TO FIND THE BEST ML REGRESSION MODEL BY USING R2 VALUE

**1. Multi Linear Regression:**

R2 value = 0.9358680970046241

**2. Support Vector Machine (SVM):**

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| --- | --- | --- | --- | --- | --- |
| **S.NO** | **HYPER PARAMETER** | **LINEAR** | **RBF** | **POLY** | **SIGMOID** |
| 1 | C0.01 | -0.057468332 | -0.057485611 | -0.057482466 | -0.057483521 |
| 2 | C10 | -0.039644947 | -0.056807593 | -0.053667205 | -0.054719583 |
| 3 | C100 | 0.106468196 | -0.050726023 | -0.019802139 | -0.030453515 |
| 4 | C500 | 0.592897727 | -0.024323348 | 0.11468480742657639 | 0.07057214489673913 |
| 5 | C1000 | 0.780283988 | 0.0067683444800727965 | 0.26616370931646915 | 0.18506861974160804 |
| 6 | C2000 | 0.876772169 | 0.067515543 | 0.4810028155606567 | 0.39706528684272135 |
| 7 | C3000 | 0.895674469 | 0.12322756620227582 | 0.6370064223754034 | 0.5913630209426106 |

The SVM Regression uses linear and hyper plane (C3000) = 0.895674469

**3. Decision Tree:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S.NO** | **CRITERION** | **SPLITTER** | **MAX FEATURES** | **R2 VALUE** |
| 1 | Squared error | best | sqrt | 0.9364412051538571 |
| 2 | Squared error | random | sqrt | 0.6126714483927256 |
| 3 | Squared error | best | log2 | 0.8531614591718801 |
| 4 | Squared error | random | log2 | 0.5324263042770196 |
| 5 | Squared error | best | none | 0.9204653447010915 |
| 6 | Squared error | random | none | 0.8457665089261598 |
| 7 | Friedman mse | best | sqrt | 0.5014821673599666 |
| 8 | Friedman mse | random | sqrt | 0.46641022370814056 |
| 9 | Friedman mse | best | log2 | 0.5877818097009855 |
| 10 | Friedman mse | random | log2 | 0.8490480043270784 |
| 11 | Friedman mse | best | none | 0.9230326925304219 |
| 12 | Friedman mse | random | none | 0.8813922401720289 |
| 13 | Absolute error | best | sqrt | 0.5335016084707852 |
| 14 | Absolute error | random | sqrt | 0.8220460222795479 |
| 15 | Absolute error | best | log2 | 0.6867442862095392 |
| 16 | Absolute error | random | log2 | 0.16571986598065613 |
| 17 | Absolute error | best | none | 0.9226350556193678 |
| 18 | Absolute error | random | none | -0.03692706 |
| 19 | Poisson | best | sqrt | 0.594655975 |
| 20 | Poisson | random | sqrt | 0.481892301 |
| 21 | Poisson | best | log2 | 0.731005107 |
| 22 | Poisson | random | log2 | 0.636676669 |
| 23 | Poisson | best | none | 0.9173047388218473 |
| 24 | Poisson | random | none | 0.639187928230485 |

The Decision Tree uses criterion (Squared error), splitter(best), max features(sqrt) =0.9364412051538571

**4. Random Forest:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S.NO** | **N\_ESTIMATORS** | **CRITERION** | **MAX FEATURES** | **R2 VALUE** |
| 1 | 50 | Squared error | sqrt | 0.8314467446200934 |
| 2 | 100 | Squared error | sqrt | 0.804936356 |
| 3 | 50 | Squared error | log2 | 0.7962677331809747 |
| 4 | 100 | Squared error | log2 | 0.7900650397334597 |
| 5 | 50 | Squared error | none | 0.91350845 |
| 6 | 100 | Squared error | none | 0.942887645 |
| 7 | 50 | Friedman mse | sqrt | 0.7405926027457137 |
| 8 | 100 | Friedman mse | sqrt | 0.792283395400489 |
| 9 | 50 | Friedman mse | log2 | 0.8189064262836101 |
| 10 | 100 | Friedman mse | log2 | 0.8098080558830527 |
| 11 | 50 | Friedman mse | none | 0.925253766 |
| 12 | 100 | Friedman mse | none | 0.938828627 |
| 13 | 50 | Absolute error | sqrt | 0.7282194545813819 |
| 14 | 100 | Absolute error | sqrt | 0.8039565464965822 |
| 15 | 50 | Absolute error | log2 | 0.800940588 |
| 16 | 100 | Absolute error | log2 | 0.7773869940097224 |
| 17 | 50 | Absolute error | none | 0.9401103 |
| 18 | 100 | Absolute error | none | 0.949939215 |
| 19 | 50 | Poisson | sqrt | 0.7660753922586305 |
| 20 | 100 | Poisson | sqrt | 0.81846154 |
| 21 | 50 | Poisson | log2 | 0.818261925 |
| 22 | 100 | Poisson | log2 | 0.781463189 |
| 23 | 50 | Poisson | none | 0.9293658935488227 |
| 24 | 100 | Poisson | none | 0.935939574 |

The Random Forest uses criterion (Absolute error), n\_estimators(100), max features(none) =0.949939215