**To find the follwing the Machine learning Regression Method using $R^2$ value**

1.Multiple Linear Regression($R^2$-value)=0.7894790349867009

2.Support vector Machine($R^2$-value)

| S.NO | HYPER PARAMETER VALUE(C) | LINEAR VALUE (R) VALUE | RBF(non-linear value R) | POLY (R) | SIGMOID(R) |
|---|---|---|---|---|---|
| 1 | C=10 | 0.4624684 | -0.0322732 | 0.0387162 | 0.0393071 |
| 2 | C=100 | 0.6288792 | 0.3200317 | 0.6179569 | 0.5276103 |
| 3 | C=500 | 0.7631057 | 0.6642984 | 0.8263683 | 0.444606 |
| 4 | C=1000 | 0.7649311 | 0.8102064 | 0.8566487 | 0.287471 |
| 5 | C=1500 | 0.7440487 | 0.8427494 | 0.8580889 | -0.06744 |

Support vector Machine $R^2$[poly and Hyperparameter(1500)]=0.8580889

**DECESION TREE ($R^2$-value)**

| S.NO | CRITIERION | MAX FEATUREAS | SPLITTERS | R VALUE |
|---|---|---|---|---|
| 1 | Mse | Auto | Best | 0.7000521 |
| 2 | Mse | Auto | Random | 0.6919682 |
| 3 | Mse | Sqrt | Best | 0.6110177 |
| 4 | Mse | Sqrt | Random | 0.7157955 |
| 5 | Mse | log2 | Best | 0.7229416 |
| 6 | Mse | log2 | Random | 0.7215323 |
| 7 | Mae | auto | Best | 0.6573389 |
| 8 | Mae | auto | Random | 0.7507558 |
| 9 | Mae | Sqrt | Best | 0.6848415 |
| 10 | Mae | Sqrt | Random | 0.7031684 |
| 11 | Mae | log2 | Best | 0.6977008 |
| 12 | Mae | log2 | Random | 0.676316 |
| 13 | friedman_mse | auto | Best | 0.7033522 |
| 14 | friedman_mse | auto | Random | 0.6861428 |
| 15 | friedman_mse | Sqrt | Best | 0.7519077 |
| 16 | friedman_mse | Sqrt | Random | 0.7088883 |
| 17 | friedman_mse | log2 | Best | 0.76619222 |
| 18 | friedman_mse | log2 | Random | 0.6962025 |

**DECESION TREE ($R^2$-value)[friedman_mse,log2,best]=0.76619222**

**RANDOM FORESET ($R^2$-value)**

| S.NO | CRITIERION | MAX FEATUREAS | N_ESTIMATORS | R VALUE |
|---|---|---|---|---|
| 1 | Mse | Auto | 10 | 0.8326454 |
| 2 | Mse | Auto | 100 | 0.8560729 |
| 3 | Mse | Sqrt | 10 | 0.8405621 |
| 4 | Mse | Sqrt | 100 | 0.8713959 |
| 5 | Mse | log2 | 10 | 0.8460456 |
| 6 | Mse | log2 | 100 | 0.8753207 |
| 7 | Mae | auto | 10 | 0.8388896 |
| 8 | Mae | auto | 100 | 0.8527284 |
| 9 | Mae | Sqrt | 10 | 0.8559707 |
| 10 | Mae | Sqrt | 100 | 0.8723463 |
| 11 | Mae | log2 | 10 | 0.8504588 |
| 12 | Mae | log2 | 100 | 0.8723241 |
| 13 | friedman_mse | auto | 10 | 0.8247351 |
| 14 | friedman_mse | auto | 100 | 0.8545791 |
| 15 | friedman_mse | Sqrt | 10 | 0.8542056 |
| 16 | friedman_mse | Sqrt | 100 | 0.8691738 |
| 17 | friedman_mse | log2 | 10 | 0.8612186 |
| 18 | friedman_mse | log2 | 100 | 0.870177 |

**RANDOM FORESET($R^2$-value)[friedman_mse,log2,100]=0.8753207**

**ADA BOOST REGRESSOR($R^2$-value)**

| S.NO | N_ESTIMATERS | LOSS-LINEAR(R VALUE) | LOSS-SQUARE(R VALUE) | LOSS-EXPONENTIAL(R) |
|---|---|---|---|---|
| 1 | 10 | 0.8566564 | 0.7101662 | 0.8254744 |
| 2 | 50 | 0.8512062 | 0.521828 | 0.6066836 |
| 3 | 100 | 0.8501721 | 0.4654836 | 0.537644 |
| 4 | 500 | 0.8687976 | 0.4531099 | 0.4751371 |
| 5 | 1000 | 0.8507999 | 0.4447981 | 0.4593156 |

**ADA BOOST REGRESSOR($R^2$-value)[N-EST=500,LOSS-LINEAR]=0.8687976**

| XGBOOSTINGREGRESSOR[GradientBoostingRegressor](($R^2$-value) | | | | |
|---|---|---|---|---|
| S.NO | CRITIERION | LOSS | N_ESTIMATORS | R VALUE |
| 1 | Mse | HUBER | 100 | 0.8913481 |
| 2 | Mse | QUANTILE | 100 | 0.6310518 |
| 3 | FRIEDMAN_MSE | HUBER | 100 | 0.8914659 |
| 4 | FRIEDMAN_MSE | QUANTILE | 100 | 0.6309441 |

XGBOOSTINGREGRESSOR[GradientBoostingRegressor](($R^2$-value)=0.8914659