**PRACTICAL: 3**

*Find the correlation coefficient for a bi-variate distribution.*

**FORMULA USED:**

1. **VARIANCE :**

Hence, we can write it as,

1. **COVARIANCE :**
2. **KARL PEARSONS’ COEFFICIENT OF CORRELATION:**

**Question:** Calculate the Karl Pearson’s Coefficient of Correlation for height and weight of students of your class.

**Answer:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| HEIGHT | WEIGHT | X^2 | Y^2 | XY |
| 120 | 45 | 14400 | 2025 | 5400 |
| 118 | 59 | 13924 | 3481 | 6962 |
| 119 | 55 | 14161 | 3025 | 6545 |
| 135 | 50 | 18225 | 2500 | 6750 |
| 110 | 51 | 12100 | 2601 | 5610 |
| 111 | 43 | 12321 | 1849 | 4773 |
| 123 | 47 | 15129 | 2209 | 5781 |
| 124 | 58 | 15376 | 3364 | 7192 |
| 123 | 49 | 15129 | 2401 | 6027 |
| 110 | 47 | 12100 | 2209 | 5170 |
| 119 | 45 | 14161 | 2025 | 5355 |
| 118 | 43 | 13924 | 1849 | 5074 |
| 117 | 54 | 13689 | 2916 | 6318 |
| 123 | 43 | 15129 | 1849 | 5289 |
| 112 | 65 | 12544 | 4225 | 7280 |
| 119 | 45 | 14161 | 2025 | 5355 |
| 111 | 34 | 12321 | 1156 | 3774 |
| 123 | 54 | 15129 | 2916 | 6642 |
| 124 | 45 | 15376 | 2025 | 5580 |
| 110 | 45 | 12100 | 2025 | 4950 |
| 117 | 59 | 13689 | 3481 | 6903 |
| 123 | 50 | 15129 | 2500 | 6150 |
| 112 | 51 | 12544 | 2601 | 5712 |
| 119 | 58 | 14161 | 3364 | 6902 |
| 110 | 49 | 12100 | 2401 | 5390 |
| 117 | 47 | 13689 | 2209 | 5499 |
| 123 | 54 | 15129 | 2916 | 6642 |
| 123 | 45 | 15129 | 2025 | 5535 |
| 124 | 34 | 15376 | 1156 | 4216 |
| 110 | 49 | 12100 | 2401 | 5390 |
| 117 | 47 | 13689 | 2209 | 5499 |
| 123 | 45 | 15129 | 2025 | 5535 |
| 118 | 43 | 13924 | 1849 | 5074 |
| 135 | 54 | 18225 | 2916 | 7290 |
| 110 | 43 | 12100 | 1849 | 4730 |
| 123 | 65 | 15129 | 4225 | 7995 |
| 119 | 45 | 14161 | 2025 | 5355 |
| 123 | 45 | 15129 | 2025 | 5535 |
| 123 | 58 | 15129 | 3364 | 7134 |
| 112 | 54 | 12544 | 2916 | 6048 |
| 123 | 45 | 15129 | 2025 | 5535 |
| 123 | 55 | 15129 | 3025 | 6765 |
| 119 | 50 | 14161 | 2500 | 5950 |
| 110 | 58 | 12100 | 3364 | 6380 |
| 119 | 47 | 14161 | 2209 | 5593 |
| 124 | 43 | 15376 | 1849 | 5332 |
| 110 | 45 | 12100 | 2025 | 4950 |
| 117 | 34 | 13689 | 1156 | 3978 |
| 123 | 51 | 15129 | 2601 | 6273 |
| 117 | 49 | 13689 | 2401 | 5733 |
| 117 | 47 | 13689 | 2209 | 5499 |
| 112 | 34 | 12544 | 1156 | 3808 |
| 126 | 49 | 15876 | 2401 | 6174 |
| 134 | 46 | 17956 | 2116 | 6164 |
| 136 | 56 | 18496 | 3136 | 7616 |
| 118 | 65 | 13924 | 4225 | 7670 |
| 120 | 43 | 14400 | 1849 | 5160 |
| 6798 | 2789 | 813152 | 139379 | 332941 |

**CALCULATIONS:**

|  |  |
| --- | --- |
| X MEAN: | 119.2632 |
| Y MEAN: | 48.92982 |
|  |  |
| X^2 MEAN | 14265.82 |
| Y^2 MEAN | 2445.246 |
| XY MEAN | 5841.07 |
|  |  |
| VAR(X)= | 42.12373 |
| SD(X)= | 6.49028 |
|  |  |
| VAR(y)= | 51.11788 |
| SD(Y)= | 7.149677 |
|  |  |
| COV(X,Y)- | 5.544783 |
|  |  |
| R= | 0.119491 |
|  |  |
| CORREL(X,Y): | 0.119491 |

**INFERENCE:**

Since the value of Karl Pearson’s’ Coefficient of Correlation is greater than 0, it is considered to be a positive correlation but it is very close to 0, Hence , we can say that the height and weight are not so closely related , there might be cases where an increasing height is corresponding to increase in weight but not always.

It can be said that it is not necessary that a fat person will be tall always; there can be short and fat people as well. Hence Height and Weight are not closely related.