October 5 and 7 Lecture Notes

Performing Linear Regression with Two Continuous Variables

Are MonthlySales related to TestScores? Are TestScores related to MonthlySales?

You can use either variable as the “X” value. The other variable will be the “Y” variable.



The result will give us an estimate of the linear relationship between X and Y and is expressed in the format of Y = coefficient X + intercept. (Y = mx+b).

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| SUMMARYOUTPUT |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| *Regression Statistics* |  |  |  |  |  |  |  |
| Multiple R | 0.430459244 |  |  |  |  |  |  |  |
| R Square | 0.185295161 |  |  |  |  |  |  |  |
| Adjusted R Square | 0.140033781 |  |  |  |  |  |  |  |
| Standard Error | 11.46182439 |  |  |  |  |  |  |  |
| Observations | 20 |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| ANOVA |  |  |  |  |  |  |  |  |
|  | *df* | *SS* | *MS* | *F* | *Significance F* |  |  |  |
| Regression | 1 | 537.8284691 | 537.8285 | 4.093891 | 0.058146749 |  |  |  |
| Residual | 18 | 2364.721531 | 131.3734 |  |  |  |  |  |
| Total | 19 | 2902.55 |   |   |   |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* | *Lower 95.0%* | *Upper 95.0%* |
| Intercept | 44.19516459 | 15.85340912 | 2.787739 | 0.012152 | 10.88838796 | 77.50194121 | 10.88838796 | 77.50194121 |
| MonthlySales | 0.053286483 | 0.026335946 | 2.023337 | 0.058147 | -0.002043285 | 0.108616252 | -0.00204329 | 0.108616252 |
|  |  |  |  |  |  |  |  |  |
| DISCUSSION |  |  |  |  |  |  |  |  |
| *Significance F* |  |  |  |  |  |  |  |  |
| 0.058146749 | \*\*\*\*\*\*\*This p-value is greater than 0.05. Therefore the regression is not significant. |  |
|  |  |  |  |  |  |  |  |  |
| R Square | 0.185295161 | \*\*\*\*\*\*This is a very low R Square value. |  |  |  |
|  |  | R Square more than 0.8 suggests a strong relationship between 2 variables.  |
|  |  |  |  |  |  |  |  |  |
| How do you calculate F? MS Regression / MS Residual  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| What are the degrees of freedom for a single linear regression? 1 |  |  |  |  |
|  |  |  |  |  |  |  |  |  |

According to Excel, the equation would be

TestScores = 0.053286483 (MonthlySales) + 44.19516459

Recall that correlation does not show causation.