

## 1. PROBLEM STATEMENT:

Predict the insurance charges

## 2. 3-STAGES:

- ➔ Machine Learning
- ➔ Supervised Learning
- ➔ Regression

## 3. ALGORITHMS:

3.1. MULTI LINEAR REGRESSION (R2 Value) = 0.78651

3.2. SUPPORT VECTOR MACHINE:

S.NO	HYPER PARAMETER	LINEAR (r value)	RBF(NON LINEAR) (r value)	POLY (r value)	SIGMOID (r value)
1	C10	-0.040369	-0.094979	-0.113782	-0.099234
2	C100	0.522025	-0.154894	-0.131775	-0.124882
3	C500	0.613341	-0.157475	-0.124370	-0.367523
4	C1000	0.618819	-0.152031	-0.105902	-1.209538
5	C2000	0.625366	-0.143940	-0.068028	-4.037362
6	C3000	0.666268	-0.133724	-0.029779	-8.449922

The SVM Regression R2 value is Linear and Hyperparameter is C3000 is 0.666268

3.3. DECISION TREE:

S.NO	CRITERIION	MAX FEAUTRES	SPLITTER	R VALUE
1	squared_error	None	Best	0.70787
2	squared_error	None	Random	0.731434
3	squared_error	Sqrt	Best	0.683759
4	squared_error	Sqrt	Random	0.669839
5	squared_error	Log2	Best	0.708099
6	squared_error	Log2	Random	0.579711
7	absolute_error	None	Best	0.685193
8	absolute_error	None	Random	0.736012
9	absolute_error	Sqrt	Best	0.644867
10	absolute_error	Sqrt	Random	0.594888

11	absolute_error	Log2	Best	0.651613
12	absolute_error	Log2	Random	0.607104
13	poisson	None	Best	0.708631
14	poisson	None	Random	0.737616
15	poisson	Sqrt	Best	0.704091
16	poisson	Sqrt	Random	0.649520
17	poisson	Log2	Best	0.764862
18	poisson	Log2	Random	0.654491

The Decision Tree R2 value is Poison, Log2, Best = 0.764862

### 3.4. RANDOM FOREST:

S.NO	CRITERIION	MAX FEAUTRES	N_ESTIMATOR	R VALUE
1	squared_error	None	10	0.84856
2	squared_error	None	100	0.85957
3	squared_error	Sqrt	10	0.84904
4	squared_error	Sqrt	100	0.86554
5	squared_error	Log2	10	0.83709
6	squared_error	Log2	100	0.86748
7	absolute_error	None	10	0.85081
8	absolute_error	None	100	0.85949
9	absolute_error	Sqrt	10	0.85328
10	absolute_error	Sqrt	100	0.86822
11	absolute_error	Log2	10	0.83933
12	absolute_error	Log2	100	0.86896
13	poisson	None	10	0.84281
14	poisson	None	100	0.86005
15	poisson	Sqrt	10	0.85824
16	poisson	Sqrt	100	0.86525
17	poisson	Log2	10	0.85165
18	poisson	Log2	100	0.86461
19	friedman_mse	None	10	0.85544
20	friedman_mse	None	100	0.85598
21	friedman_mse	Sqrt	10	0.85357
22	friedman_mse	Sqrt	100	0.86701
23	friedman_mse	Log2	10	0.85262
24	friedman_mse	Log2	100	0.86641

The Decision Tree R2 value is absolute, Log2, 100 = 0.86896