numRows(nRows), numCols(nCols), minVal(minV), maxVal(maxV), BiGaussThrVal(0),  
    histHeight(0), maxHeight(0) {
```

```
    histAry = new int[maxVal + 1]();
```

```

GaussAry = new int[maxVal + 1]();
bestFitGaussAry = new int[maxVal + 1]();

Graph = new char* [maxVal + 1];
for (int i = 0; i <= maxVal; i++) {
    Graph[i] = new char[numCols + 1](); // Assuming numCols is appropriate
    for (int j = 0; j <= numCols; j++) {
        Graph[i][j] = ' '; // Initialize to blank
    }
}
}

int loadHist(ifstream &inFile) {
    int histValue, count;
    int maxhistHeight = 0;
    while (inFile >> histValue >> count) {
        histAry[histValue] = count;
        if (count > maxhistHeight) maxhistHeight = count;
    }
    histHeight = maxhistHeight;
    // Initialize Graph with new histHeight
    for (int i = 0; i <= maxVal; i++) {
        delete[] Graph[i];
        Graph[i] = new char[histHeight + 1]();
        std::fill_n(Graph[i], histHeight + 1, ' ');
    }

    inFile.close();
    return histHeight;
}

//Output the histogram in the format as shown in the above
//1 (2):++
//2 (3):+++
//3 (5):++++++

void dispHist(ofstream& outFile) {

    for (int i = 0; i <= maxVal; i++) {
        outFile << i << " (" << histAry[i] << "):";
        for (int j = 0; j < histAry[i]; j++) {
            outFile << "+";
        }
        outFile << endl;
    }
}

// copy ary1 to ary2.

```

```

void copyArys(int* ary1, int* ary2) {
    for (int i = 0; i <= maxVal; i++) {
        ary2[i] = ary1[i];
    }
}

// plot the histogram onto Graph with '+'.
void plotHist() {

    for (int i = 0; i <= maxVal; i++) {
        for (int j = 0; j < histAry[i]; j++) {
            Graph[i][j] = '+';
        }
    }
}

// Set 1D Ary to zero;
void setZero(int* Ary) {
    for (int i = 0; i <= maxVal; i++)
        Ary[i] = 0;
}

int biGaussian(ofstream& deBugFile) {
    deBugFile << "Entering biGaussian method\n" << endl;
    double sum1, sum2, total, minSumDiff = 99999.0;
    int offSet = (maxVal - minVal) / 10;
    int dividePt = offSet, bestThr = dividePt;

    while (dividePt < (maxVal - offSet)) { //step8 repeat
        //step1
        setZero(GaussAry); // Reset GaussAry to zero for each iteration
        //step 2-4
        sum1 = fitGauss(0, dividePt, deBugFile); // Fit first Gaussian curve
        sum2 = fitGauss(dividePt + 1, maxVal, deBugFile); // Fit second Gaussian curve
        total = sum1 + sum2;
        //step5
        if (total < minSumDiff) {
            minSumDiff = total;
            bestThr = dividePt;
            for (int i = 0; i <= maxVal; i++) {
                bestFitGaussAry[i] = GaussAry[i]; // Copy GaussAry to bestFitGaussAry
            }
        }
        //step6
        deBugFile << "In biGaussian(): dividePt = " << dividePt
            << ", sum1= " << sum1 << ", sum2= " << sum2
            << ", total= " << total << ", minSumDiff = " << minSumDiff
            << " and bestThr=" << bestThr << "\n";
    }
}

```

```

        //step7
        dividePt++;
    }

    //step 9
    debugFile << "Leaving biGaussian method, minSumDiff = " << minSumDiff
        << ", bestThr is " << bestThr << "\n";
    //step10
    return bestThr;
}

```

```

double fitGauss(int leftIndex, int rightIndex, ofstream& debugFile) {
    //step0
    debugFile << "Entering fitGauss method\n";
    //step1
    double mean = computeMean(leftIndex, rightIndex, debugFile);
    double var = computeVar(leftIndex, rightIndex, mean, debugFile);
    double sum = 0.0;
    //step2,6,7
    for (int index = leftIndex; index <= rightIndex; index++) {
        //step3
        double Gval = modifiedGauss(index, mean, var);
        //step4
        sum += abs(Gval - (double)(histAry[index]));
        //step5
        GaussAry[index] = (int)(Gval);
    }
    //step8
    debugFile << "Leaving fitGauss method, sum is " << sum << "\n";
    //step9
    return sum;
}

```

```

double computeMean(int leftIndex, int rightIndex, ofstream& debugFile) {
    //step0
    debugFile << "Entering computeMean method" << endl;
    double sum = 0.0;
    int numPixels = 0;

    //step1,4,5
    for (int index = leftIndex; index <= rightIndex; index++) {
        //step2
        sum += (double)(index)*histAry[index];
        numPixels += histAry[index];
        //step3
        if (histAry[index] > maxHeight) {

```

```

        maxHeight = histAry[index]; // Update maxHeight if current hist value is greater
    }
}
//step6
double result = (numPixels > 0) ? sum / (double)numPixels : 0;
//step7
debugFile << "Leaving computeMean method. maxHeight is " << maxHeight << " and
result is " << result << endl;
//step8
return result;
}

```

```

double computeVar(int leftIndex, int rightIndex, double mean, ofstream& debugFile) {
    //step 0
    debugFile << "Entering computeVar() method" << endl;
    double sum = 0.0;
    int numPixels = 0;

    //step1,3,4
    for (int index = leftIndex; index <= rightIndex; index++) {
        double diff = index - mean;
        //step2
        sum += (double)histAry[index] * diff * diff; // Weighted sum of squared differences
        numPixels += histAry[index];
    }
}

```

```

//step 5
double result = (numPixels > 0) ? sum / (double)numPixels : 0; \
    //step6
    debugFile << "Leaving computeVar method returning result " << result << endl;
//step7
return result;
}

```

```

double modifiedGauss(int x, double mean, double var) {
    return (double)maxHeight * exp(-pow(x - mean, 2) / (2 * var));
}

```

```

void printGraph(ofstream& debugFile) {
    for (int j = histHeight; j >= 0; --j) {
        for (int i = 0; i <= maxVal; ++i) {
            debugFile << Graph[i][j];

```

```

    }
    debugFile << endl;
}

}

void plotGaussCurves(ofstream& debugFile) {
    //step 0
    debugFile << "Entering plotGaussCurves() method\n";

    //step1: index <-0
    for (int index = 0; index <= maxVal; index++) {
        int end1, end2;

        //step2
        if (bestFitGaussAry[index] <= histAry[index]) {
            end1 = bestFitGaussAry[index];
            end2 = histAry[index];
        }
        else {
            end1 = histAry[index];
            end2 = bestFitGaussAry[index];
        }

        for (int i = end1; i <= end2; i++) {
            if (i >= 0 && i <= histHeight) {
                Graph[index][i] = '^'; // Mark the gap
            }
        }

        if (bestFitGaussAry[index] >= 0 && bestFitGaussAry[index] <= histHeight) {
            Graph[index][bestFitGaussAry[index]] = '*'; // Mark the Gaussian curve point
        }
        debugFile << "Leaving plotGaussCurves()" << endl;
    }

}

};

int main(int argc, char* argv[]) {
    //step0
    ifstream inFile1(argv[1]);
    ofstream outFile1(argv[2]);
    ofstream outFile2(argv[3]);
    ofstream debugFile(argv[4]);

```

```

//step1
int numRows, numCols, minVal, maxVal;
inFile1 >> numRows >> numCols >> minVal >> maxVal;

thresholdSelection ts(numRows, numCols, minVal, maxVal); // Create an instance of
thresholdSelection

ts.loadHist(inFile1);

//Step 2
outFile1 << "In main(), below is the input histogram" << endl;
ts.dispHist(outFile1);

//step3.
ts.plotHist();
debugFile << "In main(), below is the Graph after plotting the histogram onto Graph:" <<
std::endl;

ts.printGraph(debugFile);

// Step 4: Determine BiGaussian Threshold Value
int biGaussThrVal = ts.biGaussian(debugFile);

// Step 5: Output the BiGaussian Threshold Value
outFile2 << "The BiGaussThrVal is " << biGaussThrVal << std::endl;

// Step 6: Plot Gaussian Curves on the Graph
ts.plotGaussCurves(debugFile); // Adjust parameters as needed based on class
implementation

// Step 7: Output the final graph
outFile2 << "In main(). Below is the graph showing the histogram, the best fitted Gaussian
curves and the gap" << endl;
ts.printGraph(outFile2); // Reuse printGraph method to output the final Graph to outFile2

inFile1.close();
outFile1.close();
outFile2.close();
debugFile.close();
}

```


outFile1 for **histogram1**.

```

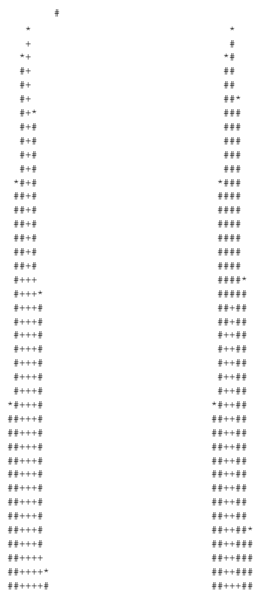
n main(), below is the input histogram
0 (10):+++++++
1 (14):+++++++
2 (17):+++++++
3 (20):+++++++
4 (22):+++++++
5 (31):+++++++
6 (28):+++++++
7 (33):+++++++
8 (45):+++++++
9 (56):+++++++
10 (70):+++++++
11 (90):+++++++
12 (120):+++++++
13 (150):+++++++
14
(192):+++++++
15
(210):+++++++
16
(192):+++++++
17 (172):+++++++
18 (132):+++++++
19 (100):+++++++
20 (89):+++++
21 (78):+++++++
22 (62):+++++++
23 (50):+++++++
24 (38):+++++++
25 (26):+++++++
26 (18):+++++++
27 (12):+++++++
28 (8):+++++++
29 (5):+++++
30 (3):+++++
31 (2):+++++
32 (1):+++++
33 (1):+++++
34 (1):+++++
35 (1):+++++
36 (1):+++++
37 (1):+++++
38 (1):+++++
39 (1):+++++
40 (1):+++++
41 (1):+++++
42 (1):+++++
43 (1):+++++
44 (1):+++++
45 (1):+++++
46 (1):+++++
47 (1):+++++
48 (1):+++++
49 (1):+++++
50 (1):+++++
51 (1):+++++
52 (1):+++++
53 (1):+++++
54 (1):+++++
55 (1):+++++
56 (1):+++++
57 (1):+++++
58 (1):+++++
59 (1):+++++
60 (1):+++++
61 (1):+++++
62 (1):+++++
63 (1):+++++

```

OutFile2

The BiGaussThrVal is 31

In main(). Below is the graph showing the histogram, the best fitted Gaussian curves and the gap



[illegible]

- deBugFile for histogram1 // limit to 4 pages.
In main(), below is the Graph after plotting the histogram onto Graph:

- deBugFile for histogram1 // limit to 4 pages.
In main(), below is the Graph after plotting the histogram onto Graph:

Entering biGaussian method

Entering fitGauss method
Entering computeMean method
Leaving computeMean method. maxHeight is 31 and result is 3.65493
Entering computeVar() method
Leaving computeVar method returning result 3.52177
Leaving fitGauss method, sum is 50.436
Entering fitGauss method
Entering computeMean method
Leaving computeMean method. maxHeight is 210 and result is 33.1373
Entering computeVar() method
Leaving computeVar method returning result 297.741
Leaving fitGauss method, sum is 5197.59
In biGaussian(): dividePt = 6, sum1= 50.436, sum2= 5197.59, total= 5248.03, minSumDiff = 5248.03 and bestThr=6
Entering fitGauss method
Entering computeMean method
Leaving computeMean method. maxHeight is 210 and result is 4.28571
Entering computeVar() method
Leaving computeVar method returning result 4.5698
Leaving fitGauss method, sum is 864.191
Entering fitGauss method
Entering computeMean method
Leaving computeMean method. maxHeight is 210 and result is 33.3573
Entering computeVar() method
Leaving computeVar method returning result 294.449
Leaving fitGauss method, sum is 5159.17
In biGaussian(): dividePt = 7, sum1= 864.191, sum2= 5159.17, total= 6023.36, minSumDiff = 5248.03 and bestThr=6
Entering fitGauss method
Entering computeMean method
Leaving computeMean method. maxHeight is 210 and result is 5.04545
Entering computeVar() method
Leaving computeVar method returning result 5.87975
Leaving fitGauss method, sum is 946.262
Entering fitGauss method
Entering computeMean method
Leaving computeMean method. maxHeight is 210 and result is 33.6517
Entering computeVar() method
Leaving computeVar method returning result 290.316
Leaving fitGauss method, sum is 5136.09
In biGaussian(): dividePt = 8, sum1= 946.262, sum2= 5136.09, total= 6082.35, minSumDiff = 5248.03 and bestThr=6
Entering fitGauss method
Entering computeMean method
Leaving computeMean method. maxHeight is 210 and result is 5.84783
Entering computeVar() method
Leaving computeVar method returning result 7.21597
Leaving fitGauss method, sum is 1004.45
Entering fitGauss method
Entering computeMean method
Leaving computeMean method. maxHeight is 210 and result is 34.0131
Entering computeVar() method
Leaving computeVar method returning result 285.532
Leaving fitGauss method, sum is 5126.12
In biGaussian(): dividePt = 9, sum1= 1004.45, sum2= 5126.12, total= 6130.56, minSumDiff = 5248.03 and bestThr=6
Entering fitGauss method
Entering computeMean method
Leaving computeMean method. maxHeight is 210 and result is 6.68786
Entering computeVar() method
Leaving computeVar method returning result 8.53841
Leaving fitGauss method, sum is 1035.8
Entering fitGauss method
Entering computeMean method
Leaving computeMean method. maxHeight is 210 and result is 34.4613
Entering computeVar() method
Leaving computeVar method returning result 279.898

Leaving fitGauss method, sum is 5139.12
 In biGaussian(): dividePt = 10, sum1= 1035.8, sum2= 5139.12, total= 6174.93, minSumDiff = 5248.03 and bestThr=6
 Entering fitGauss method
 Entering computeMean method
 Leaving computeMean method. maxHeight is 210 and result is 7.57798
 Entering computeVar() method
 Leaving computeVar method returning result 9.8219
 Leaving fitGauss method, sum is 1033.5
 Entering fitGauss method
 Entering computeMean method
 Leaving computeMean method. maxHeight is 210 and result is 35.0383
 Entering computeVar() method
 Leaving computeVar method returning result 272.912
 Leaving fitGauss method, sum is 5150.54
 In biGaussian(): dividePt = 11, sum1= 1033.5, sum2= 5150.54, total= 6184.04, minSumDiff = 5248.03 and bestThr=6
 Entering fitGauss method
 Entering computeMean method
 Leaving computeMean method. maxHeight is 210 and result is 8.53237
 Entering computeVar() method
 Leaving computeVar method returning result 11.0115
 Leaving fitGauss method, sum is 988.936
 Entering fitGauss method
 Entering computeMean method
 Leaving computeMean method. maxHeight is 210 and result is 35.8192
 Entering computeVar() method
 Leaving computeVar method returning result 263.562
 Leaving fitGauss method, sum is 5124.62
 In biGaussian(): dividePt = 12, sum1= 988.936, sum2= 5124.62, total= 6113.55, minSumDiff = 5248.03 and bestThr=6
 Entering fitGauss method
 Entering computeMean method
 Leaving computeMean method. maxHeight is 210 and result is 9.48159
 Entering computeVar() method
 Leaving computeVar method returning result 12.0117
 Leaving fitGauss method, sum is 957.849
 Entering fitGauss method
 Entering computeMean method
 Leaving computeMean method. maxHeight is 210 and result is 36.8289
 Entering computeVar() method
 Leaving computeVar method returning result 251.164
 Leaving fitGauss method, sum is 5045.64
 In biGaussian(): dividePt = 13, sum1= 957.849, sum2= 5045.64, total= 6003.49, minSumDiff = 5248.03 and bestThr=6
 Entering fitGauss method
 Entering computeMean method
 Leaving computeMean method. maxHeight is 210 and result is 10.4477
 Entering computeVar() method
 Leaving computeVar method returning result 12.8753
 Leaving fitGauss method, sum is 909.07
 Entering fitGauss method
 Entering computeMean method
 Leaving computeMean method. maxHeight is 210 and result is 38.1995
 Entering computeVar() method
 Leaving computeVar method returning result 233.075
 Leaving fitGauss method, sum is 4886.36
 In biGaussian(): dividePt = 14, sum1= 909.07, sum2= 4886.36, total= 5795.43, minSumDiff = 5248.03 and bestThr=6
 Entering fitGauss method
 Entering computeMean method
 Leaving computeMean method. maxHeight is 210 and result is 11.3105
 Entering computeVar() method
 Leaving computeVar method returning result 13.6184
 Leaving fitGauss method, sum is 871.951
 Entering fitGauss method
 Entering computeMean method
 Leaving computeMean method. maxHeight is 210 and result is 39.83

- outFile1 and outFile2 for histogram2. -

In main(), below is the input histogram
 0 (0):

```

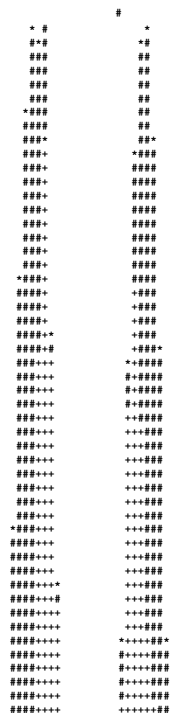
1 (1):+
2 (3):+++
3 (5):+++++
4 (4):++++
5 (5):+++++
6 (7):+++++++
7 (4):++++
8 (6):+++++
9 (10):+++++++
10 (12):+++++++
11 (15):+++++++
12 (10):+++++++
13 (14):+++++++
14 (15):+++++++
15 (22):+++++++
16 (20):+++++++
17 (18):+++++++
18 (28):+++++++
19 (38):+++++++
20 (44):+++++++
21 (56):+++++++
22 (70):+++++++
23 (90):+++++++
24 (120):+++++++
25 (150):+++++++
26
(190):+++++++
+++++++
27
(214):+++++++
+++++++
28
(190):+++++++
+++++++
29 (172):+++++++
30 (132):+++++++
31 (100):+++++++
32 (89):+++++++
33 (78):+++++++
34 (72):+++++++
35 (80):+++++++
36 (90):+++++++
37 (100):+++++++
38 (120):+++++++
39 (165):+++++++
40
(186):+++++++
+++
41
(195):+++++++
+++++++
42
(185):+++++++
+++
43 (170):+++++++
44 (165):+++++++
45 (120):+++++++
46 (90):+++++++
47 (80):+++++++
48 (70):+++++++
49 (60):+++++++
50 (54):+++++++
51 (35):+++++++
52 (31):+++++++
53 (21):+++++++
54 (19):+++++++
55 (12):+++++++
56 (10):+++++++
57 (9):+++++++
58 (11):+++++++
59 (8):+++++++
60 (6):+++++++

```

outFile2:

The BiGaussThrVal is 33

In main(). Below is the graph showing the histogram, the best fitted Gaussian curves and the gap



[illegible]

deBugFile for histogram2 // limit to 4 pages

+

+

+

Entering biGaussian method

Entering computeMean method

Entering computeVar() method

Leaving fitGauss method, sum is 4.82214

Entering computeMean method

Entering computeVar() method

Leaving fitGauss method, sum is 1674.67

Entering fitGauss method

Leaving computeMean method. maxHeight is 214 and result is 4.2

Leaving computeVar method returning result 2.32

Entering fitGauss method

Leaving computeMean method. maxHeight is 214 and result is 34.622

Leaving computeVar method returning result 96.4641

Leaving fitGauss method, sum is 1654.26

In biGaussian(): dividePt = 6, sum1= 740.68, sum2= 1654.26, total= 2394.94, minSumDiff = 1679.49 and bestThr=5
Entering fitGauss method
Entering computeMean method
Leaving computeMean method. maxHeight is 214 and result is 4.58621
Entering computeVar() method
Leaving computeVar method returning result 2.93222
Leaving fitGauss method, sum is 849.647
Entering fitGauss method
Entering computeMean method
Leaving computeMean method. maxHeight is 214 and result is 34.6491
Entering computeVar() method
Leaving computeVar method returning result 95.8078
Leaving fitGauss method, sum is 1646.26
In biGaussian(): dividePt = 7, sum1= 849.647, sum2= 1646.26, total= 2495.9, minSumDiff = 1679.49 and bestThr=5
Entering fitGauss method
Entering computeMean method
Leaving computeMean method. maxHeight is 214 and result is 5.17143
Entering computeVar() method
Leaving computeVar method returning result 4.0849
Leaving fitGauss method, sum is 994.573
Entering fitGauss method
Entering computeMean method
Leaving computeMean method. maxHeight is 214 and result is 34.6885
Entering computeVar() method
Leaving computeVar method returning result 94.8985
Leaving fitGauss method, sum is 1634.32
In biGaussian(): dividePt = 8, sum1= 994.573, sum2= 1634.32, total= 2628.89, minSumDiff = 1679.49 and bestThr=5
Entering fitGauss method
Entering computeMean method
Leaving computeMean method. maxHeight is 214 and result is 6.02222
Entering computeVar() method
Leaving computeVar method returning result 5.71062
Leaving fitGauss method, sum is 1141.63
Entering fitGauss method
Entering computeMean method
Leaving computeMean method. maxHeight is 214 and result is 34.7519
Entering computeVar() method
Leaving computeVar method returning result 93.4998
Leaving fitGauss method, sum is 1613.21
In biGaussian(): dividePt = 9, sum1= 1141.63, sum2= 1613.21, total= 2754.84, minSumDiff = 1679.49 and bestThr=5
Entering fitGauss method
Entering computeMean method
Leaving computeMean method. maxHeight is 214 and result is 6.85965
Entering computeVar() method
Leaving computeVar method returning result 7.1382
Leaving fitGauss method, sum is 1249.98
Entering fitGauss method
Entering computeMean method
Leaving computeMean method. maxHeight is 214 and result is 34.8255
Entering computeVar() method
Leaving computeVar method returning result 91.952
Leaving fitGauss method, sum is 1589.04
In biGaussian(): dividePt = 10, sum1= 1249.98, sum2= 1589.04, total= 2839.02, minSumDiff = 1679.49 and bestThr=5
Entering fitGauss method
Entering computeMean method
Leaving computeMean method. maxHeight is 214 and result is 7.72222
Entering computeVar() method
Leaving computeVar method returning result 8.4784
Leaving fitGauss method, sum is 1336.21
Entering fitGauss method
Entering computeMean method
Leaving computeMean method. maxHeight is 214 and result is 34.9143
Entering computeVar() method
Leaving computeVar method returning result 90.1708
Leaving fitGauss method, sum is 1559.65
In biGaussian(): dividePt = 11, sum1= 1336.21, sum2= 1559.65, total= 2895.86, minSumDiff = 1679.49 and bestThr=5

Entering fitGauss method
Entering computeMean method
Leaving computeMean method. maxHeight is 214 and result is 8.2439
Entering computeVar() method
Leaving computeVar method returning result 9.40393
Leaving fitGauss method, sum is 1425.23
Entering fitGauss method
Entering computeMean method
Leaving computeMean method. maxHeight is 214 and result is 34.9714
Entering computeVar() method
Leaving computeVar method returning result 89.0841
Leaving fitGauss method, sum is 1544.02
In biGaussian(): dividePt = 12, sum1= 1425.23, sum2= 1544.02, total= 2969.25, minSumDiff = 1679.49 and bestThr=5
Entering fitGauss method
Entering computeMean method
Leaving computeMean method. maxHeight is 214 and result is 8.9375
Entering computeVar() method
Leaving computeVar method returning result 10.8503
Leaving fitGauss method, sum is 1522.16
Entering fitGauss method
Entering computeMean method
Leaving computeMean method. maxHeight is 214 and result is 35.0483
Entering computeVar() method
Leaving computeVar method returning result 87.7004
Leaving fitGauss method, sum is 1528.05
In biGaussian(): dividePt = 13, sum1= 1522.16, sum2= 1528.05, total= 3050.2, minSumDiff = 1679.49 and bestThr=5
Entering fitGauss method
Entering computeMean method
Leaving computeMean method. maxHeight is 214 and result is 9.62162
Entering computeVar() method
Leaving computeVar method returning result 12.3794
Leaving fitGauss method, sum is 1617.76
Entering fitGauss method
Entering computeMean method
Leaving computeMean method. maxHeight is 214 and result is 35.1275
Entering computeVar() method
Leaving computeVar method returning result 86.3566
Leaving fitGauss method, sum is 1514.19
In biGaussian(): dividePt = 14, sum1= 1617.76, sum2= 1514.19, total= 3131.95, minSumDiff = 1679.49 and bestThr=5
Entering fitGauss method
Entering computeMean method
Leaving computeMean method. maxHeight is 214 and result is 10.5113
Entering computeVar() method
Leaving computeVar method returning result 14.3251
Leaving fitGauss method, sum is 1704.67
Entering fitGauss method
Entering computeMean method
Leaving computeMean method. maxHeight is 214 and result is 35.2392
Entering computeVar() method
Leaving computeVar method returning result 84.5746
Leaving fitGauss method, sum is 1503.81
In biGaussian(): dividePt = 15, sum1= 1704.67, sum2= 1503.81, total= 3208.48, minSumDiff = 1679.49 and bestThr=5
Entering fitGauss method
Entering computeMean method
Leaving computeMean method. maxHeight is 214 and result is 11.2288
Entering computeVar() method
Leaving computeVar method returning result 15.8758
Leaving fitGauss method, sum is 1783.57
Entering fitGauss method
Entering computeMean method
Leaving computeMean method. maxHeight is 214 and result is 35.3368
Entering computeVar() method