A8. Assignment-2 Machine Learning Regression –

Hyper Tuning

R2_Score Values for Different Methods in Machine Learning Regression with same file "50_Startup.csv" :

Method 1: Multiple Linear Regression

R2_score Value = 0.9358680970046241 = 0.9359

Method 2 : Support Vector Machine

R2_score Value = 0.930124844396843 = 0.9301

Support Vector Machine			R2_SCORE VALUE				0.9301
S.NO.	STANDARDIZATION	Hyper Parameter	R2_SCORE VALUE				
			LINEAR	POLY	RBF	SIGMOID	PRE COMPUTED
1	NO	C0.01	-0.0575	-0.0575	-0.0557	-0.0575	X.shape[0] should be equal to X.shape[1]
2	NO	C10	-0.0396	-0.0537	-0.0568	-0.0547	
3	NO	C1000	0.7803	0.2662	0.0068	0.1851	
4	YES	C0.01	-0.0575	-0.0575	-0.5749	-0.0575	
5	YES	C10	-0.0396	-0.0537	-0.0568	-0.0547	
6	YES	C1000	0.7803	0.2662	0.0068	0.1851	
7	YES	C2000	0.8768	0.4810	0.0675	0.3971	
8	YES	C10000	0.9240	0.8130	0.3719	0.8535	
9	YES	C20000	0.9301	0.6717	0.5332	0.9011	
10	YES	C50000	0.9301	0.5885	0.6661	0.0881	
11	YES	C100000	0.9301	0.4002	0.7086	-0.8434	

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Method 3: Decision Tree

R2_score Value = 0.969180643309945 = 0.9692

DECISION TREE		R2_SCORE VALUE		0.9692
S.NO.	**CRITERION**	**SPLITTER**	**MAX FEATURES**	**R2_SCORE**
1	mse	best	auto	0.9257
2	mse	best	sqrt	0.3339
3	mse	best	Log2	0.9145
4	mse	random	auto	0.6984
5	mse	random	sqrt	-0.1546
6	mse	random	Log2	0.5914
7	mae	best	auto	0.9692
8	mae	best	sqrt	0.8722
9	mae	best	Log2	0.6583
10	mae	random	auto	0.9278
11	mae	random	sqrt	0.1929
12	mae	random	Log2	0.6850
13	Friedman_mse	best	auto	0.9280
14	Friedman_mse	best	sqrt	0.1731
15	Friedman_mse	best	Log2	0.2165
16	Friedman_mse	random	auto	0.7644
17	Friedman_mse	random	sqrt	-0.0854
18	Friedman_mse	random	Log2	-0.0038

Repeat "Kernal Restart and run all cells " For same parameter:

Kernel restart & run all cells Repeated same parameters				
S.NO.	**CRITERION**	**SPLITTER**	**MAX FEATURES**	**R2_SCORE**
1	Friedman_mse	best	auto	0.9280
2	Friedman_mse	best	auto	0.9309
3	Friedman_mse	best	auto	0.9022
4	Friedman_mse	best	auto	0.9142
5	Friedman_mse	best	auto	0.9205
6	Friedman_mse	best	auto	0.9165
7	Friedman_mse	best	auto	0.9328

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Repeat "Kernal Restart and run all cells " For same parameter:

Kernel restart & run all cells Repeated same parameters				
S.NO.	**CRITERION**	**SPLITTER**	**MAX FEATURES**	**R2_SCORE**
1	mae	best	auto	0.9692
2	mae	best	auto	0.9476
3	mae	best	auto	0.9609
4	mae	best	auto	0.9560
5	mae	best	auto	0.9538
6	mae	best	auto	0.9349
7	mae	best	auto	0.9446
8	mae	best	auto	0.9385
9	mae	best	auto	0.9446
10	mae	best	auto	0.9461
11	mae	best	auto	0.9470
12	mae	best	auto	0.9401