# Name: Mark Black

# Date: 090314

# Title: ES\_IBrokers\_model\_pivot\_090314

library(IBrokers)

library(quantmod)

library(Quandl)

# Import ES Fut prior to IBKR futures

# Fut.201206 <- Quandl("CME/ESM2012", authcode="Wp68Bux85C874pBHCnNC", trim\_start="2011-06-13", trim\_end="2012-10-13")

tws <- twsConnect()

tws

# Assign Fut.xxxxxx objects

# Fut.201312 <- twsFUT("ES","GLOBEX","201312",include\_expired="1")

# Fut.201403 <- twsFUT("ES","GLOBEX","201403",include\_expired="1")

# Fut.201406 <- twsFUT("ES","GLOBEX","201406",include\_expired="1")

# Fut.201409 <- twsFUT("ES","GLOBEX","201409",include\_expired="1")

# Fut.201412 <- twsFUT("ES","GLOBEX","201412",include\_expired="1")

# Fut.201503 <- twsFUT("ES","GLOBEX","201503",include\_expired='1')

# Fut.201506 <- twsFUT("ES","GLOBEX","201506",include\_expired='1')

# Fut.201509 <- twsFUT("ES","GLOBEX","201509",include\_expired='1')

# Fut.201512 <- twsFUT("ES","GLOBEX","201512",include\_expired='1')

# Fut.201603 <- twsFUT("ES","GLOBEX","201603",include\_expired='1')

Fut.201606 <- twsFUT("ES","GLOBEX","201606",include\_expired='1')

# Download E.mini fut's into appropriate objects

# E.mini.201312 <- reqHistoricalData(tws,Contract=Fut.201312,duration='2 Y',useRTH='1')

# E.mini.201403 <- reqHistoricalData(tws,Contract=Fut.201403,duration='2 Y',useRTH='1')

# E.mini.201406 <- reqHistoricalData(tws,Contract=Fut.201406,duration='2 Y',useRTH='1')

# E.mini.201409 <- reqHistoricalData(tws,Contract=Fut.201409,duration='2 Y',useRTH='1')

# E.mini.201412 <- reqHistoricalData(tws,Contract=Fut.201412,duration='2 Y',useRTH='1')

# E.mini.201503 <- reqHistoricalData(tws,Contract=Fut.201503,duration='2 Y',useRTH='1')

# E.mini.201506 <- reqHistoricalData(tws,Contract=Fut.201506,duration='2 Y',useRTH='1')

# E.mini.201509 <- reqHistoricalData(tws,Contract=Fut.201509,duration='2 Y',useRTH='1')

# E.mini.201512 <- reqHistoricalData(tws,Contract=Fut.201512,duration='2 Y',useRTH='1')

# E.mini.201603 <- reqHistoricalData(tws,Contract=Fut.201603,duration='2 Y',useRTH='1')

E.mini.201606 <- reqHistoricalData(tws,Contract=Fut.201606,duration='2 Y',useRTH='1')

# Disconnect

twsDisconnect(tws)

# E.mini. Data Merge

# names(E.mini.201312) <- c("ES.Open","ES.High","ES.Low","ES.Close","ES.Volume","ES.VWAP",

# "ES.Gaps","ES.Count")

# E.mini.201312 <- window(E.mini.201312,start="2013-12-16",end="2013-12-12")

# E.mini <- E.mini.201312

# colnames(E.mini.201403) <- c("ES.Open","ES.High","ES.Low","ES.Close","ES.Volume","ES.VWAP",

# "ES.Gaps","ES.Count")

# E.mini.201403 <- window(E.mini.201412,start="2013-12-16",end="2014-03-13")

# E.mini <- rbind(E.mini,E.mini.201403)

#

# colnames(E.mini.201406) <- c("ES.Open","ES.High","ES.Low","ES.Close","ES.Volume","ES.VWAP",

# "ES.Gaps","ES.Count")

# E.mini.201406 <- window(E.mini.201412,start="2014-03-14",end="2014-06-10")

# E.mini <- rbind(E.mini,E.mini.201406)

#

# colnames(E.mini.201409) <- c("ES.Open","ES.High","ES.Low","ES.Close","ES.Volume","ES.VWAP",

# "ES.Gaps","ES.Count")

# E.mini.201409 <- window(E.mini.201412,start="2014-06-12",end="2014-09-11")

# E.mini <- rbind(E.mini,E.mini.201409)

#

# colnames(E.mini.201412) <- c("ES.Open","ES.High","ES.Low","ES.Close","ES.Volume","ES.VWAP",

# "ES.Gaps","ES.Count")

# E.mini.201412 <- window(E.mini.201412,start="2014-09-12",end="2014-12-10")

# E.mini <- rbind(E.mini,E.mini.201412)

#

# colnames(E.mini.201503) <- c("ES.Open","ES.High","ES.Low","ES.Close","ES.Volume","ES.VWAP",

# "ES.Gaps","ES.Count")

# E.mini.201503 <- window(E.mini.201503,start="2014-12-11",end="2015-03-11")

# E.mini <- rbind(E.mini,E.mini.201503)

#

# colnames(E.mini.201506) <- c("ES.Open","ES.High","ES.Low","ES.Close","ES.Volume","ES.VWAP",

# "ES.Gaps","ES.Count")

# E.mini.201506 <- window(E.mini.201506,start="2015-03-12", end="2015-06-10")

# E.mini <- rbind(E.mini,E.mini.201506)

#

# colnames(E.mini.201509) <- c("ES.Open","ES.High","ES.Low","ES.Close","ES.Volume","ES.VWAP",

# "ES.Gaps","ES.Count")

# E.mini.201509 <- window(E.mini.201509,start="2015-06-11", end="2015-09-10")

# E.mini <- rbind(E.mini,E.mini.201509)

#

# colnames(E.mini.201512) <- c("ES.Open","ES.High","ES.Low","ES.Close","ES.Volume","ES.VWAP",

# "ES.Gaps","ES.Count")

# E.mini.201512 <- window(E.mini.201512,start="2015-09-11", end="2015-12-10")

# E.mini.xts <- rbind(E.mini,E.mini.201512)

# colnames(E.mini.201603) <- c("ES.Open","ES.High","ES.Low","ES.Close","ES.Volume","ES.VWAP",

# "ES.Gaps","ES.Count")

# E.mini.201603 <- window(E.mini.201603,start="2015-12-11", end="2016-03-10")

colnames(E.mini.201606) <- c("ES.Open","ES.High","ES.Low","ES.Close","ES.Volume","ES.VWAP",

"ES.Gaps","ES.Count")

E.mini.201606 <- window(E.mini.201606,start="2016-03-11", end="2016-06-10")

# E.mini.xts <- rbind(E.mini,E.mini.201606)

# E.mini$ES.Count <- NULL

# # Archive Old ES files

setwd(…)

# E.mini.df <- data.frame(Date=index(E.mini.xts),coredata(E.mini.xts))

# write.csv(E.mini.df,file="ES\_PP\_archive.csv")

# Read in archived ES

ES.df <- read.csv("ES\_PP\_archive.csv", stringsAsFactors = FALSE)

ES.df <- ES.df[,-1]

ES.df$Date <- as.Date(ES.df$Date, format="%m/%d/%Y")

ES <- xts(ES.df[,-1], order.by=ES.df[,1])

# Combine archive w/ current ES contract

ES <- rbind(ES, E.mini.201606)

# Save Mid

ES$ES.Mid <- ((lag(ES$ES.High,1)-lag(ES$ES.Low,1))/2)+lag(ES$ES.Low,1)

# Pivot Points

ES$ES.PP <- (lag(ES$ES.High,1)+lag(ES$ES.Low,1)+lag(ES$ES.Close,1))/3

ES$ES.R1 <- (2\*ES$ES.PP)-lag(ES$ES.Low,1)

ES$ES.R2 <- ES$ES.PP+(lag(ES$ES.High,1)-lag(ES$ES.Low,1))

ES$ES.R3 <- ES$ES.R2+(lag(ES$ES.High,1)-lag(ES$ES.Low,1))

ES$ES.S1 <- (2\*ES$ES.PP)-lag(ES$ES.High,1)

ES$ES.S2 <- ES$ES.PP-(lag(ES$ES.High,1)-lag(ES$ES.Low,1))

ES$ES.S3 <- ES$ES.S2-(lag(ES$ES.High,1)-lag(ES$ES.Low,1))

E.mini <- ES

# Today's Projected Open

# 1st Lag the archived days

E.mini$ES.Open.Proj <- lag(E.mini$ES.Open,-1)

E.mini[nrow(E.mini),"ES.Open.Proj"] <- 2058

# Mid

# Calculate the difference in today's projected open from prev day's reference pts

E.mini$ES.PO.YCL <- (E.mini$ES.Open.Proj-E.mini$ES.Close)/E.mini$ES.Close

E.mini$ES.PO.YHI <- (E.mini$ES.Open.Proj-E.mini$ES.High)/E.mini$ES.High

E.mini$ES.PO.YLO <- (E.mini$ES.Open.Proj-E.mini$ES.Low)/E.mini$ES.Low

E.mini$ES.PO.Mid <- (E.mini$ES.Open.Proj-E.mini$ES.Mid)/E.mini$ES.Mid

# Calculate the differences

# Open-Close

E.mini$Op.Cl <- (E.mini$ES.Close-E.mini$ES.Open)/E.mini$ES.Open

E.mini$Hi.Cl <- (E.mini$ES.Close-E.mini$ES.High)/E.mini$ES.High

E.mini$Lo.Cl <- (E.mini$ES.Close-E.mini$ES.Low)/E.mini$ES.Low

#E.mini$Volume.Diff <- (E.mini$ES.Volume-lag(E.mini$ES.Volume,1))/lag(E.mini$ES.Volume,1)

E.mini$Op.YCl <- (E.mini$ES.Open-lag(E.mini$ES.Close,1))/lag(E.mini$ES.Close,1)

# Mid

E.mini$ES.Cl.Mid <- (E.mini$ES.Close-E.mini$ES.Mid)/E.mini$ES.Mid

E.mini$ES.PO.Mid <- (E.mini$ES.Open.Proj-E.mini$ES.Mid)/E.mini$ES.Mid

# Close in relation to PP

E.mini$Cl.PP <- (E.mini$ES.Close-E.mini$ES.PP)/E.mini$ES.PP

# YHI or YLO tag

E.mini$Hi.YHI <- ifelse(E.mini$ES.High>lag(E.mini$ES.High,1),1,0)

E.mini$Lo.YLO <- ifelse(E.mini$ES.Low<lag(E.mini$ES.Low,1),1,0)

E.mini$Hi.YHI1 <- lag(E.mini$Hi.YHI,-1)

E.mini$Lo.YLO1 <- lag(E.mini$Lo.YLO,-1)

# Close in relation to YHI or YLO

E.mini$Cl.YHI <- ifelse(E.mini$ES.Close>lag(E.mini$ES.High,1),1,0)

E.mini$Cl.YLO <- ifelse(E.mini$ES.Close<lag(E.mini$ES.Low,1),1,0)

# DHI DLO in relation to YHI or YLO

E.mini$Up.Trend <- ifelse(E.mini$ES.Close>lag(E.mini$ES.Close,1),1,0)

E.mini$Up.Trend1 <- lag(E.mini$Up.Trend,-1)

E.mini$Down.Trend <- ifelse(E.mini$ES.Close<lag(E.mini$ES.Close,1),1,0)

E.mini$Down.Trend1 <- lag(E.mini$Down.Trend,-1)

# Current Day PP Tag

E.mini$Mid.Tag <- ifelse((E.mini$ES.Mid<=E.mini$ES.High)&(E.mini$ES.Mid>=E.mini$ES.Low),1,0)

E.mini$PP.Tag <- ifelse((E.mini$ES.PP<=E.mini$ES.High)&(E.mini$ES.PP>=E.mini$ES.Low),1,0)

E.mini$R1.Tag <- ifelse((E.mini$ES.R1<=E.mini$ES.High)&(E.mini$ES.R1>=E.mini$ES.Low),1,0)

E.mini$R2.Tag <- ifelse((E.mini$ES.R2<=E.mini$ES.High)&(E.mini$ES.R2>=E.mini$ES.Low),1,0)

E.mini$R3.Tag <- ifelse((E.mini$ES.R3<=E.mini$ES.High)&(E.mini$ES.R3>=E.mini$ES.Low),1,0)

E.mini$S1.Tag <- ifelse((E.mini$ES.S1<=E.mini$ES.High)&(E.mini$ES.S1>=E.mini$ES.Low),1,0)

E.mini$S2.Tag <- ifelse((E.mini$ES.S2<=E.mini$ES.High)&(E.mini$ES.S2>=E.mini$ES.Low),1,0)

E.mini$S3.Tag <- ifelse((E.mini$ES.S3<=E.mini$ES.High)&(E.mini$ES.S3>=E.mini$ES.Low),1,0)

# Future Day PP Tags

E.mini$Mid.Tag1 <- lag(E.mini$Mid.Tag,-1)

E.mini$PP.Tag1 <- lag(E.mini$PP.Tag,-1)

E.mini$R1.Tag1 <- lag(E.mini$R1.Tag,-1)

E.mini$R2.Tag1 <- lag(E.mini$R2.Tag,-1)

E.mini$R3.Tag1 <- lag(E.mini$R3.Tag,-1)

E.mini$S1.Tag1 <- lag(E.mini$S1.Tag,-1)

E.mini$S2.Tag1 <- lag(E.mini$S2.Tag,-1)

E.mini$S3.Tag1 <- lag(E.mini$S3.Tag,-1)

# Gap

E.mini$Gap <- ifelse((E.mini$ES.High>=lag(E.mini$ES.Close,1))&(E.mini$ES.Low<=lag(E.mini$ES.Close,1)),1,0)

E.mini$Gap1 <- lag(E.mini$Gap,-1)

# # Calculate/Import Technical Indicators

# E.mini$VWAP <- VWAP(Cl(E.mini),Vo(E.mini))

# E.mini$EMA5 <- EMA(Cl(E.mini),5)

# E.mini$EMA8 <- EMA(Cl(E.mini),8)

# E.mini$SMA200 <- SMA(Cl(E.mini),200)

# E.mini$SMA100 <- SMA(Cl(E.mini),100)

# E.mini$SMA50 <- SMA(Cl(E.mini),50)

# E.mini$SMA20 <- SMA(Cl(E.mini),20)

# E.mini$RSI14 <- RSI(Cl(E.mini),14)

E.mini$RSI2 <- RSI(Cl(E.mini),2)

# E.mini$Momo <- momentum(Cl(E.mini),10)

# E.mini$BB2 <- BBands(Cl(E.mini),20)

# E.mini$BB3 <- BBands(Cl(E.mini),20,sd=3)

# E.mini$CCI <- CCI(Cl(E.mini),20)

# E.mini$MACD <- MACD(Cl(E.mini),nFast=12,nSlow=26,nSig=9)

# E.mini$Stoch <- stoch(Cl(E.mini),nFastK=14,nFastD=5,nSlowD=3)

# E.mini$Stoch.RSI <- stoch(RSI(Cl(E.mini)))

# E.mini$CMF <- CMF(HLC(E.mini),Vo(E.mini),n=20)

# E.mini$ADX <- ADX(HLC(E.mini),14)

# E.mini$CCI <- CCI(Cl(E.mini),20)

# E.mini$CMO <- CMO(Cl(E.mini),14)

# E.mini$DPO <- DPO(Cl(E.mini),21,shift=0)

# E.mini$ROC <- ROC(Cl(E.mini),9)

# E.mini$WPR <- WPR(HLC(E.mini),14)

# Import ATR Indicator

E.mini$ATR <- ATR(E.mini,5)

E.mini$ATR.R <- E.mini$tr/E.mini$atr

# E.mini$ATR.Diff <- (E.mini$tr-lag(E.mini$tr,1))/lag(E.mini$tr,1)

E.mini$tr <- NULL

E.mini$atr <- NULL

E.mini$trueHigh <- NULL

E.mini$ATR <- NULL

# VWAP calculation

E.mini$VWAP.Diff <- (E.mini$ES.VWAP-lag(E.mini$ES.VWAP,1))/lag(E.mini$ES.VWAP,1)

E.mini$VWAP.UD <- ifelse(E.mini$ES.Close>E.mini$ES.VWAP,1,0)

# # Calculate Slop for MA's

# E.mini$EMA5.Slope <- (E.mini$EMA5-lag(E.mini$EMA5,5))/5

# E.mini$EMA8.Slope <- (E.mini$EMA5-lag(E.mini$EMA5,8))/8

# E.mini$SMA20.Slope <- (E.mini$SMA20-lag(E.mini$SMA20,20))/20

# E.mini$SMA50.Slope <- (E.mini$SMA50-lag(E.mini$SMA50,50))/50

# E.mini$SMA100.Slope <- (E.mini$SMA100-lag(E.mini$SMA100,100))/100

# E.mini$SMA200.Slope <- (E.mini$SMA200-lag(E.mini$SMA200,200))/200

#

# # Above SMA's

# E.mini$Cl.EMA5 <- (E.mini$ES.Close-E.mini$EMA5)/E.mini$EMA5

# E.mini$Cl.EMA8 <- (E.mini$ES.Close-E.mini$EMA8)/E.mini$EMA8

# E.mini$Cl.SMA20 <- (E.mini$ES.Close-E.mini$SMA20)/E.mini$SMA20

# E.mini$Cl.SMA50 <- (E.mini$ES.Close-E.mini$SMA50)/E.mini$SMA50

# E.mini$Cl.SMA100 <- (E.mini$ES.Close-E.mini$SMA100)/E.mini$SMA100

# E.mini$Cl.SMA200 <- (E.mini$ES.Close-E.mini$SMA200)/E.mini$SMA200

# Calculate the rdiff in OHLC

E.mini$ES.Open <- (E.mini$ES.Open-lag(E.mini$ES.Open,1))/lag(E.mini$ES.Open,1)

E.mini$ES.High <- (E.mini$ES.High-lag(E.mini$ES.High,1))/lag(E.mini$ES.High,1)

E.mini$ES.Low <- (E.mini$ES.Low-lag(E.mini$ES.Low,1))/lag(E.mini$ES.Low,1)

#E.mini$ES.Vol <- (E.mini$ES.Volume-lag(E.mini$ES.Volume,1))/lag(E.mini$ES.Volume,1)

E.mini$ES.PP <- (E.mini$ES.PP-lag(E.mini$ES.PP,1))/lag(E.mini$ES.PP,1)

# Find Returns for Day & +1 Day

E.mini$Ret <- (E.mini$ES.Close-lag(E.mini$ES.Close,1))/lag(E.mini$ES.Close,1)

# E.mini$Ret1 <- (lag(ES$ES.Adjusted,-1)-ES$ES.Adjusted)/ES$ES.Adjusted

# ES$Ret2 <- (lag(ES$ES.Adjusted,-2)-ES$ES.Adjusted)/ES$ES.Adjusted

# ES$Ret3 <- (lag(ES$ES.Adjusted,-3)-ES$ES.Adjusted)/ES$ES.Adjusted

# Separate Returns

#Returns <- (ES$ES.Close-lag(ES$ES.Close,1))/lag(ES$ES.Close,1)

#Returns$Ret1 <- (lag(ES$ES.Close,-1)-ES$ES.Close)/ES$ES.Close

#Returns$Ret2 <- (lag(ES$ES.Adjusted,-2)-ES$ES.Adjusted)/ES$ES.Adjusted

#Returns$Ret3 <- (lag(ES$ES.Adjusted,-3)-ES$ES.Adjusted)/ES$ES.Adjusted

#Returns$Ret4 <- (lag(ES$ES.Adjusted,-4)-ES$ES.Adjusted)/ES$ES.Adjusted

#Returns$Ret5 <- (lag(ES$ES.Adjusted,-5)-ES$ES.Adjusted)/ES$ES.Adjusted

# Binary Function YCL > 200SMA

E.mini$RSI.OB <- ifelse(E.mini$RSI2>90, 1, 0)

# Binary Function YCL > 100SMA

E.mini$RSI.OS <- ifelse(E.mini$RSI2<10, 1, 0)

# Binary Function YCL > 50SMA

# ES$CL\_SMA50 <- ifelse(ES$ES.Close>ES$SMA50, 1, 0)

# Binary Function YCL > 20SMA

# ES$CL\_SMA20 <- ifelse(ES$ES.Close>ES$SMA20, 1, 0)

# # Binary Function YCL > UBB

# E.mini$CL\_UBB2 <- ifelse(E.mini$ES.Close>E.mini$up, 1, 0)

# E.mini$CL\_UBB3 <- ifelse(E.mini$ES.Close>E.mini$up.1, 1, 0)

# E.mini$mavg <- NULL

#

# # Binary Function YCL < UBB

# E.mini$CL\_LBB2 <- ifelse(E.mini$ES.Close<E.mini$dn, 1, 0)

# E.mini$CL\_LBB3 <- ifelse(E.mini$ES.Close<E.mini$dn.1, 1, 0)

# E.mini$mavg.1 <- NULL

#

# Remove Unnecessary columns

E.mini$ES.Mid <- NULL

E.mini$ES.Close <- NULL

#E.mini$ES.Adjusted <- NULL

E.mini$ES.Volume <- NULL

E.mini$ES.Gaps <- NULL

# E.mini$EMA5 <- NULL

# E.mini$EMA8 <- NULL

# E.mini$SMA200 <- NULL

# E.mini$SMA100 <- NULL

# E.mini$SMA50 <- NULL

# E.mini$SMA20 <- NULL

# E.mini$E.mini <- NULL

E.mini$ES.VWAP <- NULL

E.mini$dn <- NULL

E.mini$up <- NULL

E.mini$dn.1 <- NULL

E.mini$up.1 <- NULL

E.mini$ES.R1 <- NULL

E.mini$ES.R2 <- NULL

E.mini$ES.R3 <- NULL

E.mini$ES.S1 <- NULL

E.mini$ES.S2 <- NULL

E.mini$ES.S3 <- NULL

# # Import NYSE Adv/Dec

# NYSE <- Quandl("URC/NYSE\_ADV", trim\_start="2013-10-10", type="xts",

# authcode="Wp68Bux85C874pBHCnNC")

# colnames(NYSE) <- c("NYSE.Adv")

#

# NYSE$NYSE.Dec <- Quandl("URC/NYSE\_DEC", trim\_start="1997-09-10", type="xts",

# authcode="Wp68Bux85C874pBHCnNC")

# #colnames(NYSE.Dec) <- c("NYSE.Dec")

#

# NYSE$NYSE.AD.Ratio <- NYSE$NYSE.Adv/NYSE$NYSE.Dec

#

# E.mini <- merge.xts(E.mini,NYSE$NYSE.AD.Ratio, all=FALSE)

#

# VIX <- Quandl("CBOE/VIX",trim\_start="2013-10-10", authcode="Wp68Bux85C874pBHCnNC",

# type="xts", transformation="rdiff")

# VIX <- VIX[,4]

# names(VIX) <- "VIX"

#

# E.mini <- merge.xts(E.mini, VIX, all=FALSE)

# Separate out Adjusted Close for ES2 & convert to df for prediction use

#ES2 <- ES$ES.Adjusted[nrow(ES)]

E.mini.df <- data.frame(Date=index(E.mini),coredata(E.mini))

#ES2$Date

# Set Predictors as Factors

E.mini.df$Hi.YHI <- as.factor(E.mini.df$Hi.YHI)

E.mini.df$Lo.YLO <- as.factor(E.mini.df$Lo.YLO)

E.mini.df$Hi.YHI1 <- as.factor(E.mini.df$Hi.YHI1)

E.mini.df$Lo.YLO1 <- as.factor(E.mini.df$Lo.YLO1)

E.mini.df$Cl.YHI <- as.factor(E.mini.df$Cl.YHI)

E.mini.df$Cl.YLO <- as.factor(E.mini.df$Cl.YLO)

E.mini.df$Up.Trend <- as.factor(E.mini.df$Up.Trend)

E.mini.df$Down.Trend <- as.factor(E.mini.df$Down.Trend)

E.mini.df$VWAP.UD <- as.factor(E.mini.df$VWAP.UD)

E.mini.df$RSI.OB <- as.factor(E.mini.df$RSI.OB)

E.mini.df$RSI.OS <- as.factor(E.mini.df$RSI.OS)

# E.mini.df$CL\_UBB2 <- as.factor(E.mini.df$CL\_UBB2)

# E.mini.df$CL\_UBB3 <- as.factor(E.mini.df$CL\_UBB3)

# E.mini.df$CL\_LBB2 <- as.factor(E.mini.df$CL\_LBB2)

# E.mini.df$CL\_LBB3 <- as.factor(E.mini.df$CL\_LBB3)

#E.mini.df <- na.omit(E.mini.df)

E.mini.df$ES.Open.Proj <- NULL

E.mini.df$ES.Count <- NULL

# Divide into train & test

train.pp.df <- E.mini.df[1:(nrow(E.mini.df)-42),]

test.pp.df <- E.mini.df[(nrow(E.mini.df)-42):(nrow(E.mini.df)),]

# Classification LR model binomial

# HiYHI

E.mini.hi.glm <- glm(Hi.YHI1~.-Down.Trend1-Up.Trend1-Lo.YLO1-PP.Tag1-R1.Tag1-R2.Tag1-

R3.Tag1-S1.Tag1-S2.Tag1-S3.Tag1-Mid.Tag1-Gap1,train.pp.df,family="binomial")

E.mini.hi.train.probs <- predict(E.mini.hi.glm,type="response")

E.mini.hi.test.probs <- predict(E.mini.hi.glm,newdata=test.pp.df,type="response")

#Gap

E.mini.gap.glm <- glm(Gap1~.-Down.Trend1-Up.Trend1-Lo.YLO1-PP.Tag1-R1.Tag1-R2.Tag1-

R3.Tag1-S1.Tag1-S2.Tag1-S3.Tag1-Mid.Tag1-Hi.YHI1,train.pp.df,family="binomial")

E.mini.gap.train.probs <- predict(E.mini.gap.glm,type="response")

E.mini.gap.test.probs <- predict(E.mini.gap.glm,newdata=test.pp.df,type="response")

#LoYLO

E.mini.lo.glm <- glm(Lo.YLO1~.-Hi.YHI1-Down.Trend1-Up.Trend1-PP.Tag1-R1.Tag1-R2.Tag1-

R3.Tag1-S1.Tag1-S2.Tag1-S3.Tag1-Mid.Tag1-Gap1,train.pp.df,family="binomial")

E.mini.lo.train.probs <- predict(E.mini.lo.glm,type="response")

E.mini.lo.test.probs <- predict(E.mini.lo.glm,newdata=test.pp.df,type="response")

#Mid

E.mini.mid.glm <- glm(Mid.Tag1~.-Lo.YLO1-Hi.YHI1-Down.Trend1-Up.Trend1-PP.Tag1-R1.Tag1-

R2.Tag1-R3.Tag1-S1.Tag1-S2.Tag1-S3.Tag1-Gap1,train.pp.df,family="binomial")

E.mini.mid.train.probs <- predict(E.mini.mid.glm,type="response")

E.mini.mid.test.probs <- predict(E.mini.mid.glm,newdata=test.pp.df,type="response")

#Up.Trend

E.mini.up.glm <- glm(Up.Trend1~.-Down.Trend1-Hi.YHI1-Lo.YLO1-PP.Tag1-R1.Tag1-R2.Tag1-

R3.Tag1-S1.Tag1-S2.Tag1-S3.Tag1-Mid.Tag1-Gap1,train.pp.df,family="binomial")

E.mini.up.train.probs <- predict(E.mini.up.glm,type="response")

E.mini.up.test.probs <- predict(E.mini.up.glm,newdata=test.pp.df,type="response")

#Down.Trend

E.mini.down.glm <- glm(Down.Trend1~.-Up.Trend1-Hi.YHI1-Lo.YLO1-PP.Tag1-R1.Tag1-R2.Tag1-

R3.Tag1-S1.Tag1-S2.Tag1-S3.Tag1-Mid.Tag1-Gap1,train.pp.df,family="binomial")

E.mini.down.train.probs <- predict(E.mini.down.glm,type="response")

E.mini.down.test.probs <- predict(E.mini.down.glm,newdata=test.pp.df,type="response")

## PP

E.mini.pp.glm <- glm(PP.Tag1~.-Down.Trend1-Up.Trend1-Hi.YHI1-Lo.YLO1-R1.Tag1-R2.Tag1-

R3.Tag1-S1.Tag1-S2.Tag1-S3.Tag1-Mid.Tag1-Gap1,train.pp.df,family="binomial")

E.mini.pp.train.probs <- predict(E.mini.pp.glm,type="response")

E.mini.pp.test.probs <- predict(E.mini.pp.glm,newdata=test.pp.df,type="response")

## R1

E.mini.r1.glm <- glm(R1.Tag1~.-Down.Trend1-Up.Trend1-Hi.YHI1-Lo.YLO1-PP.Tag1-R2.Tag1-

R3.Tag1-S1.Tag1-S2.Tag1-S3.Tag1-Mid.Tag1-Gap1,train.pp.df,family="binomial")

E.mini.r1.train.probs <- predict(E.mini.r1.glm,type="response")

E.mini.r1.test.probs <- predict(E.mini.r1.glm,newdata=test.pp.df,type="response")

## R2

E.mini.r2.glm <- glm(R2.Tag1~.-Down.Trend1-Up.Trend1-Hi.YHI1-Lo.YLO1-PP.Tag1-R1.Tag1-R2.Tag1-

R3.Tag1-S1.Tag1-S2.Tag1-S3.Tag1-Mid.Tag1-Gap1,train.pp.df,family="binomial")

E.mini.r2.train.probs <- predict(E.mini.r2.glm,type="response")

E.mini.r2.test.probs <- predict(E.mini.r2.glm,newdata=test.pp.df,type="response")

## R3

E.mini.r3.glm <- glm(R3.Tag1~.-Down.Trend1-Up.Trend1-Hi.YHI1-Lo.YLO1-PP.Tag1-R1.Tag1-R2.Tag1-

S1.Tag1-S2.Tag1-S3.Tag1-Mid.Tag1-Gap1,train.pp.df,family="binomial")

E.mini.r3.train.probs <- predict(E.mini.r3.glm,type="response")

E.mini.r3.test.probs <- predict(E.mini.r3.glm,newdata=test.pp.df,type="response")

## S1

E.mini.s1.glm <- glm(S1.Tag1~.-Down.Trend1-Up.Trend1-Hi.YHI1-Lo.YLO1-PP.Tag1-R1.Tag1-R2.Tag1-

R3.Tag1-S2.Tag1-S3.Tag1-Mid.Tag1-Gap1,train.pp.df,family="binomial")

E.mini.s1.train.probs <- predict(E.mini.s1.glm,type="response")

E.mini.s1.test.probs <- predict(E.mini.s1.glm,newdata=test.pp.df,type="response")

## S2

E.mini.s2.glm <- glm(S2.Tag1~.-Down.Trend1-Up.Trend1-Hi.YHI1-Lo.YLO1-PP.Tag1-R1.Tag1-R2.Tag1-

R3.Tag1-S1.Tag1-S3.Tag1-Mid.Tag1-Gap1,train.pp.df,family="binomial")

E.mini.s2.train.probs <- predict(E.mini.s2.glm,type="response")

E.mini.s2.test.probs <- predict(E.mini.s2.glm,newdata=test.pp.df,type="response")

## S3

E.mini.s3.glm <- glm(S3.Tag1~.-Down.Trend1-Up.Trend1-Hi.YHI1-Lo.YLO1-PP.Tag1-R1.Tag1-R2.Tag1-

R3.Tag1-S1.Tag1-S2.Tag1-Mid.Tag1-Gap1,train.pp.df,family="binomial")

E.mini.s3.train.probs <- predict(E.mini.s3.glm,type="response")

E.mini.s3.test.probs <- predict(E.mini.s3.glm,newdata=test.pp.df,type="response")

## PREDICTIONS

# Dates

tail(test.pp.df$Date,2)

# Hi Lo Mid

tail(E.mini.hi.test.probs,2)

tail(round(E.mini.lo.test.probs,4),2)

tail(round(E.mini.mid.test.probs,4),2)

# Close

tail(E.mini.up.test.probs,2)

tail(E.mini.down.test.probs,2)

# Gap

tail(E.mini.gap.test.probs,2)

## PP

tail(E.mini.pp.test.probs,2)

tail(E.mini.r1.test.probs,2)

tail(E.mini.r2.test.probs,2)

tail(E.mini.r3.test.probs,2)

tail(E.mini.s1.test.probs,2)

tail(E.mini.s2.test.probs,2)

tail(E.mini.s3.test.probs,2)

# Save data

E.mini.archive <- data.frame(Sys.Date(), tail(E.mini.hi.test.probs,1), tail(E.mini.lo.test.probs,1),

tail(E.mini.mid.test.probs,1), tail(E.mini.up.test.probs,1),

tail(E.mini.down.test.probs,1), tail(E.mini.pp.test.probs,1),

tail(E.mini.r1.test.probs,1), tail(E.mini.r2.test.probs,1),

tail(E.mini.r3.test.probs,1), tail(E.mini.s1.test.probs,1),

tail(E.mini.s2.test.probs,1), tail(E.mini.s3.test.probs,1))

names(E.mini.archive) <- c("Date","YHI","YLO","YMID","UP","DOWN","PP","R1","R2","R3","S1","S2","S3")

write.table(E.mini.archive, file="E\_mini\_probs.csv", append=TRUE, col.names=FALSE)

# Consolidate all the predictions

E.mini.all.probs <- data.frame(E.mini.hi.test.probs,E.mini.lo.test.probs,E.mini.mid.test.probs,

E.mini.up.test.probs,E.mini.down.test.probs,E.mini.gap.test.probs,

E.mini.pp.test.probs,E.mini.r1.test.probs,E.mini.r2.test.probs,

E.mini.r3.test.probs,E.mini.s1.test.probs,E.mini.s2.test.probs,

E.mini.s3.test.probs)

E.mini.max.probs <- colnames(E.mini.all.probs)[apply(E.mini.all.probs,1,which.max)]

E.mini.max.probs.df <- data.frame(test.pp.df$Date,E.mini.max.probs)

names(E.mini.max.probs.df) <- c("Date","PROBS")

# PROB.COL <- xts(E.mini.max.probs.df$PROBS,order.by = E.mini.max.probs.df$Date)

# names(PROB.COL) <- "PROB"

# TEST ES distance from Open

ES.test <- ES

ES.test$Op.Hi <- ES$ES.Open-lag(ES$ES.High,1)

ES.test$Op.Lo <- ES$ES.Open-lag(ES$ES.Low,1)

ES.test$Op.PP <- ES$ES.Open-lag(ES$ES.PP,1)

ES.test$Op.Close <- ES$ES.Open-lag(ES$ES.Close,1)

ES.test$Op.Mid <- ES$ES.Open-lag(ES$ES.Mid,1)

ES.test$Op.R1 <- ES$ES.Open-lag(ES$ES.R1,1)

ES.test$Op.R2 <- ES$ES.Open-lag(ES$ES.R2,1)

ES.test$Op.R3 <- ES$ES.Open-lag(ES$ES.R3,1)

ES.test$Op.S1 <- ES$ES.Open-lag(ES$ES.S1,1)

ES.test$Op.S2 <- ES$ES.Open-lag(ES$ES.S2,1)

ES.test$Op.S3 <- ES$ES.Open-lag(ES$ES.S3,1)

ES.test$Hi.YHI <- E.mini$Hi.YHI

ES.test$Lo.YLO <- E.mini$Lo.YLO

ES.test$Up.Trend <- E.mini$Up.Trend

ES.test$Down.Trend <- E.mini$Down.Trend

ES.test$Mid.Tag <- E.mini$Mid.Tag

ES.test$Gap.Tag <- E.mini$Gap

ES.test$PP.Tag <- E.mini$PP.Tag

ES.test$R1.Tag <- E.mini$R1.Tag

ES.test$R2.Tag <- E.mini$R2.Tag

ES.test$R3.Tag <- E.mini$R3.Tag

ES.test$S1.Tag <- E.mini$S1.Tag

ES.test$S2.Tag <- E.mini$S2.Tag

ES.test$S3.Tag <- E.mini$S3.Tag

ES.test <- window(ES.test, start=head(test.pp.df$Date,1))

ES.test.df <- data.frame(Date=index(ES.test), coredata(ES.test))

ES.test.df <- merge(ES.test.df, E.mini.max.probs.df)

write.table(ES.test.df,file="ES\_test\_df.csv", append=TRUE, col.names=FALSE)

# TEST

table(test.pp.df$Hi.YHI, E.mini.hi.test.probs>.50)

table(test.pp.df$Lo.YLO, E.mini.lo.test.probs>.50)

table(test.pp.df$Mid.Tag, E.mini.mid.test.probs>.50)

table(test.pp.df$Up.Trend, E.mini.up.test.probs>.50)

table(test.pp.df$Down.Trend, E.mini.down.test.probs>.50)

table(test.pp.df$PP.Tag, E.mini.pp.test.probs>.50)

table(test.pp.df$Gap, E.mini.gap.test.probs>.50)