1. **Stepwise Regression : Forward and Backward Elimination**

In [statistics](https://en.wikipedia.org/wiki/Statistics), **stepwise regression** is a method of fitting [regression models](https://en.wikipedia.org/wiki/Regression_model) in which the choice of predictive variables is carried out by an automatic procedure. In each step, a variable is considered for addition to or subtraction from the set of [explanatory variables](https://en.wikipedia.org/wiki/Explanatory_variable) based on some prespecified criterion.

The main approaches are:

* **Forward selection**, which involves starting with no variables in the model, testing the addition of each variable using a chosen model fit criterion, adding the variable (if any) whose inclusion gives the most statistically significant improvement of the fit, and repeating this process until **none** improves the model to a statistically significant extent.
* **Backward elimination**, which involves starting with all predictive variables, testing the deletion of each variable using a chosen model fit criterion, deleting the variable (if any) whose loss gives the most statistically **insignificant** deterioration of the model fit, and repeating this process until no further variables can be deleted without a statistically insignificant loss of fit.
* **Bidirectional elimination**, a combination of the above, testing at each step for variables to be included or excluded.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Attitude | Awareness | Perception | Cost | Rating | Buying |
| 4 | 4.3 | 3.9 | 3.17 | 4 | 4.62 |
| 5 | 5 | 4.79 | 4.67 | 4.7 | 5.15 |
| 5.14 | 4 | 5 | 5.15 | 5 | 6.08 |
| 3.9 | 4 | 3.9 | 3.83 | 3.2 | 4.31 |
| 4.12 | 4.34 | 3.5 | 3.83 | 3.45 | 4.46 |
| 5 | 4.5 | 5.1 | 2.33 | 4.54 | 5.38 |
| 4.11 | 4.2 | 3.5 | 3.76 | 3.54 | 4.77 |
| 5.11 | 5.67 | 5.15 | 5.15 | 5.15 | 6 |
| 5.23 | 4.78 | 5 | 3.33 | 4.6 | 5.08 |
| 3.95 | 3.67 | 3.67 | 3.33 | 3.2 | 4.62 |
| 3.98 | 4.17 | 4 | 3.17 | 3.67 | 4.23 |
| 4.2 | 4.15 | 4.5 | 4.7 | 4.3 | 5 |
| 5.11 | 5.2 | 4.5 | 4.33 | 4.8 | 5.69 |
| 4.23 | 4.1 | 3.23 | 3.67 | 3.9 | 4.54 |
| 5.56 | 6 | 5.15 | 3.17 | 5.15 | 6.31 |
| 4.15 | 3.07 | 3.57 | 3 | 3.24 | 4.08 |
| 2.67 | 3.67 | 4.12 | 3.6 | 4.2 | 4.69 |
| 3.67 | 3.5 | 3.8 | 4 | 4 | 4 |
| 5.1 | 4.9 | 4.68 | 4.67 | 4.79 | 5.54 |
| 3.86 | 3.83 | 3.56 | 3.83 | 3.34 | 4.7 |
| 3.5 | 3.9 | 4.2 | 4.33 | 3.9 | 4.87 |
| 4.65 | 5.33 | 5.1 | 4.67 | 4.84 | 5.69 |
| 4 | 3.9 | 4.15 | 3.83 | 4.1 | 4.69 |
| 4 | 4.1 | 4.5 | 3.97 | 3.56 | 4.92 |
| 4.15 | 4.9 | 4.67 | 3.83 | 4.67 | 5.38 |
| 3.65 | 3.54 | 4.1 | 3.56 | 4.2 | 4.38 |
| 4.9 | 4.89 | 5.2 | 4.25 | 4.78 | 5.69 |
| 4.11 | 3.64 | 4.2 | 4.45 | 4.46 | 4.62 |
| 3.98 | 3.9 | 3.9 | 3.25 | 3.8 | 4.23 |
| 4.8 | 5 | 4.67 | 3.83 | 4.98 | 5.85 |
| 4.3 | 4.8 | 4.8 | 4.33 | 4.57 | 5.15 |
| 5 | 5 | 4.79 | 4.15 | 4.89 | 5.38 |
| 4.89 | 4.67 | 4.95 | 4.5 | 4.56 | 5.15 |
| 4.23 | 4.22 | 4.3 | 3.33 | 3.56 | 4.92 |
| 4.24 | 4.25 | 4.5 | 3.67 | 4.78 | 5 |
| 3.15 | 4 | 4.32 | 3.5 | 3.78 | 4.69 |
| 5.22 | 3.95 | 4.5 | 4.33 | 4.2 | 4.54 |
| 4.2 | 4.67 | 5.1 | 4.78 | 4.86 | 5.31 |
| 4.15 | 4.78 | 4.95 | 4.1 | 4.8 | 5.54 |
| 3.78 | 4.05 | 3.98 | 3.84 | 3.8 | 4.77 |
| 3.67 | 4.25 | 4.24 | 3.5 | 3.9 | 4.92 |
| 3.45 | 3.58 | 4.4 | 4.33 | 4 | 4.92 |
| 1.2 | 1.5 | 2 | 2 | 2 | 2.23 |
| 4.34 | 3.78 | 4.7 | 3.45 | 4.68 | 5.08 |
| 5.11 | 5.6 | 5.56 | 5.1 | 5.2 | 6 |
| 4.65 | 4.5 | 4.57 | 4 | 4.78 | 5.08 |
| 4.35 | 4.98 | 4.7 | 4.17 | 4.98 | 5.46 |
| 2.85 | 2.79 | 2.8 | 2.95 | 3 | 3.85 |
| 3.45 | 3.67 | 3.68 | 3.67 | 3.56 | 4.15 |
| 4.68 | 5 | 4.5 | 4.68 | 4.5 | 5 |
| 2.31 | 3.23 | 3 | 2.7 | 3 | 3.23 |
| 4.22 | 4 | 5.23 | 5.45 | 5.4 | 6.08 |
| 3.26 | 4.14 | 4.34 | 3.67 | 4.6 | 4.69 |
| 4.9 | 5 | 4.9 | 4.5 | 4.5 | 5.31 |
| 1 | 1.83 | 1 | 1 | 1 | 1.85 |
| 4.24 | 5 | 4.1 | 3.67 | 4.34 | 5.08 |
| 3.6 | 4.33 | 4.2 | 3.67 | 3.9 | 4.77 |
| 3.9 | 3.67 | 4 | 3.24 | 4 | 4.38 |
| 3.98 | 4.18 | 4 | 3.8 | 4.35 | 4.77 |
| 3.78 | 4.48 | 4.3 | 4.17 | 4.68 | 4.92 |
| 4.11 | 4.69 | 4.1 | 3.45 | 4.4 | 4.69 |
| 4.15 | 2 | 2 | 1.7 | 1.8 | 2.15 |
| 5.22 | 4 | 3.9 | 3.27 | 3.9 | 4.77 |
| 3.45 | 3.5 | 4 | 3.5 | 4.4 | 4.85 |
| 1.5 | 2 | 1.8 | 2 | 2 | 2 |
| 4 | 4.4 | 3.78 | 4.33 | 4.9 | 5.46 |
| 1.89 | 2 | 1.5 | 1.98 | 1.8 | 2.31 |
| 1.36 | 2 | 2 | 2 | 2 | 2.77 |
| 4.45 | 4.83 | 4.83 | 4.25 | 4.35 | 5.69 |
| 4.78 | 4.83 | 4.7 | 4.17 | 4.78 | 5.38 |
| 4.46 | 4.45 | 4.9 | 4.83 | 4.16 | 5.23 |
| 2.19 | 2.67 | 2.3 | 2.5 | 2.8 | 3 |
| 4.9 | 5.17 | 5.15 | 4.67 | 5.3 | 5.69 |
| 4.33 | 3.83 | 3.98 | 3.17 | 3.6 | 4.38 |
| 4.98 | 4.67 | 4.78 | 4.76 | 4.95 | 5.92 |
| 2.34 | 3.23 | 3 | 2.58 | 3.2 | 3.62 |
| 4.6 | 5 | 4.8 | 4.5 | 4.5 | 5.46 |
| 2.9 | 3.85 | 3 | 3.76 | 3 | 3.85 |
| 4.32 | 4 | 4.5 | 4.67 | 4.59 | 5.15 |
| 2 | 2.12 | 2 | 2.33 | 2 | 2.54 |
| 2.98 | 2.3 | 3 | 2.76 | 3.2 | 3.77 |
| 1.9 | 2 | 2 | 1.98 | 2.4 | 2.92 |
| 2.78 | 2.33 | 3 | 3 | 3 | 3.23 |
| 4.23 | 5 | 4.5 | 4.57 | 4.8 | 5.23 |
| 4.5 | 5 | 4.83 | 4.89 | 4.9 | 5.31 |
| 3.9 | 4.83 | 4 | 3.67 | 3.67 | 4.85 |
| 5 | 5.17 | 5 | 5.35 | 5.3 | 6.15 |
| 4.89 | 5.17 | 4.9 | 4.67 | 4.8 | 5.85 |
| 1 | 1 | 1 | 1.95 | 1 | 1.92 |
| 1.8 | 2 | 2 | 2.15 | 2 | 2.85 |
| 4.44 | 3.5 | 4 | 3.35 | 4 | 4.85 |
| 2.9 | 3 | 3 | 3.34 | 3.4 | 3.92 |
| 4.4 | 4.45 | 4.65 | 4.55 | 4.5 | 5.23 |
| 4.34 | 4 | 3.9 | 3.83 | 4 | 4.31 |
| 4.1 | 4.12 | 4 | 3.59 | 4.2 | 4.54 |
| 4.58 | 4.67 | 4.3 | 4.67 | 4.75 | 5.08 |
| 4.9 | 4.5 | 4.67 | 4.54 | 4.4 | 5 |
| 1.9 | 2.2 | 2 | 2.17 | 2 | 2.38 |
| 3.56 | 4 | 3.78 | 4.15 | 4 | 4.69 |
| 3.97 | 4.3 | 4 | 1.83 | 4.23 | 4.92 |
| 4 | 4 | 3.45 | 2.17 | 4.2 | 4.69 |
| 3.98 | 4.15 | 4.15 | 3.17 | 3.78 | 4.92 |
| 1.9 | 2 | 2 | 1.33 | 2 | 2.62 |
| 3.9 | 4.33 | 4.8 | 2.5 | 4.6 | 5.38 |
| 4.12 | 4.5 | 4.79 | 2.33 | 4.45 | 5.31 |
| 3.98 | 4.2 | 4 | 3.17 | 3.56 | 4.69 |
| 4.11 | 4.45 | 4.9 | 4.83 | 4.89 | 5.38 |
| 4.11 | 4.33 | 4.35 | 3.83 | 3.8 | 4.85 |
| 3.9 | 3.67 | 4.44 | 3.83 | 4.1 | 4.92 |
| 1.9 | 2 | 2 | 4.5 | 2 | 2.23 |
| 4.1 | 4.15 | 4.5 | 3 | 4.78 | 5 |
| 4.2 | 4.5 | 4 | 2.33 | 4.1 | 5 |
| 3.98 | 4.1 | 4 | 3.87 | 4.2 | 4.77 |
| 1.9 | 2 | 1.5 | 4.5 | 3.4 | 2.08 |
| 4.5 | 4.78 | 5 | 3.5 | 3.4 | 5.38 |
| 4 | 3.67 | 3.9 | 3.5 | 4.56 | 4.54 |
| 2.67 | 3.5 | 3.23 | 2.17 | 4.2 | 4 |
| 3.67 | 4 | 4.3 | 3.67 | 4.6 | 4.85 |
| 5.1 | 5.5 | 5.54 | 2 | 5.2 | 6.08 |
| 2.5 | 3 | 3 | 3.5 | 3 | 3.5 |
| 4 | 4 | 4.15 | 4.5 | 3.78 | 4.62 |
| 5 | 4.8 | 4.68 | 4.33 | 4.9 | 5.15 |
| 5.14 | 5.35 | 5.3 | 3.83 | 5.8 | 6.08 |
| 3.9 | 4 | 3.9 | 4.17 | 3.45 | 4.31 |
| 4.12 | 4 | 4.1 | 4.17 | 4.2 | 4.46 |
| 5 | 4.56 | 4.34 | 1.67 | 4.2 | 5.38 |
| 4.11 | 4 | 4.35 | 2 | 2.2 | 4.77 |
| 5.11 | 5.5 | 5.3 | 3.17 | 5.15 | 6 |
| 5.23 | 4.45 | 4.45 | 3.67 | 4.2 | 5.08 |
| 3.95 | 4 | 5.2 | 2.17 | 4 | 4.62 |
| 3.98 | 3.5 | 4 | 2.17 | 3.8 | 4.23 |
| 4.2 | 4.67 | 4.7 | 3.85 | 4.5 | 5 |
| 5.11 | 4.83 | 5 | 4 | 5.2 | 5.69 |
| 4.23 | 3.9 | 4 | 2.17 | 3.4 | 4.54 |
| 5.56 | 5.3 | 5.45 | 3.67 | 2.4 | 6.31 |
| 4.15 | 4 | 4 | 3.9 | 3.4 | 4.08 |
| 2.67 | 4 | 4 | 3.83 | 4.6 | 4.69 |
| 3.67 | 3.15 | 3.5 | 3.23 | 4 | 4 |
| 5.1 | 4.8 | 5 | 4.56 | 3.4 | 5.54 |
| 3.86 | 4 | 3.5 | 3.33 | 6 | 4.54 |
| 3.5 | 3.17 | 3.4 | 3.17 | 3.7 | 4.08 |
| 4.65 | 4.35 | 4.68 | 4.17 | 2.4 | 5.69 |
| 4 | 4 | 4 | 3.4 | 5.4 | 4.69 |
| 4 | 4 | 4.1 | 3.5 | 4.4 | 4.92 |
| 4.15 | 5 | 4.83 | 4.83 | 3.6 | 5.38 |
| 3.65 | 4.2 | 3.83 | 4 | 3.8 | 4.38 |
| 4.9 | 4.5 | 4.98 | 3.76 | 4 | 5.69 |
| 4.11 | 4 | 4.83 | 2.5 | 3.8 | 4.62 |
| 3.98 | 3.9 | 3.7 | 2.17 | 2.2 | 4.23 |
| 4.8 | 4.4 | 5.18 | 4.9 | 4.98 | 5.85 |
| 4.3 | 4.8 | 4.6 | 3.45 | 4 | 5.15 |
| 5 | 5.1 | 4.8 | 5.1 | 2.2 | 5.38 |
| 4.89 | 4.9 | 4.5 | 4.67 | 3.8 | 5.15 |
| 4.23 | 3.9 | 4.5 | 4 | 4.2 | 4.92 |
| 4.24 | 4.5 | 3.5 | 3.83 | 4.9 | 5 |
| 3.15 | 4.33 | 4.33 | 4.2 | 4.2 | 4.69 |
| 5.22 | 3.67 | 3.5 | 4.33 | 4 | 4.54 |
| 4.2 | 4.5 | 4.8 | 1.67 | 4.2 | 5.31 |
| 4.15 | 4.48 | 5.15 | 2.5 | 4 | 5.54 |
| 3.78 | 4.5 | 4.15 | 3.83 | 4 | 4.77 |
| 3.67 | 3.8 | 4.2 | 3.9 | 4.6 | 4.92 |
| 3.45 | 4 | 4.58 | 3.34 | 3.8 | 4.92 |
| 1.2 | 2 | 2 | 2 | 2 | 2.23 |
| 4.34 | 4.5 | 4.4 | 4.83 | 2 | 5.08 |
| 5.11 | 5.4 | 5.18 | 5.2 | 2.4 | 6 |
| 4.65 | 4.78 | 4.33 | 4.8 | 4.8 | 5.08 |
| 4.35 | 4.8 | 4.67 | 4.5 | 5.2 | 5.46 |
| 2.85 | 3.6 | 2.9 | 3.3 | 2.2 | 3.85 |
| 3.45 | 3.9 | 3 | 3.17 | 3.2 | 4.15 |
| 4.68 | 4.45 | 4.35 | 4.78 | 4.79 | 5 |
| 2.31 | 2.67 | 3 | 2.17 | 3 | 3.23 |
| 4.22 | 5.17 | 3.5 | 5.3 | 4.6 | 6.08 |
| 3.26 | 3.83 | 4.3 | 3.5 | 2.4 | 4.69 |
| 4.9 | 4.67 | 4.83 | 3.5 | 4.2 | 5.31 |
| 1 | 1 | 1 | 1.5 | 4 | 1.85 |
| 4.24 | 4.6 | 4.5 | 4.5 | 4.8 | 5.08 |
| 3.6 | 3.85 | 3.5 | 3.33 | 4.6 | 4.77 |
| 3.9 | 4 | 3.98 | 3.67 | 2.4 | 4.38 |
| 3.98 | 3.8 | 4.18 | 3.5 | 3.8 | 4.77 |
| 3.78 | 3.9 | 4.3 | 3.83 | 3.8 | 4.92 |
| 4.11 | 3.5 | 4.25 | 4.67 | 4 | 4.69 |
| 4.15 | 1.8 | 2 | 2 | 3.4 | 2.15 |
| 5.22 | 3.5 | 3.56 | 4.33 | 3 | 4.77 |
| 3.45 | 3.7 | 4 | 3.67 | 3.8 | 4.85 |
| 1.5 | 1.8 | 1.5 | 1.83 | 3.6 | 2 |
| 4 | 5.17 | 4.9 | 2.17 | 3.4 | 5.46 |
| 1.89 | 2 | 2 | 4.33 | 1.8 | 2.31 |
| 1.36 | 1.5 | 2 | 3.83 | 1.6 | 2.77 |
| 4.45 | 4 | 5.15 | 3.17 | 4.67 | 5.69 |
| 4.78 | 3.9 | 5 | 5.1 | 3.8 | 5.38 |
| 4.46 | 4.5 | 4.33 | 4 | 2.8 | 5.23 |
| 2.19 | 2.5 | 2.83 | 4.67 | 3.2 | 3 |
| 4.9 | 4 | 5 | 4.33 | 1.8 | 5.69 |
| 4.33 | 4.12 | 3.67 | 4.33 | 3.6 | 4.38 |
| 4.98 | 4.67 | 5.1 | 2.5 | 3.4 | 5.92 |
| 2.34 | 2.5 | 2.98 | 2.33 | 3 | 3.62 |
| 4.6 | 4.67 | 4.8 | 3.67 | 2.2 | 5.46 |
| 2.9 | 3 | 3 | 2.33 | 2.4 | 3.85 |
| 4.32 | 4.3 | 4.33 | 4.33 | 4.59 | 5.15 |
| 2 | 2 | 2.2 | 3.83 | 4 | 2.54 |
| 2.98 | 2.55 | 3 | 2.17 | 4.2 | 3.77 |
| 1.9 | 2 | 2.45 | 1.83 | 1.8 | 2.92 |
| 2.78 | 3.15 | 3 | 4.5 | 4 | 3.23 |
| 4.23 | 4.5 | 4.33 | 3.83 | 3 | 5.23 |
| 4.5 | 4.2 | 4.8 | 3.5 | 2.2 | 5.31 |
| 3.9 | 3.67 | 4.17 | 3.5 | 2.8 | 4.85 |
| 5 | 5.18 | 5.3 | 1.17 | 2.6 | 6.15 |
| 4.89 | 4.67 | 4.98 | 3.67 | 2.4 | 5.85 |
| 1 | 1.5 | 1 | 2.33 | 3.4 | 1.92 |
| 1.8 | 2 | 2 | 1.83 | 2 | 2.85 |
| 4.44 | 3.87 | 4.1 | 4.83 | 2.2 | 4.85 |
| 2.9 | 3 | 3 | 4.17 | 3.2 | 3.92 |
| 4.4 | 4.5 | 4.5 | 3.33 | 3.4 | 5.23 |
| 4.34 | 4 | 3.8 | 3.9 | 2 | 4.31 |
| 4.1 | 3.67 | 3.34 | 1.83 | 2.6 | 4.54 |
| 4.58 | 4.56 | 4.5 | 2.17 | 4.5 | 5.08 |
| 4.9 | 4.9 | 4.79 | 4.5 | 2.4 | 5 |
| 1.9 | 4 | 4.67 | 2 | 2.8 | 2.38 |
| 3.56 | 3.9 | 4 | 2.45 | 3.8 | 4.69 |
| 3.97 | 4.33 | 3.83 | 2.17 | 4.2 | 4.92 |
| 4 | 4 | 4 | 4.33 | 3 | 4.69 |
| 3.98 | 4.1 | 2.89 | 3.83 | 3.6 | 4.92 |
| 1.9 | 2 | 2 | 4.33 | 2 | 2.62 |
| 3.9 | 4 | 4.75 | 4.5 | 3.4 | 5.38 |
| 4.12 | 4 | 4.67 | 4.5 | 3 | 5.31 |
| 3.98 | 3.67 | 4.33 | 2.17 | 2.8 | 4.69 |
| 4.11 | 4.67 | 4.32 | 4.8 | 4.8 | 5.38 |
| 4.11 | 4.45 | 3.17 | 3.67 | 3.6 | 4.85 |
| 3.9 | 3.56 | 4.83 | 3.5 | 2.4 | 4.92 |
| 1.9 | 2 | 2 | 2 | 3.2 | 2.23 |
| 4.1 | 4.67 | 4.5 | 6.5 | 4.5 | 5 |
| 4.2 | 4.83 | 4.6 | 0.76 | 4.5 | 5 |
| 3.98 | 4.5 | 4 | 5.5 | 2.4 | 4.77 |
| 1.9 | 2 | 4.17 | 1.67 | 3.2 | 2.08 |
| 4.5 | 4 | 4.8 | 4.8 | 4 | 5.38 |
| 4 | 5 | 4.83 | 4.5 | 3.2 | 4.54 |
| 2.67 | 3.15 | 3.17 | 3.5 | 3.65 | 4 |
| 3.67 | 4.17 | 4.83 | 2.67 | 2.6 | 4.85 |
| 5.1 | 5.18 | 5.5 | 5.39 | 3.6 | 6.08 |
| 2.5 | 3.17 | 4.83 | 5 | 3 | 3.5 |
| 4 | 3.2 | 4 | 3.33 | 2.2 | 4.62 |
| 5 | 5 | 4.8 | 3.17 | 3.6 | 5.15 |
| 5.14 | 5.83 | 3.83 | 5.17 | 2.6 | 6.08 |
| 3.9 | 4.5 | 4.33 | 2.67 | 3.4 | 4.31 |
| 4.12 | 4.33 | 3.56 | 2.83 | 2.6 | 4.46 |
| 5 | 4.7 | 3.5 | 5.17 | 2.6 | 5.38 |
| 4.11 | 4 | 4.83 | 3.83 | 2.6 | 4.77 |
| 5.11 | 5 | 4.67 | 2.33 | 3 | 6 |
| 5.23 | 4.23 | 4.5 | 4.83 | 3.2 | 5.08 |
| 3.95 | 4 | 3.67 | 3.67 | 3.2 | 4.62 |
| 3.98 | 4.14 | 4.83 | 4.17 | 2.4 | 4.23 |
| 4.2 | 4.5 | 4.76 | 3.83 | 2.8 | 5 |
| 5.11 | 4.2 | 6 | 4.5 | 3 | 5.69 |
| 4.23 | 5 | 3.67 | 2.17 | 2.2 | 4.54 |
| 5.56 | 5.33 | 4.33 | 5.5 | 2.4 | 6.31 |
| 4.15 | 3.67 | 4.83 | 4.17 | 2.4 | 4.08 |
| 2.67 | 4.18 | 3.65 | 2.5 | 4.4 | 4.69 |
| 3.67 | 4 | 3.17 | 3.83 | 4.4 | 4 |
| 5.1 | 4.69 | 4.9 | 4.33 | 3.6 | 5.54 |
| 3.86 | 3.8 | 3.83 | 3.6 | 3 | 4.54 |
| 3.5 | 3.7 | 4.83 | 4 | 3.8 | 4.08 |
| 4.65 | 4.5 | 3.5 | 3.83 | 2.2 | 5.69 |
| 4 | 3.5 | 4 | 4.33 | 2.8 | 4.69 |
| 4 | 4.4 | 3.83 | 3.83 | 4.6 | 4.92 |
| 4.15 | 4.3 | 4.68 | 4 | 2.8 | 5.38 |
| 3.65 | 3.6 | 3.33 | 4.5 | 3.2 | 4.38 |
| 4.9 | 4.83 | 4.33 | 3.83 | 3.4 | 5.69 |
| 4.11 | 4.45 | 4 | 2.33 | 2.6 | 4.62 |
| 3.98 | 3.8 | 4.67 | 2.17 | 3 | 4.23 |
| 4.8 | 4.67 | 4.67 | 2.17 | 3 | 5.85 |
| 4.3 | 5 | 5 | 1.17 | 3.2 | 5.15 |
| 5 | 4.87 | 4.67 | 4.78 | 2.6 | 5.38 |
| 4.89 | 4.67 | 4.45 | 2.5 | 3.4 | 5.15 |
| 4.23 | 4.5 | 4 | 3 | 3.6 | 4.92 |
| 4.24 | 4.5 | 4.78 | 4.82 | 4.2 | 5 |
| 3.15 | 4.5 | 3.33 | 2.67 | 2.8 | 4.69 |
| 5.22 | 4 | 4.2 | 4.5 | 3 | 4.54 |
| 4.2 | 4.5 | 4.4 | 2.5 | 3.8 | 5.31 |
| 4.15 | 4.3 | 4.7 | 3.83 | 2.8 | 5.54 |
| 3.78 | 3.8 | 3.83 | 4.17 | 3.2 | 4.77 |
| 3.67 | 3.68 | 4 | 1.33 | 1.8 | 4.92 |
| 3.45 | 3.8 | 4 | 4.5 | 3.6 | 4.92 |
| 1.2 | 2 | 2 | 2.5 | 3.4 | 2.23 |
| 4.34 | 4.83 | 4.8 | 4 | 3 | 5.08 |
| 5.11 | 5.17 | 4.58 | 5.5 | 2.2 | 6 |
| 4.65 | 4.67 | 4.78 | 4 | 2.4 | 5.08 |
| 4.35 | 4.3 | 5.5 | 3.17 | 5 | 5.46 |
| 2.85 | 2.5 | 3 | 3 | 4 | 3.85 |
| 3.45 | 3.5 | 3.5 | 3.83 | 4.2 | 4.15 |
| 4.68 | 4.3 | 5.33 | 3.33 | 4.5 | 5 |
| 2.31 | 3 | 3 | 3.33 | 4 | 3.23 |
| 4.22 | 5.1 | 5 | 1.83 | 3 | 6.08 |
| 3.26 | 4.12 | 3 | 1.5 | 2.2 | 4.69 |
| 4.9 | 4.67 | 3.67 | 1.5 | 2.8 | 5.31 |
| 1 | 2 | 5.17 | 3.67 | 2.6 | 1.85 |
| 4.24 | 4.5 | 5.5 | 3.33 | 2.4 | 5.08 |
| 3.6 | 3.45 | 5.33 | 4.17 | 3.4 | 4.77 |
| 3.9 | 4.3 | 4 | 1.83 | 2 | 4.38 |
| 3.98 | 4.1 | 4.5 | 2.67 | 2.2 | 4.77 |
| 3.78 | 4.65 | 3.9 | 3.17 | 3.2 | 4.92 |
| 4.11 | 4 | 4.79 | 2.67 | 3.4 | 4.69 |
| 4.15 | 3 | 2 | 2.33 | 2 | 2.15 |
| 5.22 | 3.9 | 3.9 | 2.67 | 2.6 | 4.77 |
| 3.45 | 4.2 | 3.5 | 1.33 | 3.2 | 4.85 |
| 1.5 | 1.8 | 1.8 | 3.33 | 2 | 2 |
| 4 | 4.33 | 3.5 | 4.83 | 2.6 | 5.46 |
| 1.89 | 3.5 | 5.15 | 1.5 | 3.6 | 2.31 |
| 1.36 | 2.5 | 2 | 4.17 | 3 | 2.77 |
| 4.45 | 4.15 | 4.67 | 2.67 | 2.2 | 5.69 |
| 4.78 | 5.33 | 4 | 2.5 | 3.6 | 5.38 |
| 4.46 | 4.1 | 4.5 | 2.17 | 2.6 | 5.23 |
| 2.19 | 2.9 | 4.5 | 2.33 | 2.34 | 3 |
| 4.9 | 3.78 | 4.23 | 1.67 | 2.6 | 5.69 |
| 4.33 | 3.67 | 5.15 | 1.67 | 2.6 | 4.38 |
| 4.98 | 3.5 | 3.57 | 3.5 | 2.6 | 5.92 |
| 2.34 | 2.98 | 3.12 | 1.5 | 3 | 3.62 |
| 4.6 | 4.3 | 3.8 | 4.17 | 3.2 | 5.46 |
| 2.9 | 3.7 | 3 | 3.17 | 3.2 | 3.85 |
| 4.32 | 3 | 3.56 | 3.5 | 2.4 | 5.15 |
| 2 | 3 | 2 | 3.17 | 2.8 | 2.54 |
| 2.98 | 3 | 3 | 3.17 | 3 | 3.77 |
| 1.9 | 3 | 2 | 4.33 | 2.2 | 2.92 |

**Import data file : MR**

> attach(MR1)

> fitall<-lm(Buying~.,data=MR1)

> summary(fitall)

Call:

lm(formula = Buying ~ ., data = MR1)

Residuals:

Min 1Q Median 3Q Max

-1.68177 -0.21698 0.01556 0.23072 1.20153

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 0.41711 0.10857 3.842 0.000148 \*\*\*

Attitude 0.37526 0.04015 9.346 < 2e-16 \*\*\*

Awarness 0.45181 0.04868 9.281 < 2e-16 \*\*\*

Perception 0.18950 0.03840 4.935 1.3e-06 \*\*\*

Cost 0.03171 0.02267 1.399 0.162826

Rating 0.02451 0.02536 0.966 0.334584

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.3817 on 316 degrees of freedom

Multiple R-squared: 0.8639, Adjusted R-squared: 0.8618

F-statistic: 401.3 on 5 and 316 DF, p-value: < 2.2e-16

> fitfirst<-lm(Buying~1,data=MR1)

> summary(fitfirst)

Call:

lm(formula = Buying ~ 1, data = MR1)

Residuals:

Min 1Q Median 3Q Max

-2.7751 -0.3151 0.2249 0.6849 1.6849

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 4.62506 0.05721 80.85 <2e-16 \*\*\*

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 1.027 on 321 degrees of freedom

> step(fitfirst,direction = "both",scope = formula(fitall))

Start: AIC=17.89

Buying ~ 1

Df Sum of Sq RSS AIC

+ Awarness 1 269.331 68.95 -492.24

+ Attitude 1 260.196 78.09 -452.18

+ Perception 1 223.905 114.38 -329.28

+ Rating 1 66.525 271.76 -50.62

+ Cost 1 55.927 282.36 -38.30

<none> 338.29 17.89

Step: AIC=-492.24

Buying ~ Awarness

Df Sum of Sq RSS AIC

+ Attitude 1 18.502 50.45 -590.84

+ Perception 1 9.151 59.80 -536.09

+ Cost 1 1.559 67.39 -497.60

+ Rating 1 0.453 68.50 -492.36

<none> 68.95 -492.24

- Awarness 1 269.331 338.29 17.89

Step: AIC=-590.84

Buying ~ Awarness + Attitude

Df Sum of Sq RSS AIC

+ Perception 1 3.9158 46.536 -614.85

+ Rating 1 0.5473 49.905 -592.35

+ Cost 1 0.4883 49.964 -591.97

<none> 50.452 -590.84

- Attitude 1 18.5019 68.954 -492.24

- Awarness 1 27.6377 78.090 -452.18

Step: AIC=-614.85

Buying ~ Awarness + Attitude + Perception

Df Sum of Sq RSS AIC

+ Cost 1 0.3712 46.165 -615.43

<none> 46.536 -614.85

+ Rating 1 0.2222 46.314 -614.39

- Perception 1 3.9158 50.452 -590.84

- Attitude 1 13.2665 59.803 -536.09

- Awarness 1 13.9463 60.483 -532.45

Step: AIC=-615.43

Buying ~ Awarness + Attitude + Perception + Cost

Df Sum of Sq RSS AIC

<none> 46.165 -615.43

- Cost 1 0.3712 46.536 -614.85

+ Rating 1 0.1360 46.029 -614.38

- Perception 1 3.7987 49.964 -591.97

- Attitude 1 12.6005 58.765 -539.72

- Awarness 1 13.4742 59.639 -534.97

Call:

lm(formula = Buying ~ Awarness + Attitude + Perception + Cost, data = MR1)

Coefficients:

(Intercept) Awarness Attitude Perception Cost

0.44774 0.46039 0.37246 0.19440 0.03561

> step(fitall,direction = "backward")

Start: AIC=-614.38

Buying ~ Attitude + Awarness + Perception + Cost + Rating

Df Sum of Sq RSS AIC

- Rating 1 0.1360 46.165 -615.43

- Cost 1 0.2850 46.314 -614.39

<none> 46.029 -614.38

- Perception 1 3.5469 49.576 -592.48

- Awarness 1 12.5465 58.575 -538.76

- Attitude 1 12.7239 58.753 -537.79

Step: AIC=-615.43

Buying ~ Attitude + Awarness + Perception + Cost

Df Sum of Sq RSS AIC

<none> 46.165 -615.43

- Cost 1 0.3712 46.536 -614.85

- Perception 1 3.7987 49.964 -591.97

- Attitude 1 12.6005 58.765 -539.72

- Awarness 1 13.4742 59.639 -534.97

Call:

lm(formula = Buying ~ Attitude + Awarness + Perception + Cost,data = MR1)

Coefficients:

(Intercept) Attitude Awarness Perception Cost

0.44774 0.37246 0.46039 0.19440 0.03561

> step(fitfirst,direction = "forward",scope = formula(fitall))

Start: AIC=17.89

Buying ~ 1

Df Sum of Sq RSS AIC

+ Awarness 1 269.331 68.95 -492.24

+ Attitude 1 260.196 78.09 -452.18

+ Perception 1 223.905 114.38 -329.28

+ Rating 1 66.525 271.76 -50.62

+ Cost 1 55.927 282.36 -38.30

<none> 338.29 17.89

Step: AIC=-492.24

Buying ~ Awarness

Df Sum of Sq RSS AIC

+ Attitude 1 18.5019 50.452 -590.84

+ Perception 1 9.1513 59.803 -536.09

+ Cost 1 1.5590 67.395 -497.60

+ Rating 1 0.4527 68.501 -492.36

<none> 68.954 -492.24

Step: AIC=-590.84

Buying ~ Awarness + Attitude

Df Sum of Sq RSS AIC

+ Perception 1 3.9158 46.536 -614.85

+ Rating 1 0.5473 49.905 -592.35

+ Cost 1 0.4883 49.964 -591.97

<none> 50.452 -590.84

Step: AIC=-614.85

Buying ~ Awarness + Attitude + Perception

Df Sum of Sq RSS AIC

+ Cost 1 0.37124 46.165 -615.43

<none> 46.536 -614.85

+ Rating 1 0.22223 46.314 -614.39

Step: AIC=-615.43

Buying ~ Awarness + Attitude + Perception + Cost

Df Sum of Sq RSS AIC

<none> 46.165 -615.43

+ Rating 1 0.13604 46.029 -614.38

lm(formula = Buying ~ Awarness + Attitude + Perception + Cost, data = MR1)

Coefficients:

(Intercept) Awarness Attitude Perception Cost

0.44774 0.46039 0.37246 0.19440 0.03561

AIC : The Akaike information criterion (**AIC**) is an estimator of in-sample prediction error and thereby relative quality of statistical models for a given set of data. ... **AIC** estimates the relative amount of information lost by a given model: the less information a model loses, the higher the quality of that model.

**RSS :** At each stage in the process, after a new variable is added, a test is made to check if some variables can be deleted without appreciably increasing the residual sum of squares (**RSS**). The procedure terminates when the measure is (locally) maximized, or when the available improvement falls below some critical value.