IE - 324 Project
Stage 1

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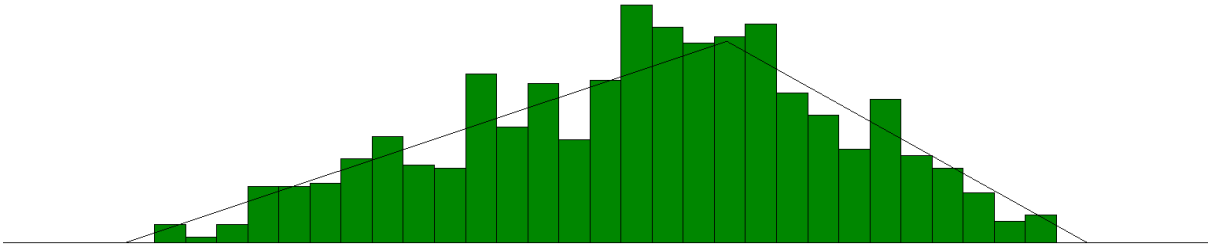
Introduction:

In the First Stage of the Project it is expected to provide the analysis of the data provided. Decisions of the distributions and the parameters found are provided and explained in the report. Interarrival times between patients and emergency calls, Ambulance response times bringing the patient to ED, transferring the patient to the nearest hospital, Triage test, registration, medical test, injection, green patient examination, yellow patient treatment, red patient treatment, patient observation, nurse observation bed set-up and discharge times, Patient label distribution of patients and emergency call, Emergency call patient group size are examined in the report.

While fitting the data first we exercise the histogram generated by Input Anilizer. After this examination we had a general inside feeling about the distribution. After this we examine further and tried to find parameters for those distributions. For example, if it is exponential we tried to find sample mean, if it is triangular then we tried to find min, max values. After those initial examination in data we also test those values in Input Analizer. We generated test statistics and p values for further examinations like Chi-Square test and Kolmogorov- Smirnov tests. After these tests we decided on the distribution and the parameters.

ambulance_arrival



Distribution: Triangular
Expression: TRIA(10, 13, 15)
Square Error: 0.001891
Histogram Range = 10 to 15
Number of Intervals = 31

Chi-Square Test
Number of intervals = 28
Degrees of freedom = 26
Test Statistic = 49.2
Corresponding p-value < 0.005
Chi-square value for 26 degrees of freedom and 0.05 significance level = 38.885

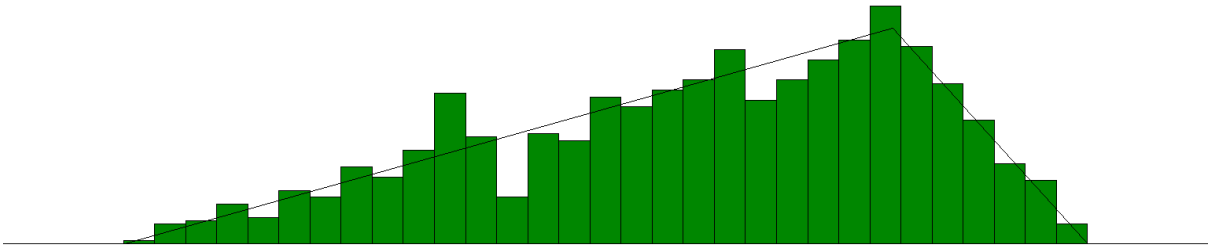
Since Test Statistic = 49.2 > 38.885, we reject the null hypothesis, deeming the distribution examined to not belong to triangular distribution, with the estimated parameters. This means that this data does not belong to a triangular distribution with significance level 0.05.

Kolmogorov-Smirnov Test
Test Statistic = 0.0399
Corresponding p-value = 0.0845
D value for 1000 observations and 0.05 significance level = 0.0429

Due to the Test Statistic = 0.0399 < 0.0429, we fail to reject the null hypothesis under the assumption that this distribution being evaluated belongs to a triangular distribution, under the significance level 0.05. This means that the data belongs to triangular distribution with the estimated parameters.

Description
We saw that the histogram of the "ambulance_arrival" data cluster around 13 and ranges from 10 to 15. We concluded that the data might come from triangular distribution. Hence, we fit the triangular distribution from the input analyzer. Even though it failed in Kolmogorov-Smirnov test it is accepted in Chi-Square test.

doc_for_green



Distribution: Triangular
Expression: TRIA(2, 6, 7)
Square Error: 0.001091
Histogram Range = 2 to 7
Number of Intervals = 31

Chi-Square Test

Number of intervals = 27
Degrees of freedom = 25
Test Statistic = 33.2
Corresponding p-value = 0.135
Chi-square value for 25 degrees of freedom and 0.05 significance level = 37.652

Since Test Statistic = 33.2 < 37.652, we fail to reject the null hypothesis, deeming the distribution examined to belong to triangular distribution, with the estimated parameters. This means that this data belongs to a triangular distribution with significance level 0.05.

Kolmogorov-Smirnov Test

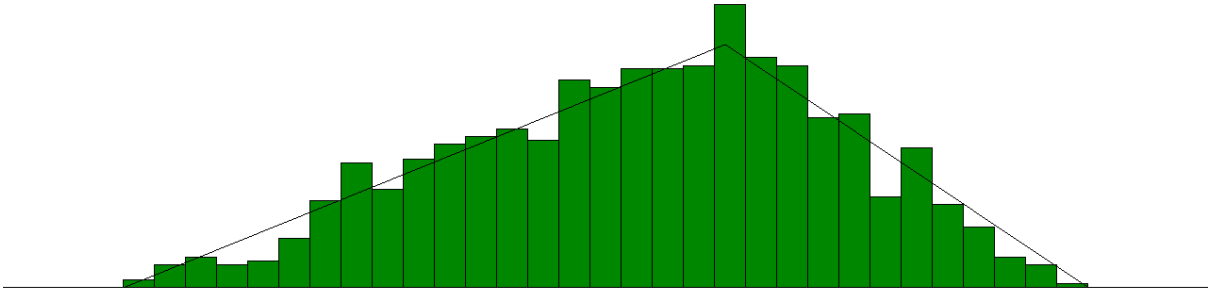
Test Statistic = 0.0278
Corresponding p-value > 0.15
D value for 1000 observations and 0.05 significance level = 0.0429

Due to the Test Statistic = 0.0278 < 0.0429, we fail to reject the null hypothesis under the assumption that this distribution being evaluated belongs to a triangular distribution, under the significance level 0.05. This means that the data belongs to a triangular distribution with the estimated parameters.

Description

We saw that the histogram of the "doc_for_green" data cluster around 6 and ranges from 2 to 7. We concluded that the data might come from triangular distribution. Hence, we fit the triangular distribution from the input analyzer. Even though it failed in Kolmogorov-Smirnov test it is accepted in Chi-square test.

doc_for_yellow



Distribution: Triangular
Expression: TRIA(6, 8.5, 10)
Square Error: 0.000775
Histogram Range = 6 to 10
Number of Intervals = 31

Chi-Square Test

Number of intervals = 28
Degrees of freedom = 26
Test Statistic = 28
Corresponding p-value = 0.368
Chi-square value for 26 degrees of freedom and 0.05 significance level = 38.885

Since Test Statistic = 28 < 38.885, we fail to reject the null hypothesis, deeming the distribution examined to belong to triangular distribution, with the estimated parameters. This means that this data belongs to a triangular distribution with significance level 0.05.

Kolmogorov-Smirnov Test

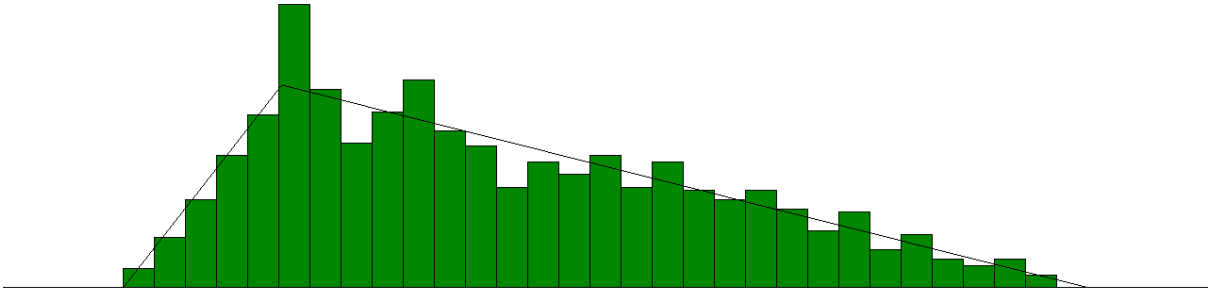
Test Statistic = 0.0226
Corresponding p-value > 0.15
D value for 1000 observations and 0.05 significance level = 0.0429

Due to the Test Statistic = 0.0278 > 0.0429, we reject the null hypothesis under the assumption that this distribution being evaluated belongs to a triangular distribution, under the significance level 0.05. This means that the data does not belong to a triangular distribution with the estimated parameters.

Description

We saw that the histogram of the “doc_for_yellow” data cluster around 8.5 and ranges from 6 to 10. We concluded that the data might come from triangular distribution. Hence, we fit the triangular distribution from the input analyzer. Even though it failed in Kolmogorov-Smirnov test it is accepted in Chi-square test.

triage



Distribution: Triangular
Expression: TRIA(1, 1.5, 4)
Square Error: 0.001476
Histogram Range = 1 to 4
Number of Intervals = 31

Chi-Square Test

Number of intervals = 27
Degrees of freedom = 25
Test Statistic = 30.4
Corresponding p-value = 0.219
Chi-square value for 25 degrees of freedom and 0.05 significance level = 37.652

Since Test Statistic = 30.4 < 37.652, we fail to reject the null hypothesis, deeming the distribution examined to belong to triangular distribution, with the estimated parameters. This means that this data belongs to a triangular distribution with significance level 0.05.

Kolmogorov-Smirnov Test

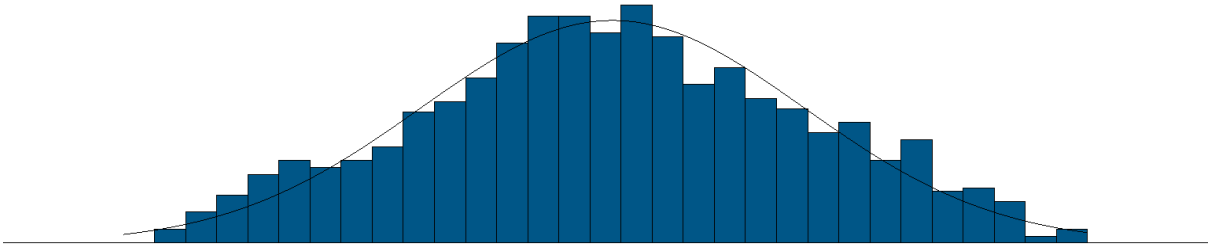
Test Statistic = 0.0271
Corresponding p-value > 0.15
D value for 1000 observations and 0.05 significance level = 0.0429

Due to the Test Statistic = 0.0271 < 0.0429, we fail to reject the null hypothesis under the assumption that this distribution being evaluated belongs to a triangular distribution, under the significance level 0.05. This means that the data belongs to a triangular distribution with the estimated parameters.

Description

We saw that the histogram of the “triage” data cluster around 1.5 and ranges from 1 to 4. We concluded that the data might come from triangular distribution. Hence, we fit the triangular distribution from the input analyzer. Even though it failed in Kolmogorov-Smirnov test it is accepted in Chi-square test.

bed_delay_2



Distribution: Normal
Expression: NORM(30, 0.8)
Square Error: 0.00073
Histogram Range = 28 to 32
Number of Intervals = 31

Chi-Square Test
Number of intervals = 25
Degrees of freedom = 22
Test Statistic = 35.1
Corresponding p-value = 0.0395
Chi-square value for 22 degrees of freedom and 0.05 significance level = 33.924

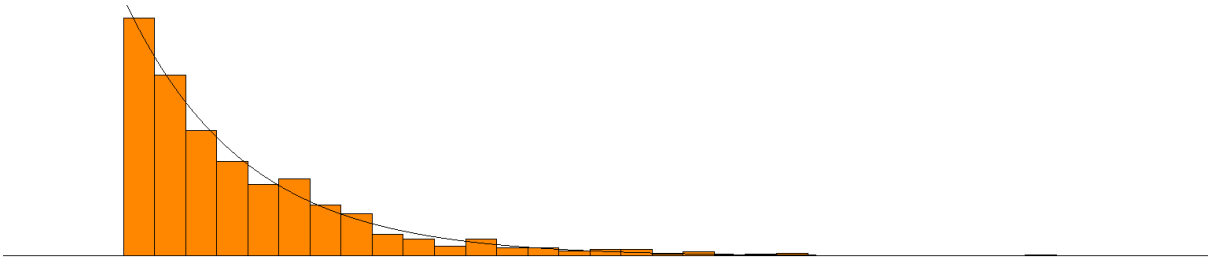
Since Test Statistic = 35.1 > 33.924, we reject the null hypothesis, deeming the distribution examined to not belong to normal distribution, with the estimated parameters. This means that this data does not belong to a normal distribution with significance level 0.05.

Kolmogorov-Smirnov Test
Test Statistic = 0.026
Corresponding p-value > 0.15
D value for 1000 observations and 0.05 significance level = 0.0429

Due to the Test Statistic = 0.026 < 0.0429, we fail to reject the null hypothesis under the assumption that this distribution being evaluated belongs to a normal distribution, under the significance level 0.05. This means that the data belongs to a normal distribution with the estimated parameters.

Description
We saw that the histogram of the "bed_delay_2" data resembles a normal distribution. Hence we took the average $\mu = 30$ and the standard deviation comes out $\sigma = 0.8$. Therefore, we fit the normal distribution from the input analyzer. Even if distribution fitted rejected in both test. Other possible distributions are worse then normal distribution. Also if we increase our alpha value then it is possible to have fail to reject outcome in the test results.

ambulance_call_interval_0_3



Distribution: Exponential
Expression: EXPO(0.99)
Square Error: 0.000857
Histogram Range = 0 to 8
Number of Intervals = 31

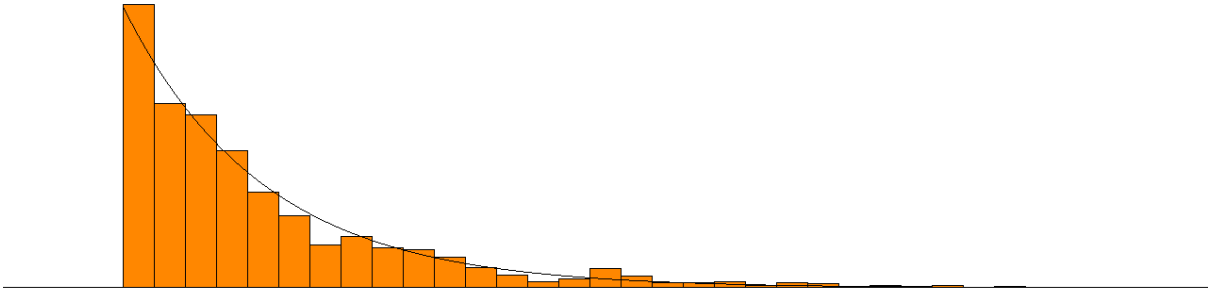
Chi-Square Test
Number of intervals = 15
Degrees of freedom = 13
Test Statistic = 20.5
Corresponding p-value = 0.0857
Chi-square value for 13 degrees of freedom and 0.05 significance level = 22.362

Since Test Statistic = 20.5 < 22.362, we fail to reject the null hypothesis, deeming the distribution examined to belong to exponential distribution, with the estimated parameters. This means that this data belongs to an exponential distribution with significance level 0.05.

Kolmogorov-Smirnov Test
Test Statistic = 0.0168
Corresponding p-value > 0.15

Description
We saw that the histogram of the "ambulance_call_0_3" data resembles exponential distribution. We took the average of the data and the mean comes out 0.99. Therefore, we fit the exponential distribution with a mean 0.99 from the input analyzer. Also we fail to reject Chi-Square test for exponential distribution with 0.99.

ambulance_call_interval_9_12



Distribution: Exponential
Expression: EXPO(2)
Square Error: 0.001423
Histogram Range = 0 to 7
Number of Intervals = 31

Chi-Square Test

Number of intervals = 17
Degrees of freedom = 15
Test Statistic = 28.7
Corresponding p-value = 0.0189
Chi-square value for 15 degrees of freedom and 0.05 significance level = 24.996

Since Test Statistic = 28.7 > 24.996, we reject the null hypothesis, deeming the distribution examined to not belongs to the exponential distribution, with the estimated parameters. This means that this data does not belong to an exponential distribution with significance level 0.05.

Kolmogorov-Smirnov Test

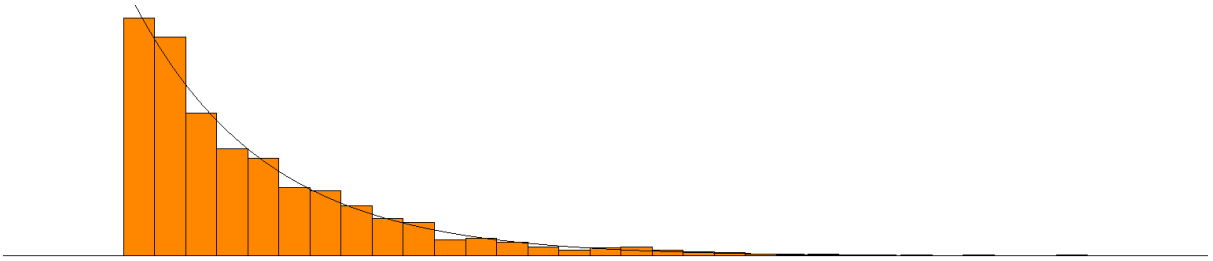
Test Statistic = 0.0256
Corresponding p-value > 0.15
D value for 1000 observations and 0.05 significance level = 0.0429

Due to the Test Statistic = 0.02656 < 0.0429, we fail to reject the null hypothesis under the assumption that this distribution being evaluated belongs to an exponential distribution, under the significance level 0.05. This means that the data belongs to an exponential distribution with the estimated parameters.

Description

We saw that the histogram of the "ambulance_call_9_12" data resembles exponential distribution. We took the average of the data and the mean comes out 2. Therefore, we fit the exponential distribution with a mean 2 from the input analyzer. Even thought it is rejected in Chi-Square the other possible distributions are worse then the exponential distribution with mean 2. Therefore, exponential distribution with mean 2 is a better fit for this data.

ambulance_call_interval_18_21



Distribution: Exponential
Expression: EXPO(0.96)
Square Error: 0.000871
Histogram Range = 0 to 7
Number of Intervals = 31

Chi-Square Test

Number of intervals = 16
Degrees of freedom = 14
Test Statistic = 12.5
Corresponding p-value = 0.566
Chi-square value for 14 degrees of freedom and 0.05 significance level = 23.685

Since Test Statistic = 12.5 < 23.68512.5, we fail to fail to reject the null hypothesis, deeming the distribution examined tobelong to exponential distribution, with the estimated parameters. This means that this data belongs to an exponential distribution with significance level 0.05.

Kolmogorov-Smirnov Test

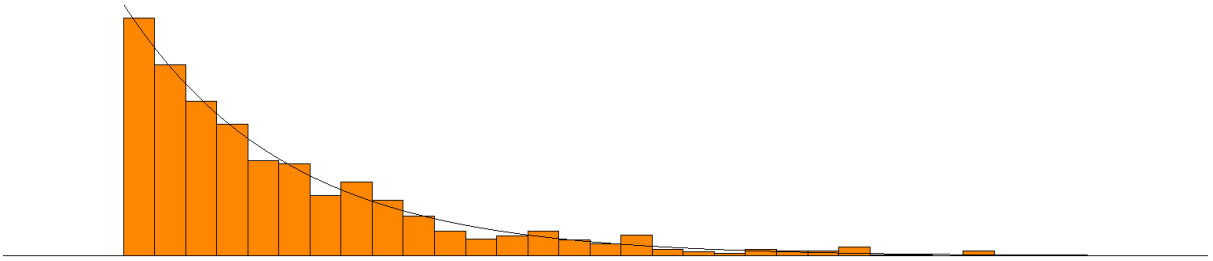
Test Statistic = 0.0178
Corresponding p-value > 0.15
D value for 1000 observations and 0.05 significance level = 0.0429

Due to the Test Statistic = 0.0178 < 0.0429, we fail to reject the null hypothesis under the assumption that this distribution being evaluated belongs to an exponential distribution, under the significance level 0.05. This means that the data belongs to an exponential distribution with the estimated parameters.

Description

We saw that the histogram of the "ambulance_call_18_21" data resembles exponential distribution. We took the average of the data and the mean comes out 0.96. Therefore, we fit the exponential distribution with a mean 0.96 from the input analyzer. Also we fail to reject Chi-Square test for exponential distribution with 0.96.

patient_interval_12_15



Distribution: Exponential
Expression: EXPO(25.2)
Square Error: 0.000609
Histogram Range = 0 to 149
Number of Intervals = 31

Chi-Square Test

Number of intervals = 19
Degrees of freedom = 17
Test Statistic = 26
Corresponding p-value = 0.0775
Chi-square value for 17 degrees of freedom and 0.05 significance level = 28.869

Since Test Statistic = 26 < 28.869, we fail to reject the null hypothesis, deeming the distribution examined to belong to exponential distribution, with the estimated parameters. This means that this data belongs to an exponential distribution with significance level 0.05.

Kolmogorov-Smirnov Test

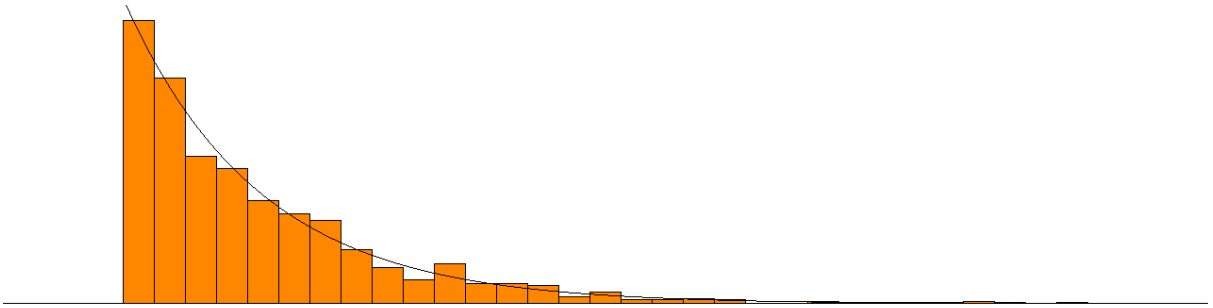
Test Statistic = 0.0191
Corresponding p-value > 0.15
D value for 1000 observations and 0.05 significance level = 0.0429

Due to the Test Statistic = 0.0191 < 0.0429, we fail to reject the null hypothesis under the assumption that this distribution being evaluated belongs to an exponential distribution, under the significance level 0.05. This means that the data belongs to an exponential distribution with the estimated parameters.

Description

We saw that the histogram of the "patient_arrival_12_15" data resembles exponential distribution. We took the average of the data and the mean comes out 25.2. Therefore, we fit the exponential distribution with a mean 25.2 from the input analyzer. Also, we fail to reject in both tests. Therefore, it is safe to say data is exponential with mean 25.2.

patient_interval_15_18



Distribution: Exponential
Expression: EXPO(19.3)
Square Error: 0.000842
Histogram Range = 0 to 138
Number of Intervals = 31

Chi-Square Test

Number of intervals = 17
Degrees of freedom = 15
Test Statistic = 17.7
Corresponding p-value = 0.282
Chi-square value for 15 degrees of freedom and 0.05 significance level = 24.996

Since Test Statistic = 17.7 < 24.996, we fail to reject the null hypothesis, deeming the distribution examined to belong to exponential distribution, with the estimated parameters. This means that this data belongs to an exponential distribution with significance level 0.05.

Kolmogorov-Smirnov Test

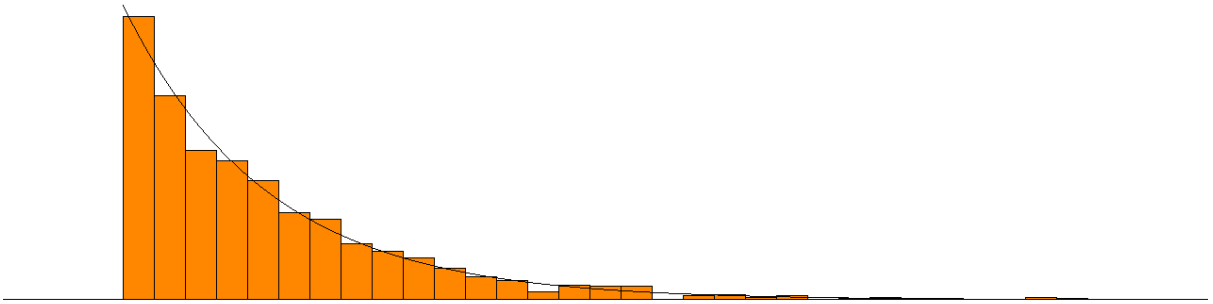
Test Statistic = 0.0241
Corresponding p-value > 0.15
D value for 1000 observations and 0.05 significance level = 0.0429

Due to the Test Statistic = 0.0241 < 0.0429, we fail to reject the null hypothesis under the assumption that this distribution being evaluated belongs to an exponential distribution, under the significance level 0.05. This means that the data belongs to an exponential distribution with the estimated parameters.

Description

We saw that the histogram of the "patient_arrival_15_18" data resembles exponential distribution. We took the average of the data and the mean comes out 19.3. Therefore, we fit the exponential distribution with a mean 19.3 from the input analyzer. Also, we fail to reject in both tests. Therefore, it is safe to say data is exponential with mean 19.3.

ambulance_call_interval_6_9



Distribution: Exponential
Expression: EXPO(3)
Square Error: 0.000682
Histogram Range = 0 to 20
Number of Intervals = 31

Chi-Square Test
Number of intervals = 17
Degrees of freedom = 15
Test Statistic = 8.89
Corresponding p-value > 0.75
Chi-square value for 15 degrees of freedom and 0.05 significance level = 24.996

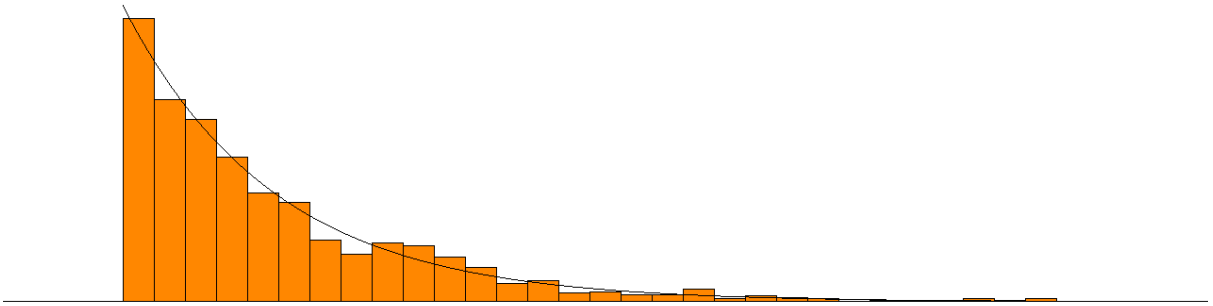
Since Test Statistic = 8.89 < 24.996, we fail to reject the null hypothesis, deeming the distribution examined to belong to exponential distribution, with the estimated parameters. This means that this data belongs to an exponential distribution with significance level 0.05.

Kolmogorov-Smirnov Test
Test Statistic = 0.0179
Corresponding p-value > 0.15
D value for 1000 observations and 0.05 significance level = 0.0429

Due to the Test Statistic = 0.0179 < 0.0429, we fail to reject the null hypothesis under the assumption that this distribution being evaluated belongs to an exponential distribution, under the significance level 0.05. This means that the data belongs to an exponential distribution with the estimated parameters.

Description
We saw that the histogram of the "ambulance_call_interval_6_9" data resembles exponential distribution. We took the average of the data and the mean comes out 3. Therefore, we fit the exponential distribution with a mean 3 from the input analyzer. Also, we fail to reject in both tests. Therefore, it is safe to say data is exponential with mean 3.

ambulance_call_interval_12_15



Distribution: Exponential
Expression: EXPO(4.07)
Square Error: 0.000791
Histogram Range = 0 to 26
Number of Intervals = 31

Chi-Square Test

Number of intervals = 18
Degrees of freedom = 16
Test Statistic = 19.4
Corresponding p-value = 0.25
Chi-square value for 16 degrees of freedom and 0.05 significance level = 26.296

Since Test Statistic = 19.4 < 26.296, we fail to reject the null hypothesis, deeming the distribution examined to belong to exponential distribution, with the estimated parameters. This means that this data belongs to an exponential distribution with significance level 0.05.

Kolmogorov-Smirnov Test

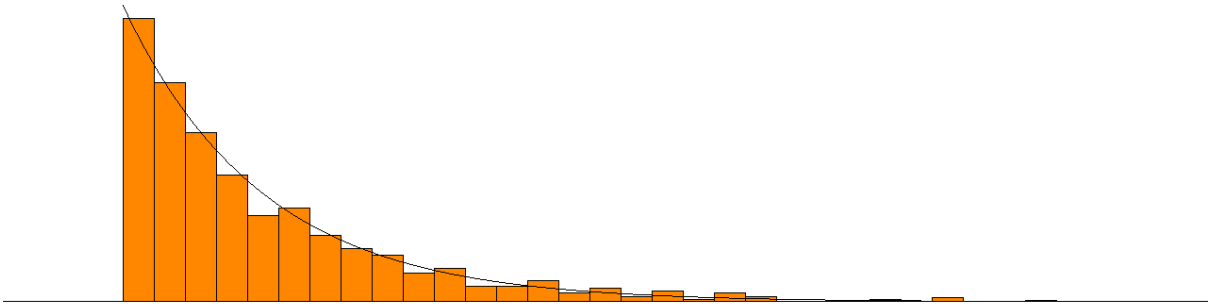
Test Statistic = 0.0225
Corresponding p-value > 0.15
D value for 1000 observations and 0.05 significance level = 0.0429

Due to the Test Statistic = 0.0225 < 0.0429, we fail to reject the null hypothesis under the assumption that this distribution being evaluated belongs to an exponential distribution, under the significance level 0.05. This means that the data belongs to an exponential distribution with the estimated parameters.

Description

We saw that the histogram of the "ambulance_call_interval_12_15" data resembles exponential distribution. We took the average of the data and the mean comes out 4.07. Therefore, we fit the exponential distribution with a mean 4.07 from the input analyzer.Also, we fail to reject in both tests. Therefore, it is safe to say data is exponential with mean 4.07.

ambulance_call_interval_15_18



Distribution: Exponential
Expression: EXPO(2)
Square Error: 0.000691
Histogram Range = 0 to 14
Number of Intervals = 31

Chi-Square Test

Number of intervals = 17
Degrees of freedom = 15
Test Statistic = 13.5
Corresponding p-value = 0.564
Chi-square value for 15 degrees of freedom and 0.05 significance level = 24.996

Since Test Statistic = 13.5 < 24.996, we fail to reject the null hypothesis, deeming the distribution examined to belong to exponential distribution, with the estimated parameters. This means that this data belongs to an exponential distribution with significance level 0.05.

Kolmogorov-Smirnov Test

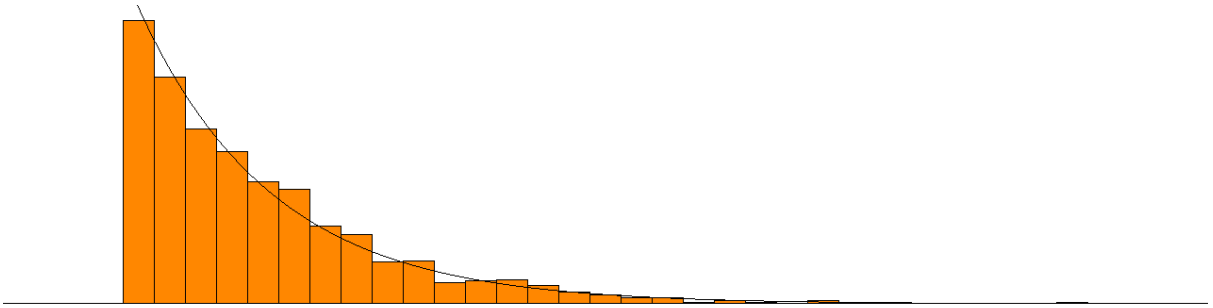
Test Statistic = 0.0237
Corresponding p-value > 0.15
D value for 1000 observations and 0.05 significance level = 0.0429

Due to the Test Statistic = 0.0237 < 0.0429, we fail to reject the null hypothesis under the assumption that this distribution being evaluated belongs to an exponential distribution, under the significance level 0.05. This means that the data belongs to an exponential distribution with the estimated parameters.

Description

We saw that the histogram of the "ambulance_call_interval_15_18" data resembles exponential distribution. We took the average of the data and the mean comes out 2. Therefore, we fit the exponential distribution with a mean 2 from the input analyzer. Also, we fail to reject in both tests. Therefore, it is safe to say data is exponential with mean 2.

patient_interval_3_6



Distribution: Exponential
Expression: EXPO(11.1)
Square Error: 0.000598
Histogram Range = 0 to 80
Number of Intervals = 31

Chi-Square Test

Number of intervals = 17
Degrees of freedom = 15
Test Statistic = 15.4
Corresponding p-value = 0.434
Chi-square value for 15 degrees of freedom and 0.05 significance level = 24.996

Since Test Statistic = 15.4 < 24.996, we fail to reject the null hypothesis, deeming the distribution examined to belong to exponential distribution, with the estimated parameters. This means that this data belongs to an exponential distribution with significance level 0.05.

Kolmogorov-Smirnov Test

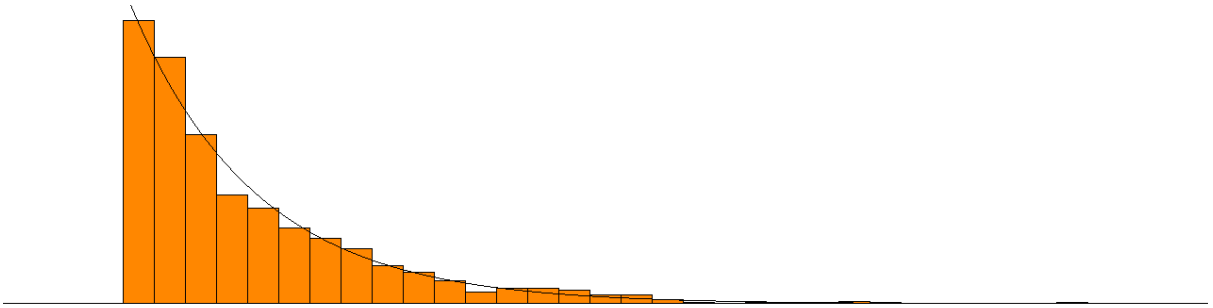
Test Statistic = 0.0273
Corresponding p-value > 0.15
D value for 1000 observations and 0.05 significance level = 0.0429

Due to the Test Statistic = 0.0273 < 0.0429, we fail to reject the null hypothesis under the assumption that this distribution being evaluated belongs to an exponential distribution, under the significance level 0.05. This means that the data belongs to an exponential distribution with the estimated parameters.

Description

We saw that the histogram of the "patient_arrival_3_6" data resembles exponential distribution. We took the average of the data and the mean comes out 11.1. Therefore, we fit the exponential distribution with a mean 11.1 from the input analyzer. Also, we fail to reject in both tests. Therefore, it is safe to say data is exponential with mean 11.1.

patient_interval_9_12



Distribution: Exponential
Expression: EXPO(17.8)
Square Error: 0.001007
Histogram Range = 0 to 137
Number of Intervals = 31

Chi-Square Test

Number of intervals = 16
Degrees of freedom = 14
Test Statistic = 18.1
Corresponding p-value = 0.212
Chi-square value for 14 degrees of freedom and 0.05 significance level = 23.685

Since Test Statistic = 18.1 < 23.685, we fail to reject the null hypothesis, deeming the distribution examined to belong to exponential distribution, with the estimated parameters. This means that this data belongs to an exponential distribution with significance level 0.05.

Kolmogorov-Smirnov Test

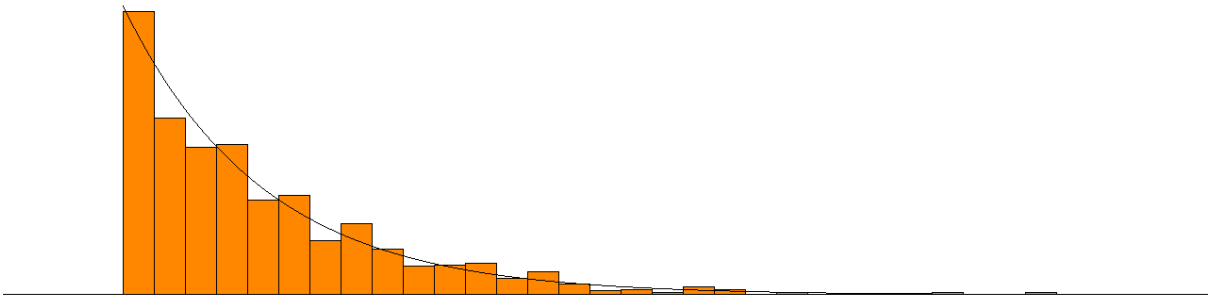
Test Statistic = 0.0289
Corresponding p-value > 0.15
D value for 1000 observations and 0.05 significance level = 0.0429

Due to the Test Statistic = 0.0289 < 0.0429, we fail to reject the null hypothesis under the assumption that this distribution being evaluated belongs to an exponential distribution, under the significance level 0.05. This means that the data belongs to an exponential distribution with the estimated parameters.

Description

We saw that the histogram of the "patient_arrival_9_12" data resembles exponential distribution. We took the average of the data and the mean comes out 17.8. Therefore, we fit the exponential distribution with a mean 17.8 from the input analyzer. Also, we fail to reject in both tests. Therefore, it is safe to say data is exponential with mean 17.8.

ambulance_call_interval_3_6



Distribution: Exponential
Expression: EXPO(2.03)
Square Error: 0.001943
Histogram Range = 0 to 14
Number of Intervals = 31

Chi-Square Test

Number of intervals = 17
Degrees of freedom = 15
Test Statistic = 29.2
Corresponding p-value = 0.0166
Chi-square value for 15 degrees of freedom and 0.05 significance level = 24.996

Since Test Statistic = 29.2 > 24.996, we reject the null hypothesis, deeming the distribution examined to not belong to exponential distribution, with the estimated parameters. This means that this data does not belong to an exponential distribution with significance level 0.05.

Kolmogorov-Smirnov Test

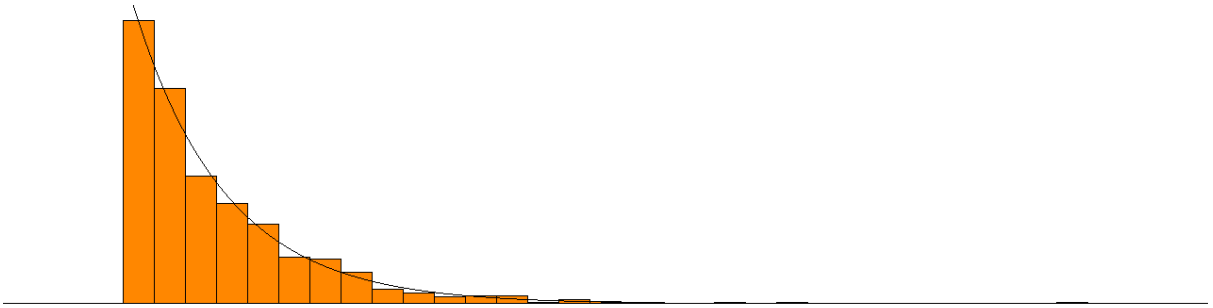
Test Statistic = 0.0345
Corresponding p-value > 0.15
D value for 1000 observations and 0.05 significance level = 0.0429

Due to the Test Statistic = 0.0345 < 0.0429, we fail to reject the null hypothesis under the assumption that this distribution being evaluated belongs to an exponential distribution, under the significance level 0.05. This means that the data belongs to an exponential distribution with the estimated parameters.

Description

We saw that the histogram of the "ambulance_call_arrival_3_6" data resembles exponential distribution. We took the average of the data and the mean comes out 2.03. Therefore, we fit the exponential distribution with a mean 2.03 from the input analyzer. Even though fit is rejected in Chi-Square test it is fail to reject in Kolmogorov-Simirnov test.

patient_interval_6_9



Distribution: Exponential
Expression: EXPO(13.8)
Square Error: 0.000688
Histogram Range = 0 to 144
Number of Intervals = 31

Chi-Square Test

Number of intervals = 12
Degrees of freedom = 10
Test Statistic = 8.62
Corresponding p-value = 0.569
Chi-square value for 10 degrees of freedom and 0.05 significance level = 18.307

Since Test Statistic = 8.62 < 18.307, we fail to reject the null hypothesis, deeming the distribution examined to belong to exponential distribution, with the estimated parameters. This means that this data belongs to an exponential distribution with significance level 0.05.

Kolmogorov-Smirnov Test

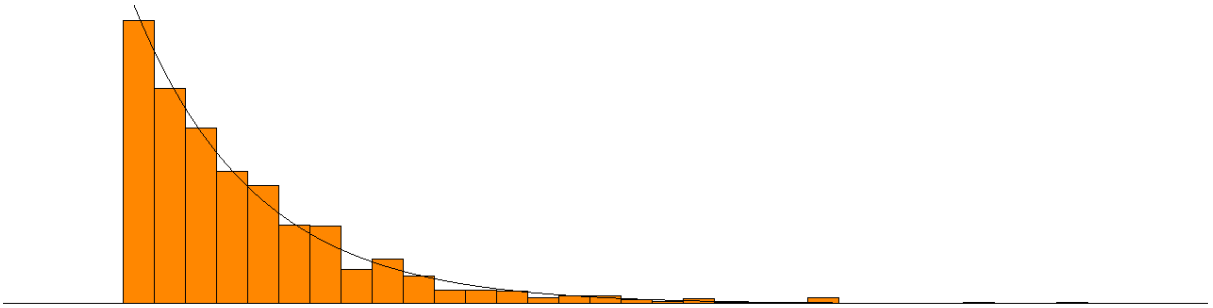
Test Statistic = 0.0222
Corresponding p-value > 0.15
D value for 1000 observations and 0.05 significance level = 0.0429

Due to the Test Statistic = 0.0222 < 0.0429, we fail to reject the null hypothesis under the assumption that this distribution being evaluated belongs to an exponential distribution, under the significance level 0.05. This means that the data belongs to an exponential distribution with the estimated parameters.

Description

We saw that the histogram of the "patient_arrival_6_9" data resembles exponential distribution. We took the average of the data and the mean comes out 13.8. Therefore, we fit the exponential distribution with a mean 13.8 from the input analyzer. Also, we fail to reject in both tests. Therefore, it is safe to say data is exponential with mean 13.8.

patient_interval_18_21



Distribution: Exponential
Expression: EXPO(12.2)
Square Error: 0.000592
Histogram Range = 0 to 97
Number of Intervals = 31

Chi-Square Test

Number of intervals = 15
Degrees of freedom = 13
Test Statistic = 13.5
Corresponding p-value = 0.418
Chi-square value for 13 degrees of freedom and 0.05 significance level = 22.362

Since Test Statistic = 13.5 < 22.362, we fail to reject the null hypothesis, deeming the distribution examined to belong to exponential distribution, with the estimated parameters. This means that this data belongs to an exponential distribution with significance level 0.05.

Kolmogorov-Smirnov Test

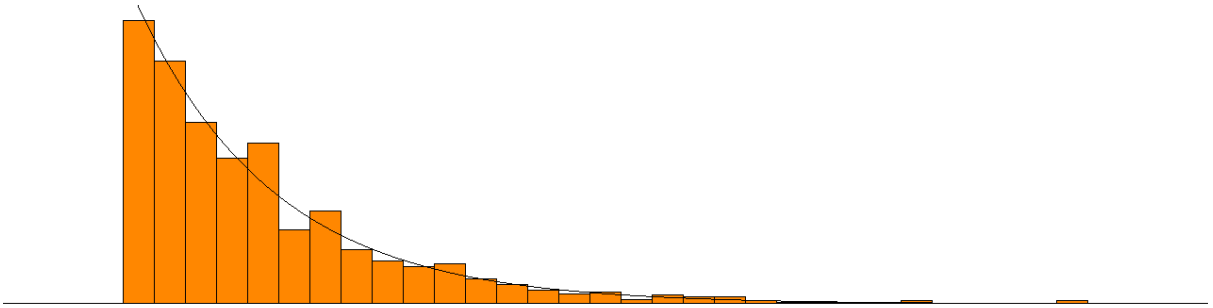
Test Statistic = 0.0165
Corresponding p-value > 0.15
D value for 1000 observations and 0.05 significance level = 0.0429

Due to the Test Statistic = 0.0165 < 0.0429, we fail to reject the null hypothesis under the assumption that this distribution being evaluated belongs to an exponential distribution, under the significance level 0.05. This means that the data belongs to an exponential distribution with the estimated parameters.

Description

We saw that the histogram of the "patient_arrival_18_21" data resembles exponential distribution. We took the average of the data and the mean comes out 12.2. Therefore, we fit the exponential distribution with a mean 12.2 from the input analyzer. Also, we fail to reject in both tests. Therefore, it is safe to say data is exponential with mean 12.2.

patient_interval_21_24



Distribution: Exponential
Expression: EXPO(6.15)
Square Error: 0.001353
Histogram Range = 0 to 43
Number of Intervals = 31

Chi-Square Test
Number of intervals = 17
Degrees of freedom = 15
Test Statistic = 19
Corresponding p-value = 0.221
Chi-square value for 19 degrees of freedom and 0.05 significance level = 30.144

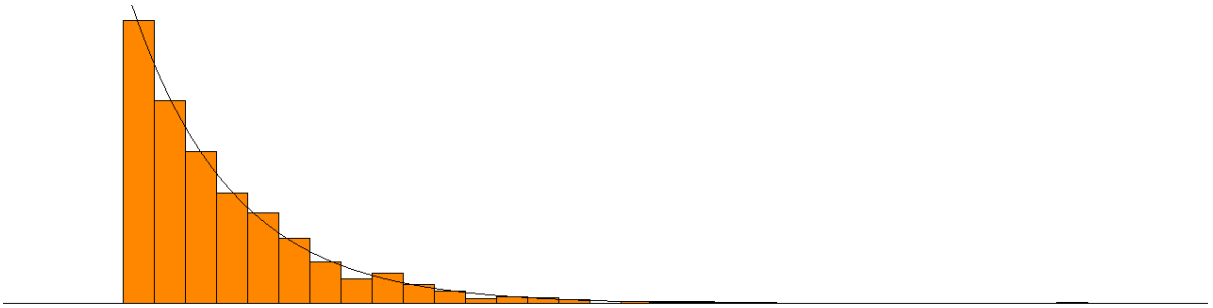
Since Test Statistic = 19 < 30.144, we fail to reject the null hypothesis, deeming the distribution examined to belong to exponential distribution, with the estimated parameters. This means that this data belongs to an exponential distribution with significance level 0.05.

Kolmogorov-Smirnov Test
Test Statistic = 0.0178
Corresponding p-value > 0.15
D value for 1000 observations and 0.05 significance level = 0.0429

Due to the Test Statistic = 0.0178 < 0.0429, we fail to reject the null hypothesis under the assumption that this distribution being evaluated belongs to an exponential distribution, under the significance level 0.05. This means that the data belongs to an exponential distribution with the estimated parameters.

Description
We saw that the histogram of the "patient_arrival_21_24" data resembles exponential distribution. We took the average of the data and the mean comes out 6.15. Therefore, we fit the exponential distribution with a mean 6.15 from the input analyzer. Also, we fail to reject in both tests. Therefore, it is safe to say data is exponential with mean 6.15.

response_red



Distribution: Exponential
Expression: EXPO(15)
Square Error: 0.000232
Histogram Range = 0 to 142
Number of Intervals = 31

Chi-Square Test

Number of intervals = 13
Degrees of freedom = 11
Test Statistic = 6.25
Corresponding p-value > 0.75
Chi-square value for 11 degrees of freedom and 0.05 significance level = 19.675

Since Test Statistic = 6.25 < 19.675, we fail to reject the null hypothesis, deeming the distribution examined to belong to exponential distribution, with the estimated parameters. This means that this data belongs to an exponential distribution with significance level 0.05.

Kolmogorov-Smirnov Test

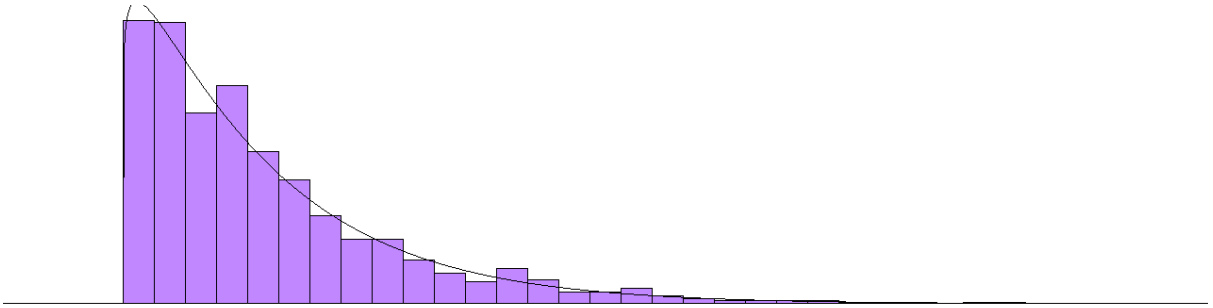
Test Statistic = 0.0193
Corresponding p-value > 0.15
D value for 1000 observations and 0.05 significance level = 0.0429

Due to the Test Statistic = 0.0193 < 0.0429, we fail to reject the null hypothesis under the assumption that this distribution being evaluated belongs to an exponential distribution, under the significance level 0.05. This means that the data belongs to an exponential distribution with the estimated parameters.

Description

We saw that the histogram of the "response_red" data resembles exponential distribution. We took the average of the data and the mean comes out 15. Therefore, we fit the exponential distribution with a mean 15 from the input analyzer. Also, we fail to reject in both tests. Therefore, it is safe to say data is exponential with mean 15.

ambulance_call_interval_21_24



Distribution: Gamma
Expression: GAMM(0.912, 1.1)
Square Error: 0.001130
Histogram Range = 0 to 6.82
Number of Intervals = 31

Chi-Square Test

Number of intervals = 17
Degrees of freedom = 14
Test Statistic =17.6
Corresponding p-value = 0.23
Chi-square value for 14 degrees of freedom and 0.05 significance level = 23.685

Since Test Statistic = 17.6 < 23.685, we fail to reject the null hypothesis, deeming the distribution examined to belong to gamma distribution, with the estimated parameters. This means that this data belongs to a gamma distribution with significance level 0.05.

Kolmogorov-Smirnov Test

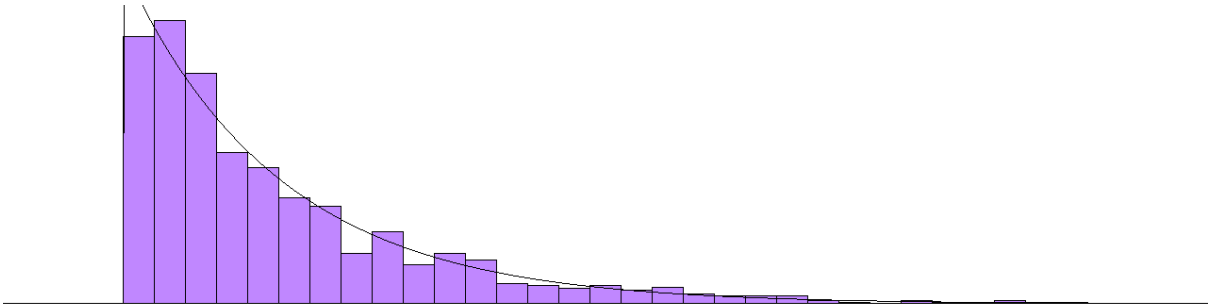
Test Statistic = 0.0245
Corresponding p-value > 0.15
D value for 1000 observations and 0.05 significance level = 0.0429

Due to the Test Statistic = 0.0245 < 0.0429, we fail to reject the null hypothesis under the assumption that this distribution being evaluated belongs to a gamma distribution, under the significance level 0.05. This means that the data belongs to a gamma distribution with the estimated parameters.

Description

We saw that the histogram of the “ambulance_call_interval_21_24” data and realise that first two columns are close to each other. We thought it might be a gamma distribution. Therefore, we fit the gamma distribution from the input analyzer and the results are shown above. Also, we fail to reject in both tests. Therefore, it is safe to say data is gamma with 0.912, 1.1 .

patient_interval_0_3



Distribution: Gamma
Expression: GAMM(7.21, 0.996)
Square Error: 0.001568
Histogram Range = 0 to 44
Number of Intervals = 31

Chi-Square Test

Number of intervals = 19
Degrees of freedom = 16
Test Statistic = 24.9
Corresponding p-value = 0.0751
Chi-square value for 16 degrees of freedom and 0.05 significance level = 26.296

Since Test Statistic = 24.9 < 26.296, we fail to reject the null hypothesis, deeming the distribution examined to belong to gamma distribution, with the estimated parameters. This means that this data belongs to a gamma distribution with significance level 0.05.

Kolmogorov-Smirnov Test

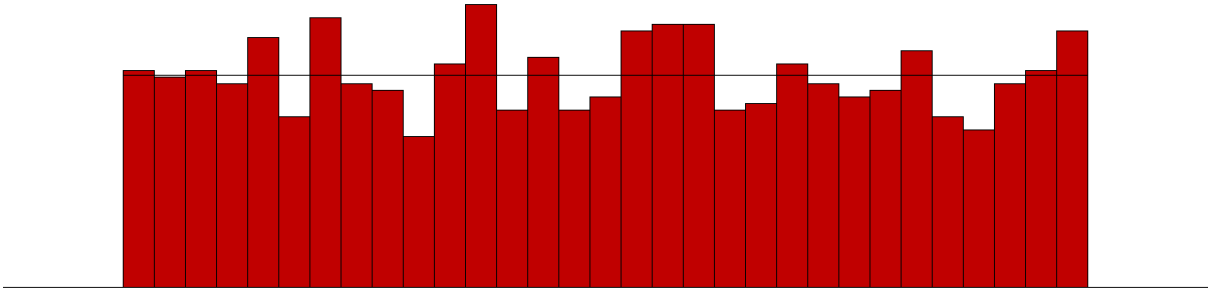
Test Statistic = 0.0257
Corresponding p-value > 0.15
D value for 1000 observations and 0.05 significance level = 0.0429

Due to the Test Statistic = 0.0257 < 0.0429, we fail to reject the null hypothesis under the assumption that this distribution being evaluated belongs to a gamma distribution, under the significance level 0.05. This means that the data belongs to a gamma distribution with the estimated parameters.

Description

We saw that the histogram of the "patient_interval_0_3" data and realise that the second column is higher thand the first column. We thought it migh be a gamma distribution. Therefore, we fit the gamma distribution from the input analyzer and the results are shown above. Also, we fail to reject in both tests. Therefore, it is safe to say data is gamma with 7.21, 0.996 .

doctor_check



Distribution: Uniform
Expression: UNIF(1, 3)
Square Error: 0.000836
Histogram Range = 1 to 3
Number of Intervals = 31

Chi-Square Test

Number of intervals = 31
Degrees of freedom = 30
Test Statistic = 25.9
Corresponding p-value = 0.676
Chi-square value for 30 degrees of freedom and 0.05 significance level = 43.773

Since Test Statistic = 25.9 < 43.773, we fail to reject the null hypothesis, deeming the distribution examined to belong to uniform distribution, with the estimated parameters. This means that this data belongs to an uniform distribution with significance level 0.05.

Kolmogorov-Smirnov Test

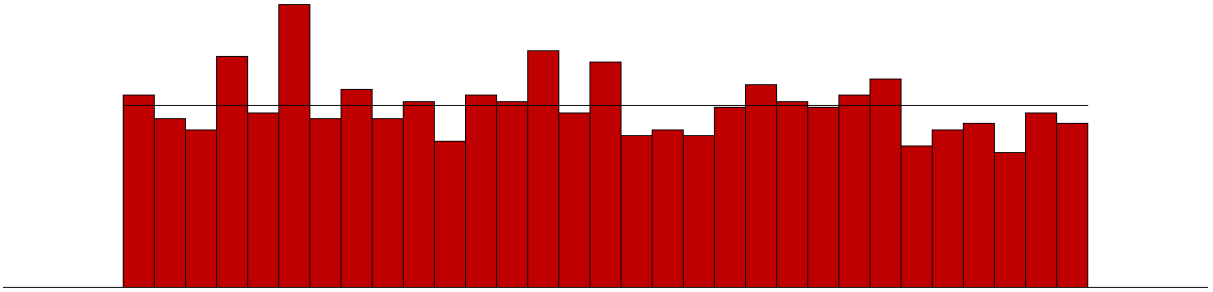
Test Statistic = 0.0211
Corresponding p-value > 0.15
D value for 1000 observations and 0.05 significance level = 0.0429

Due to the Test Statistic = 0.0211 < 0.0429, we fail to reject the null hypothesis under the assumption that this distribution being evaluated belongs to an uniform distribution, under the significance level 0.05. This means that the data belongs to an uniform distribution with the estimated parameters.

Description

We saw that the histogram of the "doctor_check" data and realize that the distribution is uniform with max value 3, min value 1. Therefore, we fit the uniform distribution with (1,3) values from the input analyzer and the results are shown above. Also, we fail to reject in both tests. Therefore, it is safe to say data is uniform between 1, 3 .

bed_delay_1_yellow



Distribution: Uniform
Expression: UNIF(2, 3)
Square Error: 0.000912
Histogram Range = 2 to 3
Number of Intervals = 31

Chi-Square Test

Number of intervals = 31
Degrees of freedom = 30
Test Statistic = 28.3
Corresponding p-value = 0.555
Chi-square value for 30 degrees of freedom and 0.05 significance level = 43.773

Since Test Statistic = 28.3 < 43.773, we fail to reject the null hypothesis, deeming the distribution examined to belong to uniform distribution, with the estimated parameters. This means that this data belongs to an uniform distribution with significance level 0.05.

Kolmogorov-Smirnov Test

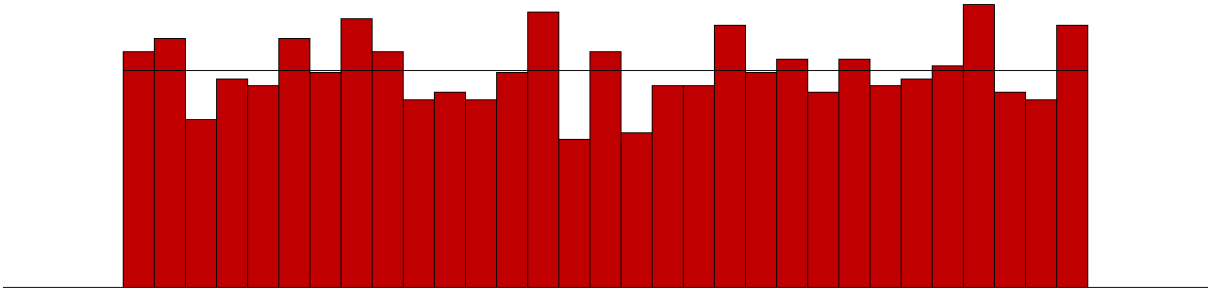
Test Statistic = 0.0323
Corresponding p-value > 0.15
D value for 1000 observations and 0.05 significance level = 0.0429

Due to the Test Statistic = 0.0323 < 0.0429, we fail to reject the null hypothesis under the assumption that this distribution being evaluated belongs to an uniform distribution, under the significance level 0.05. This means that the data belongs to an uniform distribution with the estimated parameters.

Description

We saw that the histogram of the "bed_delay_1_yellow" data and realize that the distribution is uniform with max value 3, min value 2. Therefore, we fit the uniform distribution with (2,3) values from the input analyzer and the results are shown above. Also, we fail to reject in both tests. Therefore, it is safe to say data is uniform between 2,3.

injection



Distribution: Uniform
Expression: UNIF(1, 2)
Square Error: 0.000750
Histogram Range = 1 to 2
Number of Intervals = 31

Chi-Square Test

Number of intervals = 31
Degrees of freedom = 30
Test Statistic = 23.2
Corresponding p-value > 0.75
Chi-square value for 30 degrees of freedom and 0.05 significance level = 43.773

Since Test Statistic = 23.2 < 43.773, we fail to reject the null hypothesis, deeming the distribution examined to belong to uniform distribution, with the estimated parameters. This means that this data belongs to an uniform distribution with significance level 0.05.

Kolmogorov-Smirnov Test

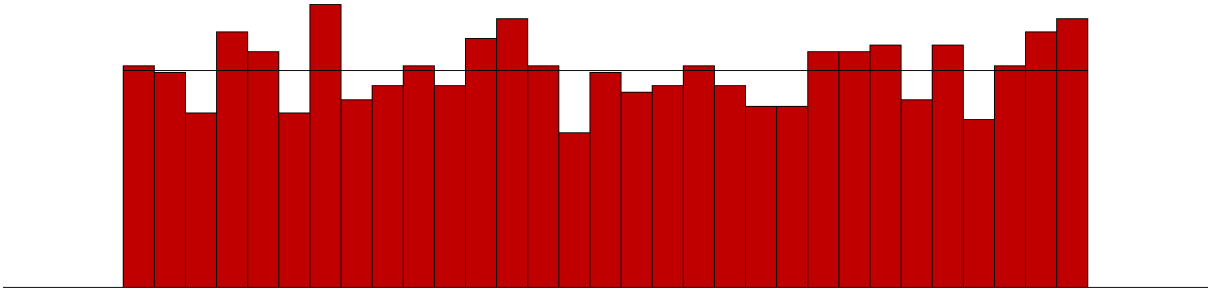
Test Statistic = 0.0161
Corresponding p-value > 0.15
D value for 1000 observations and 0.05 significance level = 0.0429

Due to the Test Statistic = 0.0161 < 0.0429, we fail to reject the null hypothesis under the assumption that this distribution being evaluated belongs to an uniform distribution, under the significance level 0.05. This means that the data belongs to an uniform distribution with the estimated parameters.

Description

We saw that the histogram of the “injection” data and realize that the distribution is uniform with max value 2, min value 1. Therefore, we fit the uniform distribution with (1,2) values from the input analyzer and the results are shown above. Also, we fail to reject in both tests. Therefore, it is safe to say data is uniform between 1,2 .

medical_tests



Distribution: Uniform
Expression: UNIF(4, 6)
Square Error: 0.000696
Histogram Range = 4 to 6
Number of Intervals = 31

Chi-Square Test

Number of intervals = 31
Degrees of freedom = 30
Test Statistic = 21.6
Corresponding p-value > 0.75
Chi-square value for 30 degrees of freedom and 0.05 significance level = 43.773

Since Test Statistic = 21.6 < 43.773, we fail to reject the null hypothesis, deeming the distribution examined to belong to uniform distribution, with the estimated parameters. This means that this data belongs to an uniform distribution with significance level 0.05.

Kolmogorov-Smirnov Test

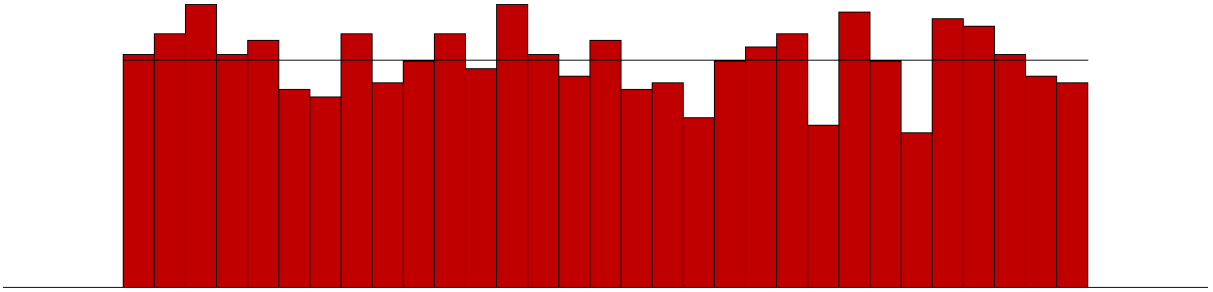
Test Statistic = 0.0217
Corresponding p-value > 0.15
D value for 1000 observations and 0.05 significance level = 0.0429

Due to the Test Statistic = 0.0217 < 0.0429, we fail to reject the null hypothesis under the assumption that this distribution being evaluated belongs to an uniform distribution, under the significance level 0.05. This means that the data belongs to an uniform distribution with the estimated parameters.

Description

We saw that the histogram of the “medical_tests” data and realise that the distribution is uniform with max value 6, min value 4. Therefore, we fit the uniform distribution with (4,6) values from the input analyzer and the results are shown above. Also, we fail to reject in both tests. Therefore, it is safe to say data is uniform between 4,6 .

observation_red_fitted



Distribution: Uniform
Expression: UNIF(19, 21)
Square Error: 0.000664
Histogram Range = 19 to 21
Number of Intervals = 31

Chi-Square Test

Number of intervals = 31
Degrees of freedom = 30
Test Statistic = 20.6
Corresponding p-value > 0.75
Chi-square value for 30 degrees of freedom and 0.05 significance level = 43.773

Since Test Statistic = 20.6 < 43.773, we fail to reject the null hypothesis, deeming the distribution examined to belong to uniform distribution, with the estimated parameters. This means that this data belongs to an uniform distribution with significance level 0.05.

Kolmogorov-Smirnov Test

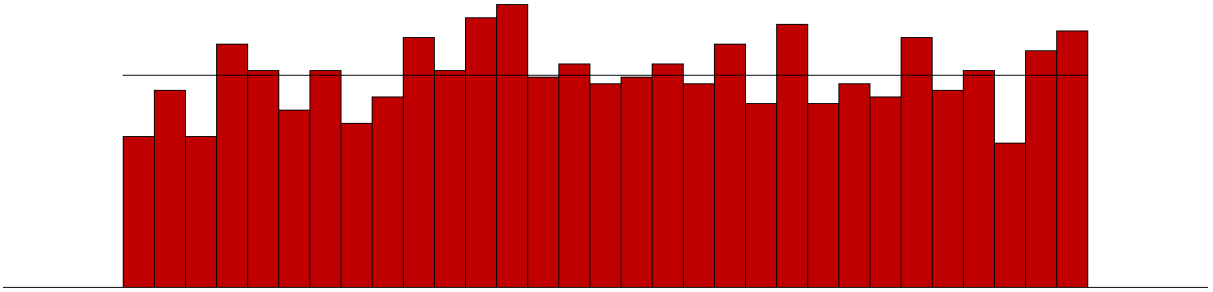
Test Statistic = 0.0221
Corresponding p-value > 0.15
D value for 1000 observations and 0.05 significance level = 0.0429

Due to the Test Statistic = 0.0221 < 0.0429, we fail to reject the null hypothesis under the assumption that this distribution being evaluated belongs to an uniform distribution, under the significance level 0.05. This means that the data belongs to an uniform distribution with the estimated parameters.

Description

We saw that the histogram of the "observation_red_fitted" data and realize that the distribution is uniform with max value 21, min value 19. Therefore, we fit the uniform distribution with (19,21) values from the input analyzer and the results are shown above. Also, we fail to reject in both tests. Therefore, it is safe to say data is uniform between 19,21 .

redirect_fitted



Distribution: Uniform
Expression: UNIF(9, 11)
Square Error: 0.000860
Histogram Range = 9 to 11
Number of Intervals = 31

Chi-Square Test

Number of intervals = 31
Degrees of freedom = 30
Test Statistic = 26.7
Corresponding p-value = 0.638
Chi-square value for 30 degrees of freedom and 0.05 significance level = 43.773

Since Test Statistic = 26.7 < 43.773, we fail to reject the null hypothesis, deeming the distribution examined to belong to uniform distribution, with the estimated parameters. This means that this data belongs to an uniform distribution with significance level 0.05.

Kolmogorov-Smirnov Test

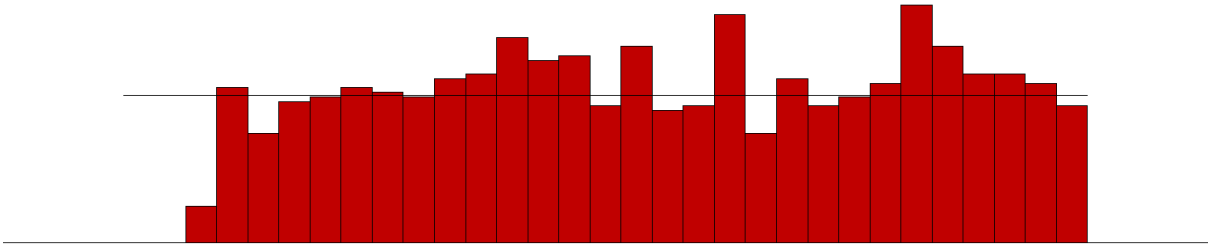
Test Statistic = 0.0347
Corresponding p-value > 0.15
D value for 1000 observations and 0.05 significance level = 0.0429

Due to the Test Statistic = 0.0347 < 0.0429, we fail to reject the null hypothesis under the assumption that this distribution being evaluated belongs to an uniform distribution, under the significance level 0.05. This means that the data belongs to an uniform distribution with the estimated parameters.

Description

We saw that the histogram of the "redirect_fitted" data and realise that the distribution is uniform with max value 11, min value 9. Therefore, we fit the uniform distribution with (9,11) values from the input analyzer and the results are shown above. Also, we fail to reject in both tests. Therefore, it is safe to say data is uniform between 9,11 .

nurse_for_yellow_fitted



Distribution: Uniform
Expression: UNIF(1.45, 2)
Square Error: 0.004190
Histogram Range = 1.45 to 2
Number of Intervals = 31

Chi-Square Test

Number of intervals = 31
Degrees of freedom = 30
Test Statistic = 130
Corresponding p-value < 0.005
Chi-square value for 30 degrees of freedom and 0.05 significance level = 43.773

Since Test Statistic = 130 > 43.773, we reject the null hypothesis, deeming the distribution examined to not belong to uniform distribution, with the estimated parameters. This means that this data does not belong to an uniform distribution with significance level 0.05.

Kolmogorov-Smirnov Test

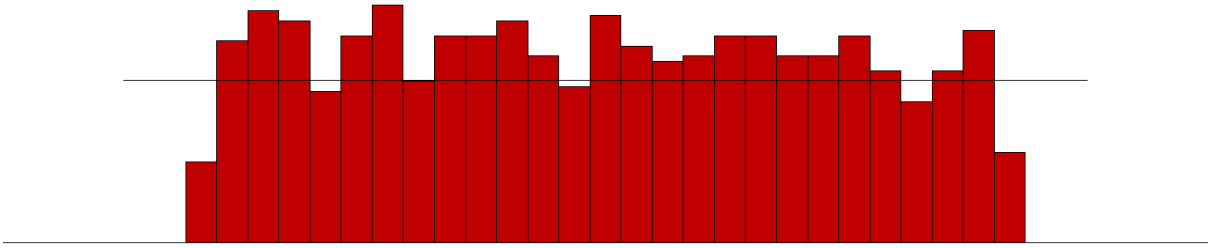
Test Statistic = 0.102
Corresponding p-value < 0.01
D value for 1000 observations and 0.05 significance level = 0.0429

Due to the Test Statistic = 0.102 > 0.0429, we reject the null hypothesis under the assumption that this distribution being evaluated does not belong to an uniform distribution, under the significance level 0.05. This means that the data does not belong to an uniform distribution with the estimated parameters.

Description

We saw that the histogram of the "nurse_for_yellow_fitted" data and realise that the distribution is uniform with max value 2, min value 1.45. Therefore, we fit the uniform distribution with (1.45,2) values from the input analyzer and the results are shown above. Although is rejected in both test, still it is the best option among other distributions. Therefore we accepted this data as uniform between 1.45, 2.

registration_fitted



Distribution: Uniform
Expression: UNIF(0.4, 1.6)
Square Error: 0.006268
Histogram Range = 0.4 to 1.6
Number of Intervals = 31

Chi-Square Test

Number of intervals = 31
Degrees of freedom = 30
Test Statistic = 194
Corresponding p-value < 0.005
Chi-square value for 30 degrees of freedom and 0.05 significance level = 43.773

Since Test Statistic = 194 > 43.773, we reject the null hypothesis, deeming the distribution examined to not belong to uniform distribution, with the estimated parameters. This means that this data does not belong to an uniform distribution with significance level 0.05.

Kolmogorov-Smirnov Test

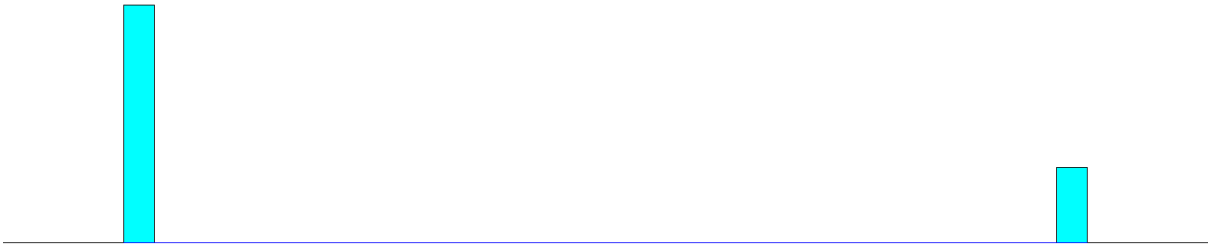
Test Statistic = 0.0835
Corresponding p-value < 0.01
D value for 1000 observations and 0.05 significance level = 0.0429

Due to the Test Statistic = 0.0835 > 0.0429, we reject the null hypothesis under the assumption that this distribution being evaluated does not belong to an uniform distribution, under the significance level 0.05. This means that the data does not belong to an uniform distribution with the estimated parameters.

Description

We saw that the histogram of the “registration_fitted” data and realise that the distribution is uniform with max value 1.6, min value 0.4. Therefore, we fit the uniform distribution with (1.6,0.4) values from the input analyzer and the results are shown above. Although is rejected in both test, still it is the best option among other distributions. Therefore we accepted this data as uniform between 0.4, 1.6.

red_group_fitted

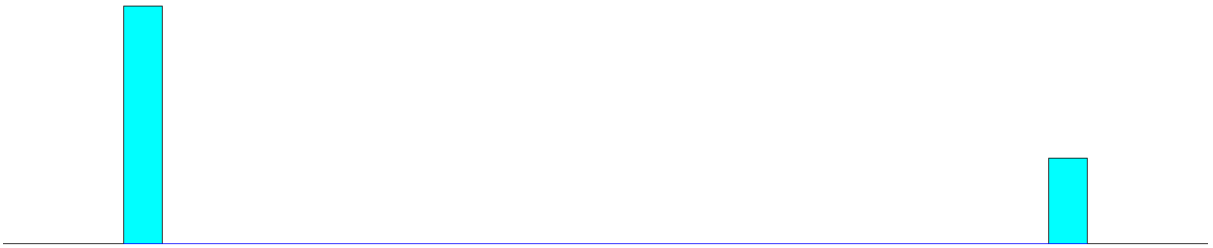


Number of Data Points = 1000
Min Data Value = 1
Max Data Value = 2
Sample Mean = 1.24
Sample Std Dev = 0.428

Description

The definition of the data provided is red_group =: # of patients arrive with a single ambulance call. Since the data take values of either 1 or 2 only. We calculated the sample mean as 1.24 and the sample standard deviation as 0.428. Data is discrete so we considered the data as empirical and do not fit to any continuous fonction.

red_med_test_need_fitted

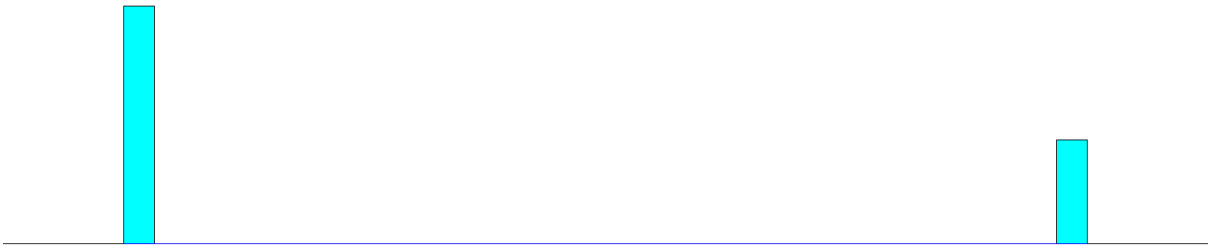


Number of Data Points = 630
Min Data Value = 0
Max Data Value = 1
Sample Mean = 0.265
Sample Std Dev = 0.442

Description

The definition of the data provided is red_med_test_need: whether the doctor requests medical test for a red patient or not (1: yes, 0: no). Since the data takes values of either 0 or 1 only. We calculated the sample mean as 0.265 and the sample standard deviation as 0.442. Data is discrete so we considered the data as empirical and do not fit to any continuous fonction.

red_to_yellow_fitted

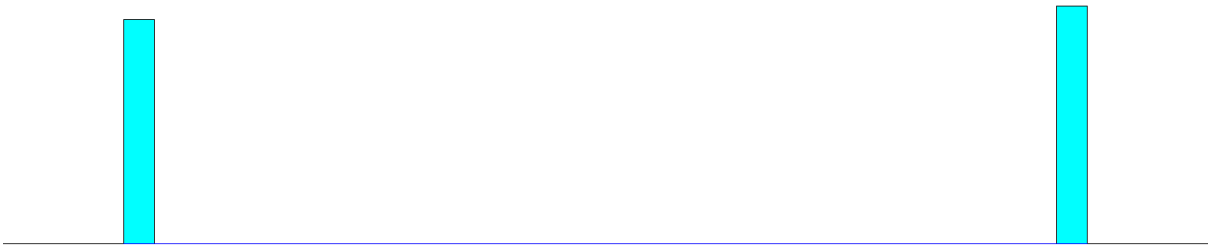


Number of Data Point = 1000
Min Data Value = 0
Max Data Value = 1
Sample Mean = 0.304
Sample Std Dev = 0.46

Description

The definition of the data provided is red_to_yellow: whether the red patient is relabeled as yellow after doctors examination or not (1: yes, 0: no). Since the data takes values either 0 or 1 only. We calculated sthe ample mean as 0.304 athe nd sample standard deviation as 0.46. Data is discrete so we considered the data as empirical and do not fit to any continuous fonction.

yellow_med_test_need_fitted

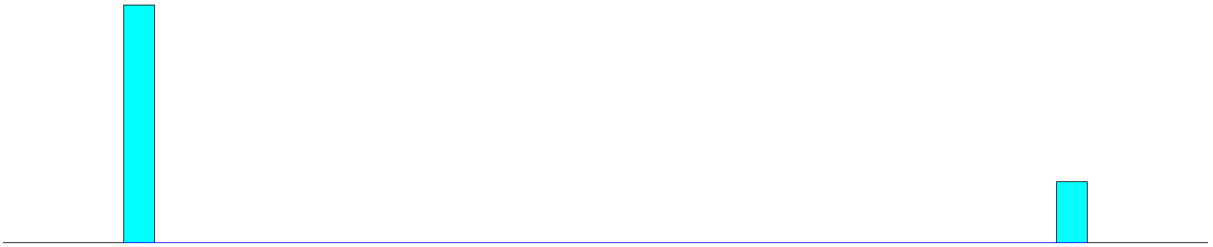


Number of Data Points = 1000
Min Data Value = 0
Max Data Value = 1
Sample Mean = 0.514
Sample Std Dev = 0.5

Description

The definition of the data provided is yellow_med_test_need: whether a yellow patient is sent for a medical test or not (1: yes, 0: no). Since the data takes valueof s either 0 or 1 only. We calculated the sample mean as 0.514 the and sample standard deviation as 0.5. Data is discrete so we considered the data as empirical and do not fit to any continuous fonction.

yellow_to_red_fitted

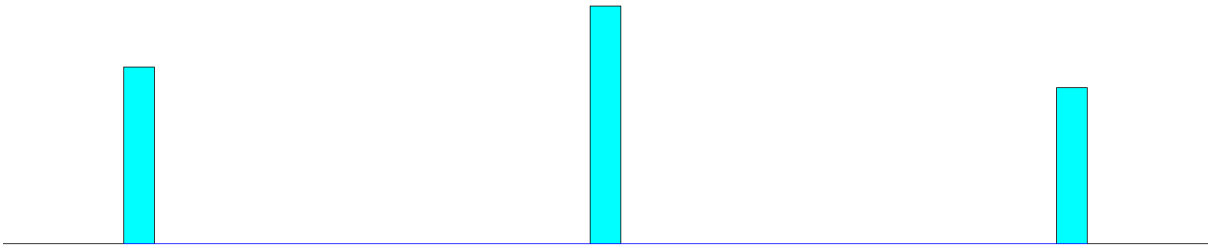


Number of Data Points = 1000
Min Data Value = 0
Max Data Value = 1
Sample Mean = 0.206
Sample Std Dev = 0.405

Description

The definition of the data provided is yellow_to_red: whether the yellow patient is relabeled as red after doctors examination or not (1: yes, 0: no). Since the data takes values either 0 or 1 only. We calculated the sample mean as 0.206 and the sample standard deviation as 0.405. Data is discrete so we considered the data as empirical and do not fit to any continuous fonction.

green_type_fitted



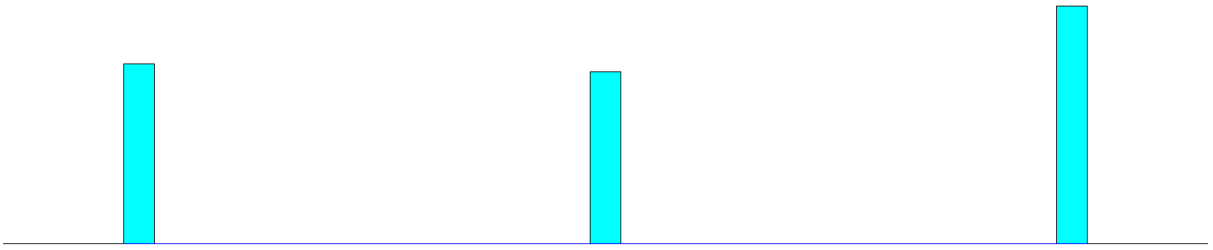
Number of Data Points = 1000
Min Data Value = 1
Max Data Value = 3
Sample Mean = 1.96
Sample Std Dev = 0.764

Description

The definition of the data provided is green_type: which indicates the doctors prescribed treatment for green patients (1: injection, 2: observation, 3: prescribe medicine and discharge). Since the data takes values 1, 2, and 3 only. We calculated sample the mean as

1.96 and the sample standard deviation as 0.764. Data is discrete so we considered the data as empirical and do not fit to any continuous fonction.

injection_green_yellow_fitted



Number of Data Points = 1000
Min Data Value = 1
Max Data Value = 3
Sample Mean = 2.1
Sample Std Dev = 0.836

Description

The definition of the data provided is injection_green_yellow: patient type (1: injection, 2: green, 3: yellow). Since the data takes values 1, 2, and 3 only. We calculated the sample mean as 2.1 and the sample standard deviation as 0.836. Data is discrete so we considered the data as empirical and do not fit to any continuous fonction.