

## Finding the best working machine learning regression method using R<sup>2</sup> value

1. Multiple Linear Regression R<sup>2</sup> value = **0.9177**

2. Support Vector Machine

| # | Hyper parameter(c=) | R <sup>2</sup> value(kernel=) |        |        |         |
|---|---------------------|-------------------------------|--------|--------|---------|
|   |                     | Linear                        | RBF    | Poly   | Sigmoid |
| 1 | 10                  | 0.0194                        | 0.0006 | 0.0017 | 0.0028  |
| 2 | 100                 | 0.1894                        | 0.0119 | 0.0233 | 0.0332  |
| 3 | 500                 | 0.6861                        | 0.0630 | 0.1150 | 0.1634  |
| 4 | 1000                | 0.8583                        | 0.1229 | 0.2213 | 0.2957  |
| 5 | 2000                | 0.9092                        | 0.2228 | 0.3777 | 0.5081  |
| 6 | <b>3000</b>         | <b>0.9181</b>                 | 0.3206 | 0.5012 | 0.6840  |

3. Decision Tree

| #  | Criterion      | Max Features | Splitter | R <sup>2</sup> value |
|----|----------------|--------------|----------|----------------------|
| 1  | squared_error  | None         | best     | 0.4194               |
| 2  |                |              | random   | -0.42669             |
| 3  |                | Sqrt         | best     | -3.0810              |
| 4  |                |              | random   | <b>0.7038</b>        |
| 5  |                | Log2         | best     | -1.2971              |
| 6  |                |              | random   | -2.1923              |
| 7  | absolute_error | None         | best     | 0.1610               |
| 8  |                |              | random   | -0.3504              |
| 9  |                | Sqrt         | best     | -4.2129              |
| 10 |                |              | random   | -1.4782              |
| 11 |                | Log2         | best     | 0.1756               |
| 12 |                |              | random   | -1.3543              |
| 13 | friedman_mse   | None         | best     | 0.4272               |
| 14 |                |              | random   | -0.42669             |
| 15 |                | Sqrt         | best     | -0.9251              |
| 16 |                |              | random   | -3.2651              |
| 17 |                | Log2         | best     | 0.4516               |
| 18 |                |              | random   | 0.1610               |

4. Random Forest

| #  | criterion     | max_features | n_estimators | R <sup>2</sup> value |
|----|---------------|--------------|--------------|----------------------|
| 1  | poisson       | log2         | 50           | 0.5991               |
| 2  |               |              | 75           | 0.6255               |
| 3  |               |              | 100          | 0.6715               |
| 4  |               | sqrt         | 50           | 0.6254               |
| 5  |               |              | 75           | 0.6281               |
| 6  |               |              | 100          | 0.7099               |
| 7  | squared_error | log2         | 50           | 0.6951               |
| 8  |               |              | 75           | 0.6822               |
| 9  |               |              | 100          | <b>0.7584</b>        |
| 10 |               | sqrt         | 50           | 0.5748               |
| 11 |               |              | 75           | 0.7432               |
| 12 |               |              | 100          | 0.7203               |

|    |                |      |     |        |
|----|----------------|------|-----|--------|
| 13 | absolute_error | log2 | 50  | 0.6518 |
| 14 |                |      | 75  | 0.6895 |
| 15 |                |      | 100 | 0.6467 |
| 16 | sqrt           | log2 | 50  | 0.7138 |
| 17 |                |      | 75  | 0.7547 |
| 18 |                |      | 100 | 0.7416 |
| 19 | friedman_mse   | log2 | 50  | 0.5836 |
| 20 |                |      | 75  | 0.7389 |
| 21 |                |      | 100 | 0.6439 |
| 22 |                | sqrt | 50  | 0.7300 |
| 23 |                |      | 75  | 0.6195 |
| 24 |                |      | 100 | 0.6606 |