MODEL NAME	MODEL DESCRIPTION
kNN Regressor	K=5 Minkowski Distance Metric Uniform weights Mean Squared Error Loss
Random Forest Regressor	Number of estimators = 100 Mean Squared Error Loss
Gradient Boosting Regressor	Number of estimators = 100 Learning rate = 0.1 Mean Squared Error Loss
Decision Tree Regressor	Minimum Sample Split = 2 Depth = 21 Mean Squared Error Loss
Bagging Regressor	Number of estimators = 10 Mean Squared Error Loss
Extra Trees Regressor	Number of estimators = 100 Random State = 77 Mean Squared Error Loss

Results and Discussions:

The comprehensive strength was predicted on the basis of certain parameters using multiple machine learning models. The predicted values were compared with the actual strengths(ground truth) and certain qualitative measures were used to confirm it's efficacy.
Firstly, the basic regression models like Linear Regression, Lasso Regression and Ridge Regression were used. They all gave a training accuracy of around 60% each. R^2 score for such basic models was found to be around 0.60. Modification in certain model parameters increased the R^2 to 0.70. Another metric used was Mean Absolute Error [MAE] which calculated the average variation between the predicted value and the actual target value. MAE for these basic models was around 9.3.

Predominantly classifying models kNN and Random Forest and Decision Trees were also employed as regressors and they gave an accuracy of around 98% and an R^2 score of around 0.80. These tree based models had a MAE around 3.2.
The model that gave the most promising predictions was the Extra Tree Regressor model. This tree based method gave a training accuracy of 99%. It gave an MAE of 2.9. Further parameters were tuned for the Extra Trees Regressor. An ideal random state was set and the peak testing accuracy of 95% and an R2 score of 0.93 was achieved. On further analysis, Age, followed by Cement, were deemed as the most influential parameters. The testing MAE stayed consistent at 2.9.