Insurance Charges Prediction

Machine Learning Regression method using Hyper Tuning Parameters to find R2 value

1. **Multiple Linear Regression (R2 value)= 0.7891**

2. **Support Vector Machine:**

Sl.No	Hyper Parameter	Linear (r value)	Rbf (r value)	Poly (r value)	Sigmoid (r value)
1	C0.01	-0.0797	-0.0897	-0.0893	-0.0897
2	C10	-0.0017	-0.0818	-0.0930	-0.0909
3	C100	-0.5432	-0.1245	-0.0992	-0.1185
4	C500	0.6269	-0.1246	-0.0817	-0.4735
5	C1000	0.6338	-0.1176	-0.0546	-1.7112
6	C1500	0.6392	-0.1125	-0.0283	-3.4453
7	C2000	0.6898	-0.1078	-0.0016	-5.8190

In SVM Regression use Hyper Tuning Parameter (Nonlinear (Poly) Hyper parameter (C2000)) to find R2 Value =**0.6898**

3. **Decision Tree**

Sl.No	Criterion	Max Features	Splitter	R Value
1	friedman_mse	sqrt	best	0.6934
2	friedman_mse	Log2	random	0.7137
3	friedman_mse	Log2	best	0.7133
4	friedman_mse	sqrt	random	0.6491
5	friedman_mse	auto	random	0.6803
6	friedman_mse	auto	best	0.6899
7	absolute_error	auto	best	0.7109
8	absolute_error	auto	random	0.7031
9	absolute_error	sqrt	best	0.7212
10	absolute_error	sqrt	random	0.7084
11	absolute_error	Log2	best	0.6505
12	absolute_error	Log2	random	0.6243
13	poisson	auto	best	0.6870
14	poisson	auto	random	0.7739
15	poisson	sqrt	best	0.6623
16	poisson	sqrt	random	0.6558
17	poisson	Log2	best	0.7544
18	poisson	Log2	random	0.6817

In Decision Tree use (Hyper tuning Parameter(criterion='poisson',max_features='auto',splitter='random')) to find R2 Value = **0.7739**

4.Random Forest Regression

SI.No	Criterion	n_estimators	Max Features	R Value
1	Squared_error	100	auto	0.8524
2	Squared_error	50	sqrt	0.8603
3	Squared_error	60	Log2	0.8609
4	friedman_mse	100	Log2	0.8661
5	friedman_mse	70	sqrt	0.8614
6	friedman_mse	100	auto	0.8524
7	absolute_error	100	auto	0.8565
8	absolute_error	50	sqrt	0.8657
9	absolute_error	50	Log2	0.8621
10	poisson	50	auto	0.8495
11	poisson	50	sqrt	0.8548
12	poisson	50	Log2	0.8586

In Random Forest use (Hyper Tuning Parameter(criterion='friedman_mse',n_estimators=100,max_features='log2')) to find R2 Value = **0.8661**

The final best model result for Machine Learning Regression :

1.In Random Forest use (Hyper Tuning Parameter(criterion='friedman_mse',n_estimators=100,max_features='log2')) to find R2 Value = **0.8661**