Statistical Test for Distance in Device A

**FPS Processed in Relation to Distance in Device A for 30 Second Period(FPS)**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Quality(%)** | **10** | **20** | **30** | **40** | **50** | **60** | **70** | **80** | **90** | **98** |
| Average FPS Sent | 13.67 | 13.60 | 12.70 | 10.73 | 8.87 | 7.77 | 5.90 | 3.43 | 2.03 | 1.00 |
| Total FPS Sent | 410 | 408 | 381 | 322 | 266 | 233 | 177 | 103 | 61 | 30 |

The calculated sample mean:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |
| Squared Differences | 18.67 | 43.20 | 38.30 | 73.87 | 63.47 | 41.37 | 72.70 | 43.37 | 22.97 | 0.00 |
| Variance | 0.64 | 1.49 | 1.32 | 2.55 | 2.19 | 1.43 | 2.51 | 1.50 | 0.79 | 0.00 |
| Standard Deviation(s) | 0.80 | 1.22 | 1.15 | 1.60 | 1.48 | 1.19 | 1.58 | 1.22 | 0.89 | 0.00 |

The calculated sample variance:

The calculated sample standard deviation:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Confidence Level** |  |  |  |  |  |  |  |  |  |  |
| 90% | 0.25 | 0.38 | 0.36 | 0.49 | 0.46 | 0.37 | 0.49 | 0.38 | 0.28 | 0.00 |
| 95% | 0.30 | 0.46 | 0.43 | 0.60 | 0.55 | 0.45 | 0.59 | 0.46 | 0.33 | 0.00 |
| 99% | 0.40 | 0.61 | 0.58 | 0.80 | 0.74 | 0.60 | 0.79 | 0.61 | 0.45 | 0.00 |

Normally distributed random variable (As the sample size is less 100, 30 which is apply normal distributions)

Let’s choose the confidence level of 95%, then α = 0.05.

We calculate the margin of error.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |
|  | 13.97 | 14.06 | 13.13 | 11.33 | 9.42 | 8.21 | 6.49 | 3.89 | 2.37 | 1.00 |
|  | 13.37 | 13.14 | 12.27 | 10.14 | 8.32 | 7.32 | 5.31 | 2.98 | 1.70 | 1.00 |

The confidence interval is:

C.I. for all quality are:

This is accuracy of the estimates with respect to the sample size 30 because most results of sample standard deviation are true positive. Therefore, we could retreat the sample mean to predict the true mean of the population of all distance in Device A.

Statistical Test for Quality in Device A

**FPS Processed in Relation to Quality Ratio in Device A for 30 Second Period(FPS)**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Quality(%)** | **10** | **20** | **30** | **40** | **50** | **60** | **70** | **80** | **90** | **98** |
| Average FPS Sent | 12.93 | 11.43 | 10.87 | 10.83 | 9.83 | 9.53 | 8.97 | 8.03 | 7.1 | 4.03 |
| Total FPS Sent | 388 | 343 | 326 | 325 | 295 | 286 | 269 | 241 | 213 | 121 |

The calculated sample mean:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |
| Squared Differences | 31.87 | 21.37 | 25.47 | 24.17 | 48.17 | 39.47 | 30.97 | 26.97 | 26.70 | 10.97 |
| Variance | 1.10 | 0.74 | 0.88 | 0.83 | 1.66 | 1.36 | 1.07 | 0.93 | 0.92 | 0.38 |
| Standard Deviation(s) | 1.05 | 0.86 | 0.94 | 0.91 | 1.29 | 1.17 | 1.03 | 0.96 | 0.96 | 0.61 |

The calculated sample variance:

The calculated sample standard deviation:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Confidence Level** |  |  |  |  |  |  |  |  |  |  |
| 90% | 0.32 | 0.27 | 0.29 | 0.28 | 0.40 | 0.36 | 0.32 | 0.30 | 0.30 | 0.19 |
| 95% | 0.39 | 0.32 | 0.35 | 0.34 | 0.48 | 0.43 | 0.39 | 0.36 | 0.36 | 0.23 |
| 99% | 0.53 | 0.43 | 0.47 | 0.46 | 0.65 | 0.59 | 0.52 | 0.48 | 0.48 | 0.31 |

Normally distributed random variable (As the sample size is less 100, 30 which is apply normal distributions)

Let’s choose the confidence level of 95%, then α = 0.05.

We calculate the margin of error.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |
|  | 13.32 | 11.75 | 11.22 | 11.17 | 10.31 | 9.97 | 9.35 | 8.39 | 7.46 | 4.26 |
|  | 12.54 | 11.11 | 10.52 | 10.49 | 9.35 | 9.10 | 8.58 | 7.67 | 6.74 | 3.80 |

The confidence interval is:

C.I. for all quality are:

This is accuracy of the estimates with respect to the sample size 30 because most results of sample standard deviation are true positive. Therefore, we could retreat the sample mean to predict the true mean of the population of all quality in Device A.