**To find the machine learning regression method using in r2 value**

**1.Multiple linear regression (r2 value=0.935)**

**2. support vector machine**:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **S.No** | **Hyper parameter** | **Precomputed (r value)** | **Poly (r value)** | **Sigmoid  (r value)** | **Rbf (non linear r value)** |
| 1 | C10 | Not response for this dataset | -0.053 | -0.054 | -0.056 |
| 2 | C100 | -0.019 | -0.030 | -0.050 |
| 3 | C500 | 0.114 | 0.070 | -0.024 |
| 4 | C1000 | 0.266 | 0.185 | 0.006 |
| 5 | C2000 | 0.481 | 0.397 | 0.067 |
| 6 | C3000 | 0.637 | 0.591 | 0.123 |

**Decision Tree:**

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No** | **Criterion** | **Spliter** | **R value** |
| 1 | mse | best | 0.895 |
| 2 | *squared\_error* | best | 0.930 |
| 3 | friedman\_mse | best | 0.907 |
| 4 | friedman\_mse | *random* | 0.869 |
| 5 | *absolute\_error* | *random* | 'absolute\_error' is only supported in scikit-learn >= 1.0 |
| 6 | poisson | This criterion is supported only in \*\*HistGradientBoostingRegressor\*\*, not DecisionTreeRegressor | 'poisson' is **not a valid criterion** for DecisionTreeRegressor |

**Random Forest**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **S.No** | **Config** | **n\_estimators** | **friedman\_mse** | **default (mse)** | **max\_depth=None** | **min\_samples\_split=2** |
| 1 | C10 | 10 | 0.925 | 0.920 | 0.925 | 0.865 |
| 2 | C50 | 50 | 0.944 |  | 0.925 | 0.925 |
| 3 | C100 | 100 | 0.946 |  | 0.925 |  |
| 4 | C500 | 500 | 0.942 |  | 0.925 |  |
| 5 | C1000 | 1000 | 0.940 |  | 0.925 |  |
| 6 | C2000 | 2000 | 0.940 |  | 0.925 |  |

**1.n\_estimators (Number of Trees)**

* As n\_estimators increases from **10 → 100**, performance (R² or accuracy score assumed) improves:
* **C10: 0.925 → C100: 0.946**