**Insurance Assignment**

1.Problem Statement – To predict the insurance charges.

2. it has 1338 rows × 6 columns

3. Converted Sex and Smoker column from categorical data to numerical data.

4. Best model is random forest where the accuracy is 87.47 is consistent even after tuning the parameter hence has better model performance.

**SVM Results:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Sl.No** | **Hyper para** | **RBF(Non linear)** | **Poly(r value)** | **Sigmoid(r value)** | **Linear** |
| 1 | C=1 | -0.0833 | -0.0756 | -0.07542 | -0.0101 |
| 2 | C = 10 | -0.0322 | 0.0387 | 0.0393 | 0.4624 |
| 3 | C=100 | 0.32 | 0.6179 | 0.5276 | 0.6288 |
| 4 | C=1000 | 0.8102 | 0.8566 | 0.2874 | 0.7649 |
| 5 | C=3000 | 0.8663 | 0.8598 | -2.1244 | 0.7414 |
| 6 | C=5000 | 0.8747 | 0.8595 | -7.53 | 0.7414 |

**Decision Tree**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sl.No** | **Criterion** | **Max Features** | **Splitter** | **R value** |
| 1 | friedman\_mse | None | random | 0.7503 |
| 2 | friedman\_mse | None | best | 0.6932 |
| 3 | friedman\_mse | srqt | random | 0.6558 |
| 4 | absolute\_error | log2 | random | 0.6887 |
| 5 | absolute\_error | srqt | random | 0.6911 |
| 6 | absolute\_error | srqt | best | 0.7326 |
| 7 | poisson | srqt | best | 0.7164 |
| 8 | poisson | srqt | random | 0.7611 |
| 9 | poisson | log2 | random | 0.6913 |
| 10 | poisson | log2 | best | 0.7007 |

**Random Forest**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sl.No** | **Criterion** | **n\_estimators** | **Max\_feature** | **R value** |
| 1 | friedman\_mse | 100 | log2 | 0.871 |
| 2 | friedman\_mse | 500 | log2 | 0.871 |
| 3 | absolute\_error | 100 | log2 | 0.871 |
| 4 | absolute\_error | 100 | sqrt | 0.87106 |
| 5 | absolute\_error | 500 | sqrt | 0.8722 |
| 6 | poisson | 500 | sqrt | 0.8714 |
| 7 | poisson | 500 | log2 | 0.8714 |