**Practical No.: 14**

**STATEMENT:**

CALCULATE KARL PEARSON’S COEFFICIENT CORRELATION COEFFICIENT TEST ITS SIGNIFICANCE AND FIND THE LIMITS OF POPULATION CORRELATION COEFFICIENT. FIND COEFFICIENT OF DETERMINATION**.**

|  |  |
| --- | --- |
| **Nutrition** | **Child Mortality** |
| 12.1 | 9.5 |
| 9.1 | 9.2 |
| 26 | 11.8 |
| 6.4 | 6.4 |
| 9.5 | 7.3 |
| 18.5 | 20.3 |
| 22.8 | 24.4 |
| 17.4 | 21.1 |
| 13.9 | 10.7 |
| 3.2 | 3.5 |
| 30.2 | 11.8 |
| 15.7 | 12.3 |
| 8.7 | 11.8 |
| 5.6 | 9.4 |
| 11.2 | 8.3 |
| 9.8 | 9 |
| 8.4 | 4.7 |

**WORKING EXPRESSION:**

1. **Karl Pearson’s Coefficient:**

The Karl Pearson’s coefficient measures the degree of association between the two variables. It is also known as the Pearsonian coefficient. And it is given by the formula:

r =

1. **Significance:**

Probable error is a statistical measure for testing the reliability of the value of correlation coefficient. It is used to test the calculated correlation coefficient whether it is significant or not. And it is calculated by the formula:

P.E(r) = 0.6745×

If 6P.E(r) > r, then it is not significant,

And if 6P.E(r) < r, then it is significant

Again,

For the limits of Correlation coefficient we have,

population correlation coefficient = r ± P.E(r)

1. **Coefficient of Determination:**

It measures the proportion of variation in dependent variable that is explained by the set of independent variables. It is the measure based on measure of variation is used to determine the fitness of the data to the model.

Coefficient of determination (R2) = ( r2 )

**CALCULATION:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Nutrition(x)** | **Child Mortality(y)** | **x2** | **y2** | **xy** |
| 12.1 | 9.5 | 146.41 | 90.25 | 114.95 |
| 9.1 | 9.2 | 82.81 | 84.64 | 83.72 |
| 26 | 11.8 | 676 | 139.24 | 306.8 |
| 6.4 | 6.4 | 40.96 | 40.96 | 40.96 |
| 9.5 | 7.3 | 90.25 | 53.29 | 69.35 |
| 18.5 | 20.3 | 342.25 | 412.09 | 375.55 |
| 22.8 | 24.4 | 519.84 | 595.36 | 556.32 |
| 17.4 | 21.1 | 302.76 | 445.21 | 367.14 |
| 13.9 | 10.7 | 193.21 | 114.49 | 148.73 |
| 3.2 | 3.5 | 10.24 | 12.25 | 11.2 |
| 30.2 | 11.8 | 912.04 | 139.24 | 356.36 |
| 15.7 | 12.3 | 246.49 | 151.29 | 193.11 |
| 8.7 | 11.8 | 75.69 | 139.24 | 102.66 |
| 5.6 | 9.4 | 31.36 | 88.36 | 52.64 |
| 11.2 | 8.3 | 125.44 | 68.89 | 92.96 |
| 9.8 | 9 | 96.04 | 81 | 88.2 |
| 8.4 | 4.7 | 70.56 | 22.09 | 39.48 |
| ∑x = 228.5 | ∑y = 191.5 | ∑ x2 = 3962.35 | ∑ y2 = 2677.89 | ∑xy = 3000.13 |

**For finding out Karl Pearson Correlation Coefficient:**

We know that,

Karl Pearson’s Coefficient is given by:

Total number of observations (n) = 17

r =

=

= 0.625666

**For the significance**

We know the formula of the significance is given by:

P.E(r) =

We have, r = 0.625666 & n = 17

So, P.E(r) = 0.6745×

= 0.6745×0.14759

= 0.00995

6P.E(r) = 6 ×0.00995

= 0.5973 (i.e. < r).

Hence it is significant as we know If 6P.E(r) > r.

**For Limits of population correlation coefficient:**

Population Correlation coefficient = r ± P.E(r) = 0.625666 ± 0.00995

Taking (-ve), 0.625666 - 0.00995 = 0.61571

Taking (+ve), 0.625666 + 0.00995 = 0.6356

Hence, the limits of population correlation is from 0.61571 to 0.6356.

**For the coefficient of the determination (R2)**

Coefficient of determination (R2) = (r2)

= 0.6256662

= 0.3914

**RESULT:**

Therefore, the Karl Pearson’s coefficient and coefficient of determination are 0.62566 and 0.3914 respectively. = 6.P.E(r) <r and it is significant. The limits of population correlation is from 0.61571 to 0.6356.

**CONCLUSION:**

Hence, in this way Karl Pearson’s coefficient, significance and coefficient of determination is computed using MS WORD and MS EXCEL.