

### Problem statement for AI in Business intelligence/Analyst-Profit Prediction.

1. Identify for 3 stages:
2. Machine learning
3. Supervised Learning
4. Regression it contains numerical output

2. To Find following the machine learning regression method using  $r^2$  value

#### 1. MULTIPLE LINEAR REGRESSION ( $R^2$ VALUE= 0.935)

2. SUPPORT VECTOR MACHINE:

S.NO	HYPER PARAMETER	LINEAR (r value)	RBF (NON LINEAR) (r value)	POLY (r value)	SIGMOID (r value)
1	No changes	0.895	-0.0574	-0.057	-0.057
2	C0.01	0.9335	-0.057	-0.057	-0.057
3	C0.001	0.9330	-0.57	-0.057	-0.057
4	C0.001	0.9330	-0.030	0.465	-0.058
5	C500	-3547.07	0.0500	0.6207	-0.0640
6	C1000	-3654.0	0.1606	0.6403	-0.0707
7	C2000	-3769.0	0.288	0.6717	-0.0845

The SVM Regression use  $R^2$  value (Linear and hyper parameter(C0.001) = 0.9330

3.DECISION TREE:

S.NO	CRITERION	MAX FEATURES	SPLITTER	R VALUE
1	Squared_error	Auto	Best	0.915
2	Squared_error	Auto	Random	0.888
3	Squared_error	Sqrt	Best	0.6546
4	Squared_error	Sqrt	Random	0.899
5	Squared_error	Log2	Best	0.0281
6	Squared_error	Log2	Random	-0.177
7	friedman_mse	Auto	Random	0.928
8	friedman_mse	Auto	best	0.903
9	friedman_mse	Sqrt	random	0.8058
10	friedman_mse	Sqrt	best	0.5690
11	friedman_mse	Log2	random	0.6144
12	friedman_mse	Log2	best	0.4498
13	poisson	auto	random	0.9091

14	poisson	auto	best	0.9156
15	poisson	sqrt	random	0.0498
16	poisson	sqrt	best	-0.0479
17	poisson	Log2	random	0.6844
18	poisson	Log2	best	0.559
19	absolute_error	auto	Random	0.8390
20	Absolute_error	auto	best	0.9239
21	Absolute_error	sqrt	Best	0.645
22	Absolute_error	sqrt	Random	0.8856
23	Absolute_error	Log2	Best	-0.621
24	Absolute_error	Log2	random	0.2689

The Decision tree Regression use  $R^2$  value( poisson , auto, best)=0.9325

### 3. RANDOM FOREST REGRESSOR

S.NO	CRITERION	MAX FEATURES	N_ESTIMATORS	R VALUE
1	Squared_error	auto	50	0.944
2	Squared_error	auto	100	0.946
3	Squared_error	sqrt	50	0.6830
4	Squared_error	sqrt	100	0.7591
5	Squared_error	Log2	50	0.683
6	Squared_error	Log2	100	0.7591
7	Mae	auto	50	0.9401
8	Mae	auto	100	0.9459
9	Mae	sqrt	50	0.722
10	Mae	sqrt	100	0.785
11	Mae	Log2	50	0.722
12	Mae	Log2	100	0.785
13	Friedman mse	Auto	50	0.9388
14	Friedman mse	Auto	100	0.9412
15	Friedman mse	Sqrt	50	0.6889
16	Friedman mse	Sqrt	100	0.7608
17	Friedman mse	Log2	50	0.6889

18	Friedman mse	Log2	100	0.7608
19	poisson	Auto	50	0.9463
20	poisson	Auto	100	0.9413
21	poisson	Sqrt	50	0.7208
22	poisson	Sqrt	100	0.7717
23	poisson	Log2	50	0.7208
24	poisson	Log2	100	0.7717

The Random Forest Regression  $R^2$  value (mse, auto, 50) =0.946

Or

The Random Forest Regression  $R^2$  value (poisson, auto, 50) =0.9463

4. The final machine learning best method of Regression:

1.Random Forest  $R^2$  value (mse, auto, 50) =0.946

Or

2. The SVM Regression use  $R^2$  value (Linear and hyper parameter (C0.001) = 0.9330