**HOPE ARTIFICIAL INTELLIGENCE**

***Assignment***

**To find out the best Machine Learning Regression method using in r2 value**

1. **MULTIPLE LINEAR REGRESSION (R2 Value)= 0.93586**
2. **SUPPORT VECTOR MACHINE**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S.NO** | **HYPER PARAMETER** | **LINEAR**  **(r value)** | **RBF(NON LINEAR)**  **(r value)** | **POLY**  **(r value)** | **SIGMOID**  **(r value)** |
| 1 | C=0.01 | -0.05746 | -0.57418 | -0.57418 | -0.05748 |
| 2 | C=100 | 0.10646 | -0.05072 | -0.01980 | -0.03045 |
| 3 | C=500 | 0.59289 | -0.02432 | 0.11468 | 0.07057 |
| 4 | C=1000 | 0.78028 | 0.00676 | 0.26616 | 0.18506 |
| 5 | C=10000 | 0.92399 | 0.37189 | 0.81296 | 0.85353 |

**The SVM Regression use R2 value (linear and hyper parameter (C=10000)=0.92399**

1. **DECISION TREE**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S.NO** | **CRITERION** | **SPLITTER** | **MAX FEATURES** | **R VALUE** |
| 1 | squared\_error | best | sqrt | 0.752803 |
| 2 | squared\_error | best | log2 | 0.792736 |
| 3 | squared\_error | best | None | 0.89878 |
| 4 | squared\_error | random | sqrt | 0.64993 |
| 5 | squared\_error | random | log2 | 0.28950 |
| 6 | squared\_error | random | None | 0.91243 |
| 7 | friedman\_mse | best | sqrt | 0.68688 |
| 8 | friedman\_mse | best | log2 | 0.78041 |
| 9 | friedman\_mse | best | None | 0.92393 |
| 10 | friedman\_mse | random | sqrt | 0.71382 |
| 11 | friedman\_mse | random | log2 | 0.24263 |
| 12 | friedman\_mse | random | None | 0.75158 |
| 13 | absolute\_error | best | sqrt | 0.72950 |
| 14 | absolute\_error | best | log2 | 0.91530 |
| 15 | absolute\_error | best | None | 0.93323 |
| 16 | absolute\_error | random | sqrt | 0.41717 |
| 17 | absolute\_error | random | log2 | 0.49931 |
| 18 | absolute\_error | random | None | 0.92074 |
| 19 | poisson | best | sqrt | 0.18653 |
| 20 | poisson | best | log2 | 0.55693 |
| 21 | poisson | best | None | 0.91617 |
| 22 | poisson | random | sqrt | -2.05603 |
| 23 | poisson | random | log2 | 0.65941 |
| 24 | poisson | random | None | 0.91505 |

**The Decision Tree Regression use R2 value(friedman\_mse,best,None)=0.92393**

1. **RANDOM FOREST**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S.NO** | **N\_ESTIMATORS** | **CRITERION** | **MAX FEATURES** | **R VALUE** |
| 1 | 50 | squared\_error | sqrt | 0.76623 |
| 2 | 50 | squared\_error | log2 | 0.78134 |
| 3 | 50 | squared\_error | None | 0.94072 |
| 4 | 100 | squared\_error | sqrt | 0.78013 |
| 5 | 100 | squared\_error | log2 | 0.78304 |
| 6 | 100 | squared\_error | None | 0.93201 |
| 7 | 50 | absolute\_error | sqrt | 0.84312 |
| 8 | 50 | absolute\_error | log2 | 0.79077 |
| 9 | 50 | absolute\_error | None | 0.94657 |
| 10 | 100 | absolute\_error | sqrt | 0.69477 |
| 11 | 100 | absolute\_error | log2 | 0.83632 |
| 12 | 100 | absolute\_error | None | 0.94254 |
| 13 | 50 | friedman\_mse | sqrt | 0.81678 |
| 14 | 50 | friedman\_mse | log2 | 0.76540 |
| 15 | 50 | friedman\_mse | None | 0.93253 |
| 16 | 100 | friedman\_mse | sqrt | 0.79723 |
| 17 | 100 | friedman\_mse | log2 | 0.83779 |
| 18 | 100 | friedman\_mse | None | 0.93559 |
| 19 | 50 | poisson | sqrt | 0.66166 |
| 20 | 50 | poisson | log2 | 0.69909 |
| 21 | 50 | poisson | None | 0.94152 |
| 22 | 100 | poisson | sqrt | 0.75887 |
| 23 | 100 | poisson | log2 | 0.79354 |
| 24 | 100 | poisson | None | 0.94038 |

**The Random Forest Regression use R2 value(n\_estimators=50,absolute\_error,None)=0.94657**