Problem Statement:

Stage 1:

Domain- Machine Learning.

Stage 2:

The requirement is clear. So Supervised Learning.

Stage 3:

Output is Numeric. So Regression

Single Linear Regression not suitable in this case due to the presence of multiple inputs.

Dataset Basic Information:

Number of rows - 1338
Number of columns - 6

Categorical Column - sex, smoker (Ordinal data)

Multi Linear Regression:

R2 Value = 0.7894790349867009

Support Vector Machine:

Parameters:
Kernel = linear,rbf,poly,sigmoid
Penalty=0.01,0.1,1,10,100,1000,10000

S.No	PENALTY	LINEAR	RBF	POLY	SIGMOID
1.	C=0.01	-0.08883133439168489	-0.08964553739867864	-0.08956828487671076	-0.0895650159341983
2.	C=0.1	-0.080959968427891	-0.08907451521042731	-0.08830237655410711	-0.08826991450485111
3.	C=1	-0.010102665316081394	-0.03227329390671052	-0.07569965570860893	-0.07542924281107188

4.	C=10	0.462468414233968	-0.03227329390671052	0.038716222760231456	0.03930714378274347
5.	C=100	0.6288792857320358	0.3200317832050831	0.6179569624059795	0.5276103546510404
6.	C=1000	0.7649311738596382	0.8102064851758545	0.8566487675946569	0.28747069486976207
7.	C=10000	0.7414230132428099	0.8779952426221569	0.8591715079473912	-34.151535978496256

Decision Tree:

Parameters:
Criterion = mse,friedman_mse
Max_features = auto,sqrt,log2
splitter=best,random

S.No	CRITERION	MAX_FEATURES	SPLITTER	R VALUE
1.	mse	auto	best	0.6865135066676138
2.	mse	sqrt	best	0.7214915079989148
3.	mse	log2	best	0.5703192759372698
4.	mse	auto	random	0.7526860936060862
5.	mse	sqrt	random	0.7526860936060862
6.	mse	log2	random	0.6441143372730915
7.	friedman_mse	auto	best	0.6859327560813799

8.	friedman_mse	sqrt	best	0.7567691431298412
9.	friedman_mse	log2	best	0.7257206732374384
10.	friedman_mse	auto	random	0.7257206732374384
11.	friedman_mse	sqrt	random	0.7257206732374384
12.	friedman_mse	log2	random	0.6810998006488564

Random Forest

Parameters:
Criterion = mse
Max_features = auto,sqrt,log2
n_estimaters=10,50,100

S.No	CRITERION	MAX_FEATURES	N_ESTIMATERS	R_VALUE
1.	Mse	auto	10	0.8365429576618842
2.	Mse	sqrt	10	0.8626676857364539
3.	Mse	log2	10	0.8578674146472178
4.	Mse	auto	50	0.8578674146472178
5.	Mse	sqrt	50	0.8578674146472178
6.	Mse	log2	50	0.8578674146472178
7.	Mse	auto	100	0.8719799546274639
8.	Mse	sqrt	100	0.8719799546274639
9.	Mse	log2	100	0.8578674146472178

The final best model has been chosen.

Random Forest, r2 value = 0.8719799546274639