

## Insurance Charge Prediction - AI Models

- 1 **Problem Statement:** Predict the **insurance charges** based on parameters
- 2 **Details of Dataset:** No. of Rows- 1338 No. of Columns- 6
- 3 **Pre-processing Method:** Standard Scalar- Input
- 4 **To find the r2 values, the Machine Learning Regression used are-** Multiple Linear, SVM, DR, RF
- 5 **Research Values are as below:**

1. **MULTIPLE LINEAR REGRESSION:** 0.7895

2. **SUPPORT VECTOR MACHINE:**

SL.No	HYPER PARAMETER	LINEAR R-VALUE	RBF (NON-LINEAR R-VALUE)	POLY (R-VALUE)	SIGMOID R-VALUE
1	C10	0.4625	-0.0819	0.0387	0.0393
2	C100	0.6289	-0.1248	0.6180	0.5276
3	C500	0.7631	-0.1246	0.8264	0.4446
4	C1000	0.7649	-0.1246	0.8566	0.2875
5	C2000	0.7440	-0.1078	0.8606	-0.5940
6	C3000	0.7414	-0.0962	0.8595	-2.1244

**DECISION TREE:**

Sl.No	CRITERION	MAX. FEATURES	SPLITTER	R_VALUE
1	squared_error	default=None	best	0.6921
2	squared_error	default=None	random	0.7118
3	squared_error	sqrt	best	0.6926
4	squared_error	sqrt	random	0.5945
5	squared_error	log2	best	0.6750
6	squared_error	log2	random	0.6096
7	poisson	default=None	best	0.7275
8	poisson	default=None	random	0.7196
9	poisson	sqrt	best	0.7354
10	poisson	sqrt	random	0.6636
11	poisson	log2	best	0.7080
12	poisson	log2	random	0.6584
13	Mae(Mean absolute_error)	default=None	best	0.6590
14	Mae(Mean absolute_error)	default=None	random	0.7419
15	Mae(Mean absolute_error)	sqrt	best	0.7076
16	Mae(Mean absolute_error)	sqrt	random	0.7204
17	Mae(Mean absolute_error)	log2	best	0.7418
18	Mae(Mean absolute_error)	log2	random	0.6344
19	friedman_mse	default=None	best	0.6930
20	friedman_mse	default=None	random	0.7353
21	friedman_mse	sqrt	best	0.6958
22	friedman_mse	sqrt	random	0.7293
23	friedman_mse	log2	best	0.7212
24	friedman_mse	log2	random	0.7401

**RANDOM FOREST:**

Sl.No	CRITERION	MAX. FEATURES	SPLITTER	R_VALUE
1	squared_error	default=None	best	0.8538

2	squared_error	sqrt	best	0.8710
3	squared_error	log2	best	0.8710
4	poisson	default=None	best	0.8526
5	poisson	sqrt	best	0.8680
6	poisson	log2	best	0.8680
7	Mae(Mean absolute_error)	default=None	best	0.8520
8	Mae(Mean absolute_error)	sqrt	best	0.8711
9	Mae(Mean absolute_error)	log2	best	0.8711
10	friedman_mse	default=None	best	0.8541
11	friedman_mse	sqrt	best	0.8711
12	friedman_mse	log2	best	0.8711

**FINAL MODEL CHOSEN:** Random Forest Mae (Sqrt, log2) or Friedman\_mse(sqrt, log2)

**Reason for Selection:** Random Forest Mae (Sqrt, log2) or Friedman\_mse(sqrt, log2) which has the best R2 value as 87.11%