**Machine Learning Regression Using R2 Value Method**

1. **Multiple Linear Regression –> R2 Value is 0.9358**
2. **Support Vector Machine:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S.No** | **Type of Regression** | **kernel** | **C** | **Hyper Tuned Parameters** | **r\_Score** |
| 1 | SVR | linear | 10 | regressor = SVR (kernel = 'linear', C = 10) | -0.0396 |
| 2 | SVR | linear | 100 | regressor = SVR (kernel = 'linear', C = 100) | 0.1065 |
| 3 | SVR | linear | 500 | regressor = SVR (kernel = 'linear', C = 500) | 0.5929 |
| 4 | SVR | linear | 1000 | regressor = SVR (kernel = 'linear', C = 1000) | 0.7803 |
| 5 | SVR | linear | 2000 | regressor = SVR (kernel = 'linear', C = 2000) | 0.8768 |
| 6 | SVR | linear | 5000 | regressor = SVR (kernel = 'linear', C = 5000) | 0.9004 |
| **7** | **SVR** | **linear** | **10000** | **regressor = SVR (kernel = 'linear', C = 10000)** | **0.9240** |
| **8** | **SVR** | **rbf** | **10** | **regressor = SVR (kernel = 'rbf', C = 10)** | **-0.0568** |
| 9 | SVR | rbf | 100 | regressor = SVR (kernel = 'rbf', C = 100) | -0.0507 |
| 10 | SVR | rbf | 500 | regressor = SVR (kernel = 'rbf', C = 500) | -0.0243 |
| 11 | SVR | rbf | 1000 | regressor = SVR (kernel = 'rbf', C = 1000) | 0.0068 |
| 12 | SVR | rbf | 2000 | regressor = SVR (kernel = 'rbf', C = 2000) | 0.0675 |
| 13 | SVR | rbf | 5000 | regressor = SVR (kernel = 'rbf', C = 5000) | 0.2124 |
| 14 | SVR | rbf | 10000 | regressor = SVR (kernel = 'rbf', C = 10000) | 0.3719 |
| 15 | SVR | sigmoid | 10 | regressor = SVR (kernel = 'sigmoid', C = 10) | -0.0547 |
| 16 | SVR | sigmoid | 100 | regressor = SVR (kernel = 'sigmoid', C = 100) | -0.0305 |
| 17 | SVR | sigmoid | 500 | regressor = SVR (kernel = 'sigmoid', C = 500) | 0.0706 |
| 18 | SVR | sigmoid | 1000 | regressor = SVR (kernel = 'sigmoid', C = 1000) | 0.1851 |
| 19 | SVR | sigmoid | 2000 | regressor = SVR (kernel = 'sigmoid', C = 2000) | 0.3971 |
| 20 | SVR | sigmoid | 5000 | regressor = SVR (kernel = 'sigmoid', C = 5000) | 0.7307 |
| 21 | SVR | sigmoid | 10000 | regressor = SVR (kernel = 'sigmoid', C = 10000) | 0.8535 |
| 15 | SVR | poly | 10 | regressor = SVR (kernel = 'poly', C = 10) | -0.0537 |
| 16 | SVR | poly | 100 | regressor = SVR (kernel = 'poly', C = 100) | -0.0198 |
| 17 | SVR | poly | 500 | regressor = SVR (kernel = 'poly', C = 500) | 0.1147 |
| 18 | SVR | poly | 1000 | regressor = SVR (kernel = 'poly', C = 1000) | 0.2662 |
| 19 | SVR | poly | 2000 | regressor = SVR (kernel = 'poly', C = 2000) | 0.4810 |
| 20 | SVR | poly | 5000 | regressor = SVR (kernel = 'poly', C = 5000) | 0.7937 |
| 21 | SVR | poly | 10000 | regressor = SVR (kernel = 'poly', C = 10000) | 0.8130 |

(**The Highest R2 Value is Highlighted in Color – Green** and **The Lowest R2 Value is Highlighted in Color – Red**)

1. **Decision Tree :**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S.No** | **Type of Regression** | **criterion** | **splitter** | **max\_features** | **r\_Score** |
| 1 | DecisionTreeRegressor | squared\_error | best | **NA** | 0.9248 |
| 2 | DecisionTreeRegressor | squared\_error | random | **NA** | 0.9089 |
| 3 | DecisionTreeRegressor | friedman\_mse | best | **NA** | 0.9420 |
| 4 | DecisionTreeRegressor | friedman\_mse | random | **NA** | 0.8794 |
| 5 | DecisionTreeRegressor | absolute\_error | best | **NA** | 0.9526 |
| 6 | DecisionTreeRegressor | absolute\_error | random | **NA** | 0.6585 |
| 7 | DecisionTreeRegressor | poisson | best | **NA** | 0.9275 |
| **8** | **DecisionTreeRegressor** | **poisson** | **random** | **NA** | **0.9548** |
| 9 | DecisionTreeRegressor | squared\_error | best | sqrt | 0.6835 |
| 10 | DecisionTreeRegressor | squared\_error | random | sqrt | 0.7867 |
| 11 | DecisionTreeRegressor | friedman\_mse | best | sqrt | 0.1990 |
| 12 | DecisionTreeRegressor | friedman\_mse | random | sqrt | 0.4602 |
| 13 | DecisionTreeRegressor | absolute\_error | best | sqrt | 0.7144 |
| 14 | DecisionTreeRegressor | absolute\_error | random | sqrt | 0.3191 |
| 15 | DecisionTreeRegressor | poisson | best | sqrt | 0.1162 |
| 16 | DecisionTreeRegressor | poisson | random | sqrt | 0.9501 |
| 17 | DecisionTreeRegressor | squared\_error | best | log2 | 0.6744 |
| 18 | DecisionTreeRegressor | squared\_error | random | log2 | 0.2310 |
| 19 | DecisionTreeRegressor | friedman\_mse | best | log2 | 0.7568 |
| 20 | DecisionTreeRegressor | friedman\_mse | random | log2 | 0.2631 |
| 21 | DecisionTreeRegressor | absolute\_error | best | log2 | 0.7927 |
| **22** | **DecisionTreeRegressor** | **absolute\_error** | **random** | **log2** | **-0.0389** |
| 23 | DecisionTreeRegressor | poisson | best | log2 | 0.7719 |
| 24 | DecisionTreeRegressor | poisson | random | log2 | 0.5237 |

(**The Highest R2 Value is Highlighted in Color – Green** and **The Lowest R2 Value is Highlighted in Color – Red**)

1. **Random Forest :**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **S.No** | **Type of Regression** | **n\_estimators** | **random\_state** | **criterion** | **max\_features** | **r\_Score** |
| 1 | RandomForestRegressor | 50 | 0 | squared\_error | None | 0.9446 |
| 2 | RandomForestRegressor | 100 | 0 | squared\_error | None | 0.9460 |
| 3 | RandomForestRegressor | 50 | 0 | friedman\_mse | None | 0.9389 |
| 4 | RandomForestRegressor | 100 | 0 | friedman\_mse | None | 0.9413 |
| 5 | RandomForestRegressor | 50 | 0 | absolute\_error | None | 0.9402 |
| 6 | RandomForestRegressor | 100 | 0 | absolute\_error | None | 0.9459 |
| **7** | **RandomForestRegressor** | **50** | **0** | **poisson** | **None** | **0.9464** |
| 8 | RandomForestRegressor | 100 | 0 | poisson | None | 0.9414 |
| **9** | **RandomForestRegressor** | **50** | **0** | **squared\_error** | **sqrt** | **0.6830** |
| 10 | RandomForestRegressor | 100 | 0 | squared\_error | sqrt | 0.7592 |
| 11 | RandomForestRegressor | 50 | 0 | friedman\_mse | sqrt | 0.6889 |
| 12 | RandomForestRegressor | 100 | 0 | friedman\_mse | sqrt | 0.7609 |
| 13 | RandomForestRegressor | 50 | 0 | absolute\_error | sqrt | 0.7222 |
| 14 | RandomForestRegressor | 100 | 0 | absolute\_error | sqrt | 0.7857 |
| 15 | RandomForestRegressor | 50 | 0 | poisson | sqrt | 0.7209 |
| 16 | RandomForestRegressor | 100 | 0 | poisson | sqrt | 0.7718 |
| 17 | RandomForestRegressor | 50 | 0 | squared\_error | log2 | 0.6830 |
| 18 | RandomForestRegressor | 100 | 0 | squared\_error | log2 | 0.7592 |
| 19 | RandomForestRegressor | 50 | 0 | friedman\_mse | log2 | 0.6889 |
| 20 | RandomForestRegressor | 100 | 0 | friedman\_mse | log2 | 0.7609 |
| 21 | RandomForestRegressor | 50 | 0 | absolute\_error | log2 | 0.7222 |
| 22 | RandomForestRegressor | 100 | 0 | absolute\_error | log2 | 0.7857 |
| 23 | RandomForestRegressor | 50 | 0 | poisson | log2 | 0.7209 |
| 24 | RandomForestRegressor | 100 | 0 | poisson | log2 | 0.7718 |

(**The Highest R2 Value is Highlighted in Color – Green** and **The Lowest R2 Value is Highlighted in Color – Red**)