Machine Learning Regression

Algorithm Validation:

1. SVM (Support Vector Machine)

Support Vector Machine					
Serial number	Hyper parameter	Linear (r2 value)	RBF(Non Linear) r2 value	Poly (r2 value)	Sigmoid (r2 value)
1	C1.0	0.8950	-0.0574	-0.0571	-0.0572
2	C10	-2.4370	-0.0568	-0.0537	-0.0547
3	C100	-357.0790	-0.0507	-0.0198	-0.030453
4	C1000	-36014.0206	0.0068	0.2662	0.1851
5	C1500	not checked	0.0378	0.3875	0.2949
6	C3000	not checked	0.1232	0.6370	0.59136
7	C6000	not checked	0.2452	0.8226	0.79725
8	C8000	not checked	0.3150	0.8286	0.83652

The Kernel type Linear R^2 value is 0.8950.This model looks good (1st choice)

The Kernel type Sigmoid R^2 value is 0.836(2nd choice)

2. Decision Tree

Decision Tree				
Sno	Criterion	Splitter	Max Features	R Value
1	squared_error	best	log2	0.662
2	squared_error	best	sqrt	0.424
3	friedman_mse	best	log2	-0.443
4	friedman_mse	best	sqrt	0.202
5	friedman_mse	random	sqrt	0.823
6	friedman_mse	random	log2	0.673
7	absolute_error	best	log2	0.702
8	absolute_error	random	log2	0.246
9	absolute_error	best	sqrt	0.414
10	absolute_error	random	sqrt	0.210
11	poisson	best	sqrt	0.773
12	poisson	best	log2	0.893
13	poisson	random	log2	0.676
14	poisson	random	sqrt	0.793
15	squared_error	random	log2	0.709
16	squared_error	random	sqrt	0.483

The Decision tree algorithm gives a better R^2 value (0.893) when using

Criterion =poisson, splitter=best and max_features=log2

3. Random Forest Algorithm

Random Forest				
Sno	Criterion	n_estimators	random_state	R2 value
1	Squared_error	10	0	0.9253
2	Squared_error	50	0	0.9446
3	Squared_error	100	0	0.9460
4	Squared_error	100	5	0.9322
5	Squared_error	200	0	0.9439
6	friedman_mse	10	0	0.9207
7	friedman_mse	50	0	0.9389
8	friedman_mse	100	0	0.9413
9	friedman_mse	150	0	0.9429
10	friedman_mse	200	0	0.9442
11	friedman_mse	200	0	0.9417
12	poisson	10	0	0.9305
13	poisson	50	0	0.9464
14	poisson	100	0	0.9414
15	poisson	60	0	0.9457
16	poisson	75	0	0.9403
17	poisson	70	0	0.9433

Random Forest Algorithm gives a better R^2 value (0.9460) while using the following

Criterion: Squared_error , n_estimators=100 and random_state=0

Criterion: poisson , n_estimators=50 and random_state=0