**Appendix**

1. **R CODE**

/\* Project R codes \*/

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**# The Model**

**reg1<-lm(CCS~.,data=Concrete)**

**summary(reg1)**

**par(mfrow=c(2,2))**

**plot(reg1)**

**# Create decision tree using regression**

**library(rpart)**

**S.rpart <- rpart(CCS~., data = Concrete)**

**summary((S.rpart))**

**#The model after the regression tree**

**Tree.Model<-lm(CCS~Cement+Age+FA+Water+BFS,data=Concrete)**

**summary(Tree.Model)**

**par(mfrow=c(2,2))**

**plot(Tree.Model)**

**#Interaction**

**Trans<-lm(CCS~Cement+Age+FA+Water+BFS+Cement\*Age,data=Concrete)**

**summary(Trans)**

**par(mfrow=c(2,2))**

**plot(Trans)**

**#Step wise Method**

**library(MASS)**

**step.model <- stepAIC(Tree.Model, direction = "both",trace = FALSE)**

**summary(step.model)**

**intercept\_only <- lm(CCS ~ 1, data=Concrete)**

**STEPWISE <- step(intercept\_only, direction='both', scope=formula(Tree.Model), trace=0)**

**summary(STEPWISE)**

**#Comparing models using ANOVA function**

**anova(Tree.Model,Trans)**

**#Outliers**

**library(car)**

**outlierTest(Trans)**

**#Standarized\_Coeff**

**mod1<-lm(scale(CCS)~scale(Cement),data=Concrete)**

**summary(mod1)**

**mod2<-lm(scale(CCS)~scale(Water),data=Concrete)**

**summary(mod2)**

**mod3<-lm(scale(CCS)~scale(Age),data=Concrete)**

**summary(mod3)**

**mod4<-lm(scale(CCS)~scale(BFS),data=Concrete)**

**summary(mod4)**

**mod5<-lm(scale(CCS)~scale(FA),data=Concrete)**

**summary(mod5)**

**mod6<-lm(scale(CCS)~scale(Cement\*Age),data=Concrete)**

**summary(mod6)**