##

## ── Running yfR for 1 stocks | 2019-01-01 --> 2024-03-20 (1905 days) ──

##

## ℹ Downloading data for benchmark ticker ^GSPC

## ℹ (1/1) Fetching data for ^BVSP

## ✔ - found cache file (2019-01-02 --> 2024-03-19)

## ✔ - got 1295 valid rows (2019-01-02 --> 2024-03-19)

## ✔ - got 96% of valid prices -- Good stuff!

## ℹ Binding price data

##

## ── Diagnostics ────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────

## ✔ Returned dataframe with 1295 rows -- Time for some tea?

## ℹ Using 1.9 MB at C:\Users\James\AppData\Local\Temp\RtmpEbAYOq/yf\_cache for 14 cache files

## ℹ Out of 1 requested tickers, you got 1 (100%)

## [1] "2019-01-02" "2024-03-19"

##

## ── Running yfR for 1 stocks | 2019-01-01 --> 2024-03-20 (1905 days) ──

##

## ℹ Downloading data for benchmark ticker ^GSPC

## ℹ (1/1) Fetching data for ^FTAS

## ✔ - found cache file (2019-01-02 --> 2024-03-19)

## ✔ - got 1317 valid rows (2019-01-02 --> 2024-03-19)

## ✔ - got 98% of valid prices -- Good job !

## ℹ Binding price data

##

## ── Diagnostics ────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────

## ✔ Returned dataframe with 1317 rows -- Looking good!

## ℹ Using 1.9 MB at C:\Users\James\AppData\Local\Temp\RtmpEbAYOq/yf\_cache for 14 cache files

## ℹ Out of 1 requested tickers, you got 1 (100%)

## [1] "2019-01-02" "2024-03-19"

## [1] "2019-01-02" "2024-03-19"

## # A tibble: 6 × 8  
## date open close high low price logvolume return  
## <date> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>  
## 1 2019-01-02 3675. 3681. 3689. 3610. 3681. 18.3 NA   
## 2 2019-01-03 3681. 3658. 3689. 3656. 3658. 18.4 -0.00648  
## 3 2019-01-04 3658. 3734. 3739. 3658. 3734. 18.4 0.0208   
## 4 2019-01-07 3734. 3729. 3753. 3713. 3729. 18.5 -0.00129  
## 5 2019-01-08 3729. 3759. 3779. 3726. 3759. 18.5 0.00809  
## 6 2019-01-09 3759. 3787. 3802. 3759. 3787. 18.7 0.00759

## [1] "2019-01-02" "2024-03-19"

##

## ── Running yfR for 1 stocks | 2019-01-01 --> 2024-03-20 (1905 days) ──

##

## ℹ Downloading data for benchmark ticker ^GSPC

## ℹ (1/1) Fetching data for CL=F

## ✔ - found cache file (2019-01-02 --> 2024-03-19)

## ✔ - got 1313 valid rows (2019-01-02 --> 2024-03-19)

## ✔ - got 100% of valid prices -- Well done !

## ℹ Binding price data

##

## ── Diagnostics ────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────

## ✔ Returned dataframe with 1313 rows -- Time for some tea?

## ℹ Using 1.9 MB at C:\Users\James\AppData\Local\Temp\RtmpEbAYOq/yf\_cache for 14 cache files

## ℹ Out of 1 requested tickers, you got 1 (100%)

##

## ── Running yfR for 1 stocks | 2019-01-01 --> 2024-03-20 (1905 days) ──

##

## ℹ Downloading data for benchmark ticker ^GSPC

## ℹ (1/1) Fetching data for GBPUSD=X

## ✔ - found cache file (2019-01-01 --> 2024-03-20)

## ✔ - got 1361 valid rows (2019-01-01 --> 2024-03-20)

## ✔ - got 89% of valid prices -- Got it!

## ℹ Binding price data

##

## ── Diagnostics ────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────

## ✔ Returned dataframe with 1361 rows -- Nice!

## ℹ Using 1.9 MB at C:\Users\James\AppData\Local\Temp\RtmpEbAYOq/yf\_cache for 14 cache files

## ℹ Out of 1 requested tickers, you got 1 (100%)

##

## ── Running yfR for 1 stocks | 2019-01-01 --> 2024-03-20 (1905 days) ──

##

## ℹ Downloading data for benchmark ticker ^GSPC

## ℹ (1/1) Fetching data for GBPEUR=X

## ✔ - found cache file (2019-01-01 --> 2024-03-20)

## ✔ - got 1362 valid rows (2019-01-01 --> 2024-03-20)

## ✔ - got 89% of valid prices -- All OK!

## ℹ Binding price data

##

## ── Diagnostics ────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────

## ✔ Returned dataframe with 1362 rows -- Time for some tea?

## ℹ Using 1.9 MB at C:\Users\James\AppData\Local\Temp\RtmpEbAYOq/yf\_cache for 14 cache files

## ℹ Out of 1 requested tickers, you got 1 (100%)

##

## ── Running yfR for 1 stocks | 2019-01-01 --> 2024-03-20 (1905 days) ──

##

## ℹ Downloading data for benchmark ticker ^GSPC

## ℹ (1/1) Fetching data for BRLUSD=X

## ✔ - found cache file (2019-01-01 --> 2024-03-20)

## ✔ - got 1361 valid rows (2019-01-01 --> 2024-03-20)

## ✔ - got 89% of valid prices -- Got it!

## ℹ Binding price data

##

## ── Diagnostics ────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────

## ✔ Returned dataframe with 1361 rows -- Looking good!

## ℹ Using 1.9 MB at C:\Users\James\AppData\Local\Temp\RtmpEbAYOq/yf\_cache for 14 cache files

## ℹ Out of 1 requested tickers, you got 1 (100%)

##

## ── Running yfR for 1 stocks | 2019-01-01 --> 2024-03-20 (1905 days) ──

##

## ℹ Downloading data for benchmark ticker ^GSPC

## ℹ (1/1) Fetching data for BRLEUR=X

## ✔ - found cache file (2019-01-01 --> 2024-03-20)

## ✔ - got 1362 valid rows (2019-01-01 --> 2024-03-20)

## ✔ - got 89% of valid prices -- You got it !

## ℹ Binding price data

##

## ── Diagnostics ────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────

## ✔ Returned dataframe with 1362 rows -- Good job !

## ℹ Using 1.9 MB at C:\Users\James\AppData\Local\Temp\RtmpEbAYOq/yf\_cache for 14 cache files

## ℹ Out of 1 requested tickers, you got 1 (100%)

## Rows: 1728 Columns: 6  
## ── Column specification ───────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────  
## Delimiter: ","  
## chr (2): Date, Change %  
## dbl (4): Price, Open, High, Low  
##   
## ℹ Use `spec()` to retrieve the full column specification for this data.  
## ℹ Specify the column types or set `show\_col\_types = FALSE` to quiet this message.  
## Rows: 1324 Columns: 6  
## ── Column specification ───────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────  
## Delimiter: ","  
## chr (2): Date, Change %  
## dbl (2): Price, Low  
## num (2): Open, High  
##   
## ℹ Use `spec()` to retrieve the full column specification for this data.  
## ℹ Specify the column types or set `show\_col\_types = FALSE` to quiet this message.  
##   
##   
## ── Running yfR for 1 stocks | 2019-01-01 --> 2024-03-20 (1905 days) ──  
##   
##   
##   
## ℹ Downloading data for benchmark ticker ^GSPC  
##   
## ℹ (1/1) Fetching data for ZC=F  
##   
## ✔ - found cache file (2019-01-02 --> 2024-03-19)  
##   
## ✔ - got 1312 valid rows (2019-01-02 --> 2024-03-19)  
##   
## ✔ - got 100% of valid prices -- Time for some tea?  
##   
## ℹ Binding price data  
##   
##   
##   
## ── Diagnostics ────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────  
##   
## ✔ Returned dataframe with 1312 rows -- All OK!  
##   
## ℹ Using 1.9 MB at C:\Users\James\AppData\Local\Temp\RtmpEbAYOq/yf\_cache for 14 cache files  
##   
## ℹ Out of 1 requested tickers, you got 1 (100%)  
##   
##   
##   
## ── Running yfR for 1 stocks | 2019-01-01 --> 2024-03-20 (1905 days) ──  
##   
##   
##   
## ℹ Downloading data for benchmark ticker ^GSPC  
##   
## ℹ (1/1) Fetching data for SB=F  
##   
## ✔ - found cache file (2019-01-02 --> 2024-03-19)  
##   
## ✔ - got 1313 valid rows (2019-01-02 --> 2024-03-19)  
##   
## ✔ - got 100% of valid prices -- Good job !  
##   
## ℹ Binding price data  
##   
##   
##   
## ── Diagnostics ────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────  
##   
## ✔ Returned dataframe with 1313 rows -- Time for some tea?  
##   
## ℹ Using 1.9 MB at C:\Users\James\AppData\Local\Temp\RtmpEbAYOq/yf\_cache for 14 cache files  
##   
## ℹ Out of 1 requested tickers, you got 1 (100%)  
##   
##   
##   
## ── Running yfR for 1 stocks | 2019-01-01 --> 2024-03-20 (1905 days) ──  
##   
##   
##   
## ℹ Downloading data for benchmark ticker ^GSPC  
##   
## ℹ (1/1) Fetching data for GC=F  
##   
## ✔ - found cache file (2019-01-02 --> 2024-03-19)  
##   
## ✔ - got 1313 valid rows (2019-01-02 --> 2024-03-19)  
##   
## ✔ - got 100% of valid prices -- You got it !  
##   
## ℹ Binding price data  
##   
##   
##   
## ── Diagnostics ────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────  
##   
## ✔ Returned dataframe with 1313 rows -- Mais faceiro que guri de bombacha nova!  
##   
## ℹ Using 1.9 MB at C:\Users\James\AppData\Local\Temp\RtmpEbAYOq/yf\_cache for 14 cache files  
##   
## ℹ Out of 1 requested tickers, you got 1 (100%)  
##   
##   
##   
## ── Running yfR for 1 stocks | 2019-01-01 --> 2024-03-20 (1905 days) ──  
##   
##   
##   
## ℹ Downloading data for benchmark ticker ^GSPC  
##   
## ℹ (1/1) Fetching data for EWZ  
##   
## ✔ - found cache file (2019-01-02 --> 2024-03-19)  
##   
## ✔ - got 1312 valid rows (2019-01-02 --> 2024-03-19)  
##   
## ✔ - got 100% of valid prices -- Got it!  
##   
## ℹ Binding price data  
##   
##   
##   
## ── Diagnostics ────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────  
##   
## ✔ Returned dataframe with 1312 rows -- Time for some tea?  
##   
## ℹ Using 1.9 MB at C:\Users\James\AppData\Local\Temp\RtmpEbAYOq/yf\_cache for 14 cache files  
##   
## ℹ Out of 1 requested tickers, you got 1 (100%)  
##   
##   
##   
## ── Running yfR for 1 stocks | 2019-01-01 --> 2024-03-20 (1905 days) ──  
##   
##   
##   
## ℹ Downloading data for benchmark ticker ^GSPC  
##   
## ℹ (1/1) Fetching data for ^STOXX  
##   
## ✔ - found cache file (2019-01-03 --> 2024-03-19)  
##   
## ✔ - got 1315 valid rows (2019-01-03 --> 2024-03-19)  
##   
## ✔ - got 98% of valid prices -- Looking good!  
##   
## ℹ Binding price data  
##   
##   
##   
## ── Diagnostics ────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────  
##   
## ✔ Returned dataframe with 1315 rows -- All OK!  
##   
## ℹ Using 1.9 MB at C:\Users\James\AppData\Local\Temp\RtmpEbAYOq/yf\_cache for 14 cache files  
##   
## ℹ Out of 1 requested tickers, you got 1 (100%)  
##   
## Rows: 6856 Columns: 8  
## ── Column specification ───────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────  
## Delimiter: ","  
## chr (3): Date, DateasText, date  
## dbl (5): eu\_price, nz\_price, kor\_price, uk\_price, t  
##   
## ℹ Use `spec()` to retrieve the full column specification for this data.  
## ℹ Specify the column types or set `show\_col\_types = FALSE` to quiet this message.  
##   
##   
## ── Running yfR for 1 stocks | 2019-01-01 --> 2024-03-20 (1905 days) ──  
##   
##   
##   
## ℹ Downloading data for benchmark ticker ^GSPC  
##   
## ℹ (1/1) Fetching data for NG=F  
##   
## ✔ - found cache file (2019-01-02 --> 2024-03-19)  
##   
## ✔ - got 1313 valid rows (2019-01-02 --> 2024-03-19)  
##   
## ✔ - got 100% of valid prices -- Well done !  
##   
## ℹ Binding price data  
##   
##   
##   
## ── Diagnostics ────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────  
##   
## ✔ Returned dataframe with 1313 rows -- Good job !  
##   
## ℹ Using 1.9 MB at C:\Users\James\AppData\Local\Temp\RtmpEbAYOq/yf\_cache for 14 cache files  
##   
## ℹ Out of 1 requested tickers, you got 1 (100%)  
##   
## Rows: 1900 Columns: 3  
## ── Column specification ───────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────  
## Delimiter: ","  
## chr (1): date  
## dbl (2): brazil\_temp, uk\_temp  
##   
## ℹ Use `spec()` to retrieve the full column specification for this data.  
## ℹ Specify the column types or set `show\_col\_types = FALSE` to quiet this message.  
## Rows: 1900 Columns: 3  
## ── Column specification ───────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────────  
## Delimiter: ","  
## chr (1): date  
## dbl (2): brazil\_temp, uk\_temp  
##   
## ℹ Use `spec()` to retrieve the full column specification for this data.  
## ℹ Specify the column types or set `show\_col\_types = FALSE` to quiet this message.

## Rows: 2,379  
## Columns: 112  
## $ date <date> 2019-01-02, 2019-01-03, 2019-01-04, 2019-01-…  
## $ open <dbl> 3675.06, 3681.37, 3657.52, 3733.55, 3728.73, …  
## $ close <dbl> 3681.37, 3657.52, 3733.55, 3728.73, 3758.89, …  
## $ high <dbl> 3688.57, 3689.13, 3739.32, 3753.23, 3779.39, …  
## $ low <dbl> 3609.69, 3656.10, 3657.52, 3712.58, 3726.45, …  
## $ price <dbl> 3681.37, 3657.52, 3733.55, 3728.73, 3758.89, …  
## $ logvolume <dbl> 18.34389, 18.43566, 18.41227, 18.51120, 18.54…  
## $ return <dbl> NA, -6.478593e-03, 2.078732e-02, -1.291015e-0…  
## $ direction <fct> NA, DOWN, UP, DOWN, UP, UP, UP, DOWN, DOWN, U…  
## $ direction.1 <fct> DOWN, UP, DOWN, UP, UP, UP, DOWN, DOWN, UP, D…  
## $ intraday <dbl> 1.715522e-03, -6.499670e-03, 2.057421e-02, -1…  
## $ dirintra <fct> SMALL\_UP, SMALL\_DOWN, LARGE\_UP, SMALL\_DOWN, L…  
## $ direction.2 <fct> SMALL\_DOWN, LARGE\_UP, SMALL\_DOWN, LARGE\_UP, L…  
## $ DVI2 <dbl[,3]> <matrix[26 x 3]>  
## $ DVI7 <dbl[,3]> <matrix[26 x 3]>  
## $ DVI14 <dbl[,3]> <matrix[26 x 3]>  
## $ DVI21 <dbl[,3]> <matrix[26 x 3]>  
## $ UltOsc <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N…  
## $ TRIX2 <dbl[,2]> <matrix[26 x 2]>  
## $ TRIX5 <dbl[,2]> <matrix[26 x 2]>  
## $ TRIX10 <dbl[,2]> <matrix[26 x 2]>  
## $ runSum <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, 37495…  
## $ runMin <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, 3657.…  
## $ runMax <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, 3804.…  
## $ runMedian <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, 3761.455,…  
## $ runVar <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, 2430.…  
## $ runSD <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, 49.29…  
## $ runMAD <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, 44.94…  
## $ wilderSum <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, 34123.85,…  
## $ BBands2 <dbl[,4]> <matrix[26 x 4]>  
## $ BBands5 <dbl[,4]> <matrix[26 x 4]>  
## $ BBands10 <dbl[,4]> <matrix[26 x 4]>  
## $ aroon2 <dbl[,3]> <matrix[26 x 3]>  
## $ aroon5 <dbl[,3]> <matrix[26 x 3]>  
## $ aroon10 <dbl[,3]> <matrix[26 x 3]>  
## $ WilliamsAD <dbl> NA, -31.60986, 44.42017, 19.92017, 52.36011, …  
## $ tdi10 <dbl[,2]> <matrix[26 x 2]>  
## $ tdi20 <dbl[,2]> <matrix[26 x 2]>  
## $ tdi30 <dbl[,2]> <matrix[26 x 2]>  
## $ ChaikinAD <dbl> 14.995135, -1.855456, 13.959283, 10.156805, 1…  
## $ kst <dbl[,2]> <matrix[26 x 2]>  
## $ cmo <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N…  
## $ cmf <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N…  
## $ donchianchannel20 <dbl[,3]> <matrix[26 x 3]>  
## $ donchianchannel10 <dbl[,3]> <matrix[26 x 3]>  
## $ EHcorrel <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, 0.7818181…  
## $ tr <dbl[,3]> <matrix[26 x 3]>  
## $ dx <dbl[,4]> <matrix[26 x 4]>  
## $ rsi3 <dbl> NA, NA, NA, 47.36912, 57.73733, 56.85313, 49.…  
## $ rsi5 <dbl> NA, NA, NA, NA, NA, 54.36486, 51.39830, 45.05…  
## $ rsi10 <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, 4…  
## $ rsi14 <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N…  
## $ cci3 <dbl> NA, NA, 100.00000, 80.12391, 100.00000, 1…  
## $ cci5 <dbl> NA, NA, NA, NA, 101.663851, 109.716506, 9…  
## $ clv <dbl> 0.81744575, -0.91402173, 0.85892381, -0.2…  
## $ GMMA <dbl[,12]> <matrix[26 x 12]>  
## $ sar <dbl[,1]> <matrix[26 x 1]>  
## $ snr <dbl> NA, NA, NA, NA, NA, 2.10997264, 3.0259056…  
## $ macd <dbl[,2]> <matrix[26 x 2]>  
## $ vhf <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N…  
## $ zigzag <dbl> 3649.130, 3651.462, 3653.794, 3656.127, 3…  
## $ pbands <dbl[,3]> <matrix[26 x 3]>  
## $ lag <dbl> NA, 3681.37, 3657.52, 3733.55, 3728.73, 3…  
## $ chvol <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, -0.31…  
## $ sma2 <dbl> NA, 3669.445, 3695.535, 3731.140, 3743.810, 3…  
## $ disparityfive <dbl> NA, -3.249824e-05, 1.028674e-04, -6.45924…  
## $ OBV <dbl> 18.343890408, -0.091766629, 18.320504856, -0.…  
## $ MFI <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N…  
## $ sma5 <dbl> NA, NA, NA, NA, 3712.012, 3733.224, 3762.…  
## $ sma10 <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, 3749.…  
## $ sma20 <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N…  
## $ volsma2 <dbl> NA, 18.38977, 18.42396, 18.46174, 18.5281…  
## $ volsma5 <dbl> NA, NA, NA, NA, 18.44963, 18.51142, 18.51…  
## $ volsma10 <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N…  
## $ ema2 <dbl> NA, 3669.445, 3712.182, 3723.214, 3746.998, 3…  
## $ ema7 <dbl> NA, NA, NA, NA, NA, NA, 3735.984, 3751.271, 3…  
## $ ema14 <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N…  
## $ ema21 <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N…  
## $ EMV <dbl[,2]> <matrix[26 x 2]>  
## $ WPR <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N…  
## $ keltnerChannels <dbl[,3]> <matrix[26 x 3]>  
## $ runPercentRank <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N…  
## $ stoch\_k <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, …  
## $ stoch\_d <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N…  
## $ volatility <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N…  
## $ ROC <dbl> NA, -6.499670e-03, 2.057421e-02, -1.29184…  
## $ M2 <dbl> NA, NA, 52.179932, 71.209961, 25.339844, 58.6…  
## $ M7 <dbl> NA, NA, NA, NA, NA, NA, NA, 115.7597656, 106.…  
## $ M14 <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N…  
## $ M21 <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N…  
## $ brookman <dbl> 1.934898e-03, -7.319768e-03, 2.362181e-02, -1…  
## $ corn\_price <dbl> 375.75, 379.75, 383.00, 382.25, 380.00, 382.0…  
## $ sugar\_price <dbl> 11.93, 11.69, 11.93, 12.65, 12.76, 12.87, 12.…  
## $ gold\_price <dbl> 1281.0, 1291.8, 1282.7, 1286.8, 1283.2, 1289.…  
## $ UK.EPU <dbl> 261.75, 260.50, 202.67, 222.88, 353.46, 184.2…  
## $ World.EPU <dbl> 263.3797, 263.3797, 263.3797, 263.3797, 263.3…  
## $ Geopolitcial.uncertainty <dbl> 87.42410, 87.42410, 87.42410, 87.42410, 87.42…  
## $ oil\_price <dbl> 46.54, 47.09, 47.96, 48.52, 49.78, 52.36, 52.…  
## $ GBPUSD <dbl> 1.275429, 1.252191, 1.262881, 1.273496, 1.278…  
## $ GBPEUR <dbl> 1.11264, 1.10570, 1.10851, 1.11593, 1.11362, …  
## $ BRLUSD <dbl> 0.2577386, 0.2641101, 0.2663045, 0.2731345, 0…  
## $ BRLEUR <dbl> 0.22300, 0.23292, 0.23360, 0.23610, 0.23300, …  
## $ uk\_bond <dbl> 0.747, 0.722, 0.766, 0.813, 0.773, 0.762, 0.7…  
## $ brazil\_bond <dbl> 6.480, 6.525, 6.550, 6.615, 6.600, 6.585, 6.6…  
## $ brazil\_neighbour <dbl> 40.64, 40.90, 41.82, 41.40, 41.90, 42.96, 42.…  
## $ uk\_neighbour <dbl> NA, 333.92, 343.38, 342.88, 345.85, 347.7…  
## $ eu\_carbon\_price <dbl> 25.02, 23.04, 23.49, 22.07, 22.65, 21.86, 21.…  
## $ nz\_carbon\_price <dbl> NA, 14.90948, 14.90948, 14.87981, 14.8501…  
## $ kor\_carbon\_price <dbl> 19.52208, 19.52208, 19.52208, 19.52208, 19.52…  
## $ `NGAS price` <dbl> 2.958, 2.945, 3.044, 2.944, 2.967, 2.984, 2.9…  
## $ brazil\_temp <dbl> 83, 87, 88, 87, 88, 86, 85, 85, 85, 86, 85, 8…  
## $ uk\_temp <dbl> 41, 40, 37, 47, 44, 40, 39, 43, 44, 42, 44, 3…

## Rows: 2,300  
## Columns: 112  
## $ date <date> 2019-01-02, 2019-01-03, 2019-01-04, 2019-01-…  
## $ open <dbl> 87887, 91011, 91577, 91845, 91699, 92033, 935…  
## $ close <dbl> 91012, 91564, 91841, 91699, 92032, 93613, 938…  
## $ high <dbl> 91479, 91596, 92701, 92552, 92231, 93626, 939…  
## $ low <dbl> 87536, 89922, 90824, 91288, 91064, 92028, 930…  
## $ price <dbl> 91012, 91564, 91841, 91699, 92032, 93613, 938…  
## $ logvolume <dbl> 15.54102, 15.61824, 15.48738, 15.33393, 15.31…  
## $ return <dbl> NA, 0.0060651343, 0.0030252064, -0.0015461504…  
## $ direction <fct> NA, UP, UP, DOWN, UP, UP, UP, DOWN, UP, DOWN,…  
## $ direction.1 <fct> UP, UP, DOWN, UP, UP, UP, DOWN, UP, DOWN, UP,…  
## $ intraday <dbl> 0.0349394675, 0.0060578030, 0.0028786726, -0.…  
## $ dirintra <fct> LARGE\_UP, SMALL\_UP, SMALL\_UP, SMALL\_DOWN, SMA…  
## $ direction.2 <fct> SMALL\_UP, SMALL\_UP, SMALL\_DOWN, SMALL\_UP, LAR…  
## $ DVI2 <dbl[,3]> <matrix[26 x 3]>  
## $ DVI7 <dbl[,3]> <matrix[26 x 3]>  
## $ DVI14 <dbl[,3]> <matrix[26 x 3]>  
## $ DVI21 <dbl[,3]> <matrix[26 x 3]>  
## $ UltOsc <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N…  
## $ TRIX2 <dbl[,2]> <matrix[26 x 2]>  
## $ TRIX5 <dbl[,2]> <matrix[26 x 2]>  
## $ TRIX10 <dbl[,2]> <matrix[26 x 2]>  
## $ runSum <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, 92775…  
## $ runMin <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, 91012…  
## $ runMax <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, 94474…  
## $ runMedian <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, 92822.5, …  
## $ runVar <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, 15810…  
## $ runSD <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, 1257.…  
## $ runMAD <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, 1561.…  
## $ wilderSum <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, 844385.1,…  
## $ BBands2 <dbl[,4]> <matrix[26 x 4]>  
## $ BBands5 <dbl[,4]> <matrix[26 x 4]>  
## $ BBands10 <dbl[,4]> <matrix[26 x 4]>  
## $ aroon2 <dbl[,3]> <matrix[26 x 3]>  
## $ aroon5 <dbl[,3]> <matrix[26 x 3]>  
## $ aroon10 <dbl[,3]> <matrix[26 x 3]>  
## $ WilliamsAD <dbl> NA, 1642, 2659, 1806, 2774, 4359, 5115, 4812,…  
## $ tdi10 <dbl[,2]> <matrix[26 x 2]>  
## $ tdi20 <dbl[,2]> <matrix[26 x 2]>  
## $ tdi30 <dbl[,2]> <matrix[26 x 2]>  
## $ ChaikinAD <dbl> 11.85974, 26.88087, 28.17629, 22.81427, 32.90…  
## $ kst <dbl[,2]> <matrix[26 x 2]>  
## $ cmo <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N…  
## $ cmf <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N…  
## $ donchianchannel20 <dbl[,3]> <matrix[26 x 3]>  
## $ donchianchannel10 <dbl[,3]> <matrix[26 x 3]>  
## $ EHcorrel <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, 0.9636364…  
## $ tr <dbl[,3]> <matrix[26 x 3]>  
## $ dx <dbl[,4]> <matrix[26 x 4]>  
## $ rsi3 <dbl> NA, NA, NA, 0.00000, 17.63911, 50.96443, 30.4…  
## $ rsi5 <dbl> NA, NA, NA, NA, NA, 33.75378, 25.26892, 23.38…  
## $ rsi10 <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, 3…  
## $ rsi14 <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N…  
## $ cci3 <dbl> NA, NA, 90.81487, 55.47353, -65.19481, 10…  
## $ cci5 <dbl> NA, NA, NA, NA, 52.5421043, 166.6666667, …  
## $ clv <dbl> 0.763124524, 0.961768220, 0.083644113, -0…  
## $ GMMA <dbl[,12]> <matrix[26 x 12]>  
## $ sar <dbl[,1]> <matrix[26 x 1]>  
## $ snr <dbl> NA, NA, NA, NA, NA, 1.71569921, 1.6011998…  
## $ macd <dbl[,2]> <matrix[26 x 2]>  
## $ vhf <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N…  
## $ zigzag <dbl> 89507.50, 89726.13, 89944.76, 90163.39, 9…  
## $ pbands <dbl[,3]> <matrix[26 x 3]>  
## $ lag <dbl> NA, 91012, 91564, 91841, 91699, 92032, 93…  
## $ chvol <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, -0.37…  
## $ sma2 <dbl> NA, 91288.0, 91702.5, 91770.0, 91865.5, 92822…  
## $ disparityfive <dbl> NA, 3.023398e-05, 1.510319e-05, -7.736733…  
## $ OBV <dbl> 15.54102, 31.15927, 46.64664, 31.31272, 46.63…  
## $ MFI <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N…  
## $ sma5 <dbl> NA, NA, NA, NA, 91629.6, 92149.8, 92598.2…  
## $ sma10 <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, 92775…  
## $ sma20 <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N…  
## $ volsma2 <dbl> NA, 15.57963, 15.55281, 15.41065, 15.3263…  
## $ volsma5 <dbl> NA, NA, NA, NA, 15.45988, 15.43712, 15.39…  
## $ volsma10 <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N…  
## $ ema2 <dbl> NA, 91288.00, 91656.67, 91684.89, 91916.30, 9…  
## $ ema7 <dbl> NA, NA, NA, NA, NA, NA, 92223.86, 92582.39, 9…  
## $ ema14 <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N…  
## $ ema21 <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N…  
## $ EMV <dbl[,2]> <matrix[26 x 2]>  
## $ WPR <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N…  
## $ keltnerChannels <dbl[,3]> <matrix[26 x 3]>  
## $ runPercentRank <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N…  
## $ stoch\_k <tibble[,1]> <tbl\_df[26 x 1]>  
## $ stoch\_d <tibble[,1]> <tbl\_df[26 x 1]>  
## $ volatility <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, …  
## $ ROC <dbl> NA, 0.0060468154, 0.0030206397, -0.001547…  
## $ M2 <dbl> NA, NA, 829, 135, 191, 1914, 1774, 45, 668, 3…  
## $ M7 <dbl> NA, NA, NA, NA, NA, NA, NA, 2646, 2910, 2…  
## $ M14 <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N…  
## $ M21 <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, NA, N…  
## $ brookman <dbl> 0.82538249, 0.14468809, 0.06838604, -0.03…  
## $ corn\_price <dbl> 375.75, 379.75, 383.00, 382.25, 380.00, 382.0…  
## $ sugar\_price <dbl> 11.93, 11.69, 11.93, 12.65, 12.76, 12.87, 12.…  
## $ gold\_price <dbl> 1281.0, 1291.8, 1282.7, 1286.8, 1283.2, 1289.…  
## $ UK.EPU <dbl> 261.75, 260.50, 202.67, 222.88, 353.46, 184.2…  
## $ World.EPU <dbl> 263.3797, 263.3797, 263.3797, 263.3797, 263.3…  
## $ Geopolitcial.uncertainty <dbl> 87.42410, 87.42410, 87.42410, 87.42410, 87.42…  
## $ oil\_price <dbl> 46.54, 47.09, 47.96, 48.52, 49.78, 52.36, 52.…  
## $ GBPUSD <dbl> 1.275429, 1.252191, 1.262881, 1.273496, 1.278…  
## $ GBPEUR <dbl> 1.11264, 1.10570, 1.10851, 1.11593, 1.11362, …  
## $ BRLUSD <dbl> 0.2577386, 0.2641101, 0.2663045, 0.2731345, 0…  
## $ BRLEUR <dbl> 0.22300, 0.23292, 0.23360, 0.23610, 0.23300, …  
## $ uk\_bond <dbl> 0.747, 0.722, 0.766, 0.813, 0.773, 0.762, 0.7…  
## $ brazil\_bond <dbl> 6.480, 6.525, 6.550, 6.615, 6.600, 6.585, 6.6…  
## $ brazil\_neighbour <dbl> 40.64, 40.90, 41.82, 41.40, 41.90, 42.96, 42.…  
## $ uk\_neighbour <dbl> NA, 333.92, 343.38, 342.88, 345.85, 347.70, 3…  
## $ eu\_carbon\_price <dbl> 25.02, 23.04, 23.49, 22.07, 22.65, 21.86, 21.…  
## $ nz\_carbon\_price <dbl> NA, 14.90948, 14.90948, 14.87981, 14.8501…  
## $ kor\_carbon\_price <dbl> 19.52208, 19.52208, 19.52208, 19.52208, 19.52…  
## $ `NGAS price` <dbl> 2.958, 2.945, 3.044, 2.944, 2.967, 2.984,…  
## $ brazil\_temp <dbl> 83, 87, 88, 87, 88, 86, 85, 85, 85, 86, 85, 8…  
## $ uk\_temp <dbl> 41, 40, 37, 47, 44, 40, 39, 43, 44, 42…

# FTSE TTR 1 step fixed window

## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## glmnet   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with a fixed window)   
## Summary of sample sizes: 146, 146, 146, 146, 146, 146, ...   
## Resampling results across tuning parameters:  
##   
## alpha lambda Accuracy Kappa  
## 0.1000000 6.526951e-05 0.2903226 0   
## 0.1000000 1.816163e-04 0.2903226 0   
## 0.1000000 5.053581e-04 0.2741935 0   
## 0.1000000 1.406189e-03 0.3225806 0   
## 0.1000000 3.912804e-03 0.3064516 0   
## 0.1000000 1.088761e-02 0.4032258 0   
## 0.1000000 3.029542e-02 0.4193548 0   
## 0.1000000 8.429882e-02 0.3870968 0   
## 0.2285714 6.526951e-05 0.2903226 0   
## 0.2285714 1.816163e-04 0.2903226 0   
## 0.2285714 5.053581e-04 0.2741935 0   
## 0.2285714 1.406189e-03 0.3225806 0   
## 0.2285714 3.912804e-03 0.3225806 0   
## 0.2285714 1.088761e-02 0.4032258 0   
## 0.2285714 3.029542e-02 0.4032258 0   
## 0.2285714 8.429882e-02 0.3709677 0   
## 0.3571429 6.526951e-05 0.2903226 0   
## 0.3571429 1.816163e-04 0.2903226 0   
## 0.3571429 5.053581e-04 0.2741935 0   
## 0.3571429 1.406189e-03 0.3387097 0   
## 0.3571429 3.912804e-03 0.3225806 0   
## 0.3571429 1.088761e-02 0.3709677 0   
## 0.3571429 3.029542e-02 0.3709677 0   
## 0.3571429 8.429882e-02 0.4032258 0   
## 0.4857143 6.526951e-05 0.2903226 0   
## 0.4857143 1.816163e-04 0.2903226 0   
## 0.4857143 5.053581e-04 0.2903226 0   
## 0.4857143 1.406189e-03 0.3548387 0   
## 0.4857143 3.912804e-03 0.3387097 0   
## 0.4857143 1.088761e-02 0.3709677 0   
## 0.4857143 3.029542e-02 0.3870968 0   
## 0.4857143 8.429882e-02 0.4193548 0   
## 0.6142857 6.526951e-05 0.2903226 0   
## 0.6142857 1.816163e-04 0.2903226 0   
## 0.6142857 5.053581e-04 0.2903226 0   
## 0.6142857 1.406189e-03 0.3548387 0   
## 0.6142857 3.912804e-03 0.3387097 0   
## 0.6142857 1.088761e-02 0.3709677 0   
## 0.6142857 3.029542e-02 0.3870968 0   
## 0.6142857 8.429882e-02 0.4354839 0   
## 0.7428571 6.526951e-05 0.2741935 0   
## 0.7428571 1.816163e-04 0.2903226 0   
## 0.7428571 5.053581e-04 0.2903226 0   
## 0.7428571 1.406189e-03 0.3387097 0   
## 0.7428571 3.912804e-03 0.3548387 0   
## 0.7428571 1.088761e-02 0.3709677 0   
## 0.7428571 3.029542e-02 0.3870968 0   
## 0.7428571 8.429882e-02 0.4354839 0   
## 0.8714286 6.526951e-05 0.3064516 0   
## 0.8714286 1.816163e-04 0.3387097 0   
## 0.8714286 5.053581e-04 0.3064516 0   
## 0.8714286 1.406189e-03 0.3064516 0   
## 0.8714286 3.912804e-03 0.3709677 0   
## 0.8714286 1.088761e-02 0.3709677 0   
## 0.8714286 3.029542e-02 0.3870968 0   
## 0.8714286 8.429882e-02 0.4193548 0   
## 1.0000000 6.526951e-05 0.3709677 0   
## 1.0000000 1.816163e-04 0.3225806 0   
## 1.0000000 5.053581e-04 0.3225806 0   
## 1.0000000 1.406189e-03 0.2903226 0   
## 1.0000000 3.912804e-03 0.3709677 0   
## 1.0000000 1.088761e-02 0.4032258 0   
## 1.0000000 3.029542e-02 0.3870968 0   
## 1.0000000 8.429882e-02 0.4193548 0   
##   
## Kappa was used to select the optimal model using the largest value.  
## The final values used for the model were alpha = 0.1 and lambda = 0.08429882.

## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## Bagged CART   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with a fixed window)   
## Summary of sample sizes: 146, 146, 146, 146, 146, 146, ...   
## Resampling results:  
##   
## Accuracy Kappa  
## 0.3387097 0

## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## Support Vector Machines with Linear Kernel   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with a fixed window)   
## Summary of sample sizes: 146, 146, 146, 146, 146, 146, ...   
## Resampling results:  
##   
## Accuracy Kappa  
## 0.2580645 0   
##   
## Tuning parameter 'C' was held constant at a value of 1

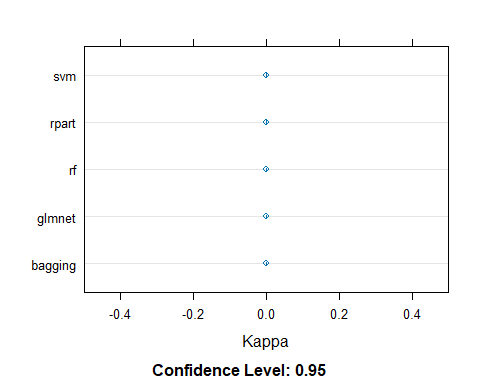
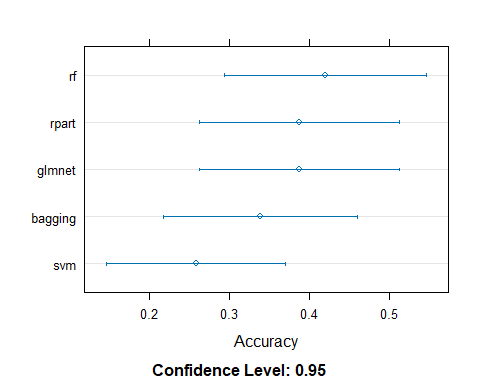
## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## CART   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with a fixed window)   
## Summary of sample sizes: 146, 146, 146, 146, 146, 146, ...   
## Resampling results across tuning parameters:  
##   
## cp Accuracy Kappa  
## 0.00000000 0.3709677 0   
## 0.01428571 0.3548387 0   
## 0.02857143 0.3548387 0   
## 0.04285714 0.3548387 0   
## 0.05714286 0.3870968 0   
## 0.07142857 0.3709677 0   
## 0.08571429 0.3709677 0   
## 0.10000000 0.3870968 0   
##   
## Kappa was used to select the optimal model using the largest value.  
## The final value used for the model was cp = 0.1.

## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## Random Forest   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with a fixed window)   
## Summary of sample sizes: 146, 146, 146, 146, 146, 146, ...   
## Resampling results across tuning parameters:  
##   
## mtry Accuracy Kappa  
## 2 0.4193548 0   
## 22 0.3870968 0   
## 42 0.4032258 0   
## 63 0.4193548 0   
## 83 0.4193548 0   
## 104 0.4032258 0   
## 124 0.4032258 0   
## 145 0.4354839 0   
##   
## Kappa was used to select the optimal model using the largest value.  
## The final value used for the model was mtry = 2.

##   
## Call:  
## summary.resamples(object = resamps)  
##   
## Models: glmnet, rpart, rf, bagging, svm   
## Number of resamples: 62   
##   
## Accuracy   
## Min. 1st Qu. Median Mean 3rd Qu. Max. NA's  
## glmnet 0 0 0 0.3870968 1.00 1 0  
## rpart 0 0 0 0.3870968 1.00 1 0  
## rf 0 0 0 0.4193548 1.00 1 0  
## bagging 0 0 0 0.3387097 1.00 1 0  
## svm 0 0 0 0.2580645 0.75 1 0  
##   
## Kappa   
## Min. 1st Qu. Median Mean 3rd Qu. Max. NA's  
## glmnet 0 0 0 0 0 0 24  
## rpart 0 0 0 0 0 0 24  
## rf 0 0 0 0 0 0 26  
## bagging 0 0 0 0 0 0 21  
## svm 0 0 0 0 0 0 16



## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## glmnet   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with a fixed window)   
## Summary of sample sizes: 146, 146, 146, 146, 146, 146, ...   
## Resampling results across tuning parameters:  
##   
## alpha lambda Accuracy Kappa  
## 0.1000000 6.526951e-05 0.2903226 0   
## 0.1000000 1.816163e-04 0.2903226 0   
## 0.1000000 5.053581e-04 0.2741935 0   
## 0.1000000 1.406189e-03 0.3225806 0   
## 0.1000000 3.912804e-03 0.3064516 0   
## 0.1000000 1.088761e-02 0.4032258 0   
## 0.1000000 3.029542e-02 0.4193548 0   
## 0.1000000 8.429882e-02 0.3870968 0   
## 0.2285714 6.526951e-05 0.2903226 0   
## 0.2285714 1.816163e-04 0.2903226 0   
## 0.2285714 5.053581e-04 0.2741935 0   
## 0.2285714 1.406189e-03 0.3225806 0   
## 0.2285714 3.912804e-03 0.3225806 0   
## 0.2285714 1.088761e-02 0.4032258 0   
## 0.2285714 3.029542e-02 0.4032258 0   
## 0.2285714 8.429882e-02 0.3709677 0   
## 0.3571429 6.526951e-05 0.2903226 0   
## 0.3571429 1.816163e-04 0.2903226 0   
## 0.3571429 5.053581e-04 0.2741935 0   
## 0.3571429 1.406189e-03 0.3387097 0   
## 0.3571429 3.912804e-03 0.3225806 0   
## 0.3571429 1.088761e-02 0.3709677 0   
## 0.3571429 3.029542e-02 0.3709677 0   
## 0.3571429 8.429882e-02 0.4032258 0   
## 0.4857143 6.526951e-05 0.2903226 0   
## 0.4857143 1.816163e-04 0.2903226 0   
## 0.4857143 5.053581e-04 0.2903226 0   
## 0.4857143 1.406189e-03 0.3548387 0   
## 0.4857143 3.912804e-03 0.3387097 0   
## 0.4857143 1.088761e-02 0.3709677 0   
## 0.4857143 3.029542e-02 0.3870968 0   
## 0.4857143 8.429882e-02 0.4193548 0   
## 0.6142857 6.526951e-05 0.2903226 0   
## 0.6142857 1.816163e-04 0.2903226 0   
## 0.6142857 5.053581e-04 0.2903226 0   
## 0.6142857 1.406189e-03 0.3548387 0   
## 0.6142857 3.912804e-03 0.3387097 0   
## 0.6142857 1.088761e-02 0.3709677 0   
## 0.6142857 3.029542e-02 0.3870968 0   
## 0.6142857 8.429882e-02 0.4354839 0   
## 0.7428571 6.526951e-05 0.2741935 0   
## 0.7428571 1.816163e-04 0.2903226 0   
## 0.7428571 5.053581e-04 0.2903226 0   
## 0.7428571 1.406189e-03 0.3387097 0   
## 0.7428571 3.912804e-03 0.3548387 0   
## 0.7428571 1.088761e-02 0.3709677 0   
## 0.7428571 3.029542e-02 0.3870968 0   
## 0.7428571 8.429882e-02 0.4354839 0   
## 0.8714286 6.526951e-05 0.3064516 0   
## 0.8714286 1.816163e-04 0.3387097 0   
## 0.8714286 5.053581e-04 0.3064516 0   
## 0.8714286 1.406189e-03 0.3064516 0   
## 0.8714286 3.912804e-03 0.3709677 0   
## 0.8714286 1.088761e-02 0.3709677 0   
## 0.8714286 3.029542e-02 0.3870968 0   
## 0.8714286 8.429882e-02 0.4193548 0   
## 1.0000000 6.526951e-05 0.3709677 0   
## 1.0000000 1.816163e-04 0.3225806 0   
## 1.0000000 5.053581e-04 0.3225806 0   
## 1.0000000 1.406189e-03 0.2903226 0   
## 1.0000000 3.912804e-03 0.3709677 0   
## 1.0000000 1.088761e-02 0.4032258 0   
## 1.0000000 3.029542e-02 0.3870968 0   
## 1.0000000 8.429882e-02 0.4193548 0   
##   
## Accuracy was used to select the optimal model using the largest value.  
## The final values used for the model were alpha = 0.6142857 and lambda  
## = 0.08429882.

## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## Bagged CART   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with a fixed window)   
## Summary of sample sizes: 146, 146, 146, 146, 146, 146, ...   
## Resampling results:  
##   
## Accuracy Kappa  
## 0.3387097 0

## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## Support Vector Machines with Linear Kernel   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with a fixed window)   
## Summary of sample sizes: 146, 146, 146, 146, 146, 146, ...   
## Resampling results:  
##   
## Accuracy Kappa  
## 0.2580645 0   
##   
## Tuning parameter 'C' was held constant at a value of 1

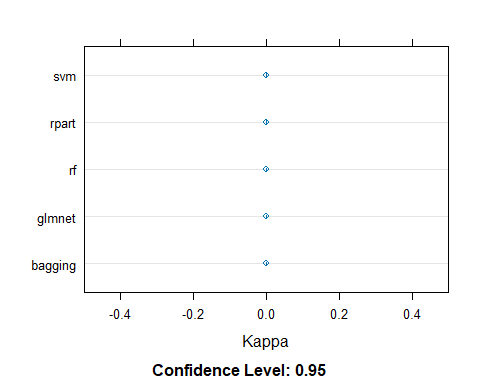
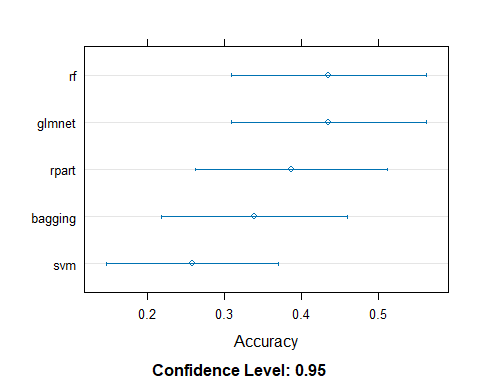
## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## CART   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with a fixed window)   
## Summary of sample sizes: 146, 146, 146, 146, 146, 146, ...   
## Resampling results across tuning parameters:  
##   
## cp Accuracy Kappa  
## 0.00000000 0.3709677 0   
## 0.01428571 0.3548387 0   
## 0.02857143 0.3548387 0   
## 0.04285714 0.3548387 0   
## 0.05714286 0.3870968 0   
## 0.07142857 0.3709677 0   
## 0.08571429 0.3709677 0   
## 0.10000000 0.3870968 0   
##   
## Accuracy was used to select the optimal model using the largest value.  
## The final value used for the model was cp = 0.1.

## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## Random Forest   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with a fixed window)   
## Summary of sample sizes: 146, 146, 146, 146, 146, 146, ...   
## Resampling results across tuning parameters:  
##   
## mtry Accuracy Kappa  
## 2 0.4193548 0   
## 22 0.3870968 0   
## 42 0.4032258 0   
## 63 0.4193548 0   
## 83 0.4193548 0   
## 104 0.4032258 0   
## 124 0.4032258 0   
## 145 0.4354839 0   
##   
## Accuracy was used to select the optimal model using the largest value.  
## The final value used for the model was mtry = 145.

##   
## Call:  
## summary.resamples(object = resamps)  
##   
## Models: glmnet, rpart, rf, bagging, svm   
## Number of resamples: 62   
##   
## Accuracy   
## Min. 1st Qu. Median Mean 3rd Qu. Max. NA's  
## glmnet 0 0 0 0.4354839 1.00 1 0  
## rpart 0 0 0 0.3870968 1.00 1 0  
## rf 0 0 0 0.4354839 1.00 1 0  
## bagging 0 0 0 0.3387097 1.00 1 0  
## svm 0 0 0 0.2580645 0.75 1 0  
##   
## Kappa   
## Min. 1st Qu. Median Mean 3rd Qu. Max. NA's  
## glmnet 0 0 0 0 0 0 27  
## rpart 0 0 0 0 0 0 24  
## rf 0 0 0 0 0 0 27  
## bagging 0 0 0 0 0 0 21  
## svm 0 0 0 0 0 0 16

 # FTSE TTR 5 step fixed window

## glmnet   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (5 held-out with a fixed window)   
## Summary of sample sizes: 146, 146, 146, 146, 146, 146, ...   
## Resampling results across tuning parameters:  
##   
## alpha lambda Accuracy Kappa   
## 0.1000000 6.526951e-05 0.2965517 0.04432955  
## 0.1000000 1.816163e-04 0.3000000 0.04795932  
## 0.1000000 5.053581e-04 0.3034483 0.04806270  
## 0.1000000 1.406189e-03 0.3517241 0.08591143  
## 0.1000000 3.912804e-03 0.3724138 0.11082303  
## 0.1000000 1.088761e-02 0.3896552 0.12692995  
## 0.1000000 3.029542e-02 0.4000000 0.14087344  
## 0.1000000 8.429882e-02 0.3551724 0.03301671  
## 0.2285714 6.526951e-05 0.2896552 0.03661630  
## 0.2285714 1.816163e-04 0.2965517 0.04553161  
## 0.2285714 5.053581e-04 0.3000000 0.04661905  
## 0.2285714 1.406189e-03 0.3551724 0.09005331  
## 0.2285714 3.912804e-03 0.3655172 0.10760708  
## 0.2285714 1.088761e-02 0.3965517 0.13526834  
## 0.2285714 3.029542e-02 0.3965517 0.11508011  
## 0.2285714 8.429882e-02 0.3586207 0.01974634  
## 0.3571429 6.526951e-05 0.2931034 0.04058456  
## 0.3571429 1.816163e-04 0.2896552 0.03772834  
## 0.3571429 5.053581e-04 0.3034483 0.05110144  
## 0.3571429 1.406189e-03 0.3413793 0.07507341  
## 0.3571429 3.912804e-03 0.3620690 0.10088330  
## 0.3571429 1.088761e-02 0.3758621 0.09025131  
## 0.3571429 3.029542e-02 0.3724138 0.07160499  
## 0.3571429 8.429882e-02 0.4103448 0.05536980  
## 0.4857143 6.526951e-05 0.2896552 0.03968276  
## 0.4857143 1.816163e-04 0.3000000 0.04953858  
## 0.4857143 5.053581e-04 0.3068966 0.05586657  
## 0.4857143 1.406189e-03 0.3413793 0.07734848  
## 0.4857143 3.912804e-03 0.3655172 0.09995737  
## 0.4857143 1.088761e-02 0.3758621 0.09083209  
## 0.4857143 3.029542e-02 0.3758621 0.05885476  
## 0.4857143 8.429882e-02 0.4241379 0.07097815  
## 0.6142857 6.526951e-05 0.2965517 0.05118200  
## 0.6142857 1.816163e-04 0.3000000 0.05113846  
## 0.6142857 5.053581e-04 0.2965517 0.04477014  
## 0.6142857 1.406189e-03 0.3448276 0.08111221  
## 0.6142857 3.912804e-03 0.3586207 0.09255311  
## 0.6142857 1.088761e-02 0.3724138 0.07770444  
## 0.6142857 3.029542e-02 0.3827586 0.03777447  
## 0.6142857 8.429882e-02 0.4413793 0.08529011  
## 0.7428571 6.526951e-05 0.2896552 0.04440388  
## 0.7428571 1.816163e-04 0.2896552 0.04331745  
## 0.7428571 5.053581e-04 0.3034483 0.05867722  
## 0.7428571 1.406189e-03 0.3310345 0.07543948  
## 0.7428571 3.912804e-03 0.3551724 0.09028169  
## 0.7428571 1.088761e-02 0.3758621 0.07263321  
## 0.7428571 3.029542e-02 0.3689655 0.01120454  
## 0.7428571 8.429882e-02 0.4413793 0.08247709  
## 0.8714286 6.526951e-05 0.2965517 0.05408643  
## 0.8714286 1.816163e-04 0.3000000 0.06016000  
## 0.8714286 5.053581e-04 0.3137931 0.07755657  
## 0.8714286 1.406189e-03 0.3310345 0.08879871  
## 0.8714286 3.912804e-03 0.3620690 0.09983260  
## 0.8714286 1.088761e-02 0.3758621 0.07214279  
## 0.8714286 3.029542e-02 0.3862069 0.03564271  
## 0.8714286 8.429882e-02 0.4379310 0.09112959  
## 1.0000000 6.526951e-05 0.3310345 0.09545119  
## 1.0000000 1.816163e-04 0.3241379 0.08732130  
## 1.0000000 5.053581e-04 0.3206897 0.08306883  
## 1.0000000 1.406189e-03 0.3068966 0.06220373  
## 1.0000000 3.912804e-03 0.3724138 0.10869152  
## 1.0000000 1.088761e-02 0.3827586 0.09318138  
## 1.0000000 3.029542e-02 0.4068966 0.06215439  
## 1.0000000 8.429882e-02 0.4241379 0.06786762  
##   
## Kappa was used to select the optimal model using the largest value.  
## The final values used for the model were alpha = 0.1 and lambda = 0.03029542.

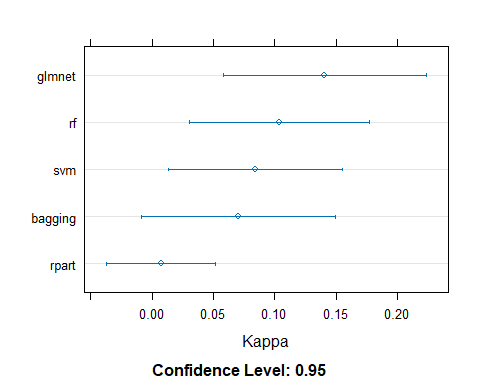
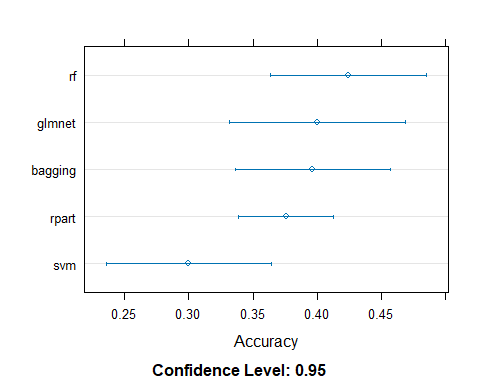
## Bagged CART   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (5 held-out with a fixed window)   
## Summary of sample sizes: 146, 146, 146, 146, 146, 146, ...   
## Resampling results:  
##   
## Accuracy Kappa   
## 0.3965517 0.0705973

## Support Vector Machines with Linear Kernel   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (5 held-out with a fixed window)   
## Summary of sample sizes: 146, 146, 146, 146, 146, 146, ...   
## Resampling results:  
##   
## Accuracy Kappa   
## 0.3 0.08422525  
##   
## Tuning parameter 'C' was held constant at a value of 1

## CART   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (5 held-out with a fixed window)   
## Summary of sample sizes: 146, 146, 146, 146, 146, 146, ...   
## Resampling results across tuning parameters:  
##   
## cp Accuracy Kappa   
## 0.00000000 0.3103448 -3.853452e-02  
## 0.01428571 0.3172414 -1.877257e-02  
## 0.02857143 0.3275862 -2.180541e-02  
## 0.04285714 0.3689655 5.554746e-06  
## 0.05714286 0.3758621 7.316238e-03  
## 0.07142857 0.3758621 2.124231e-03  
## 0.08571429 0.3793103 3.201818e-03  
## 0.10000000 0.3689655 7.852799e-04  
##   
## Kappa was used to select the optimal model using the largest value.  
## The final value used for the model was cp = 0.05714286.

## Random Forest   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (5 held-out with a fixed window)   
## Summary of sample sizes: 146, 146, 146, 146, 146, 146, ...   
## Resampling results across tuning parameters:  
##   
## mtry Accuracy Kappa   
## 2 0.3965517 0.03100272  
## 22 0.3965517 0.06434515  
## 42 0.3965517 0.07651521  
## 63 0.4103448 0.08364886  
## 83 0.4103448 0.08141489  
## 104 0.4137931 0.10027604  
## 124 0.4034483 0.08416732  
## 145 0.4241379 0.10348590  
##   
## Kappa was used to select the optimal model using the largest value.  
## The final value used for the model was mtry = 145.

##   
## Call:  
## summary.resamples(object = resamps)  
##   
## Models: glmnet, rpart, rf, bagging, svm   
## Number of resamples: 58   
##   
## Accuracy   
## Min. 1st Qu. Median Mean 3rd Qu. Max. NA's  
## glmnet 0 0.2 0.4 0.4000000 0.6 1.0 0  
## rpart 0 0.2 0.4 0.3758621 0.4 0.6 0  
## rf 0 0.2 0.4 0.4241379 0.6 0.8 0  
## bagging 0 0.2 0.4 0.3965517 0.6 1.0 0  
## svm 0 0.2 0.2 0.3000000 0.4 1.0 0  
##   
## Kappa   
## Min. 1st Qu. Median Mean 3rd Qu. Max.  
## glmnet -0.3888889 -3.469447e-17 0.00000000 0.140873438 0.23076923 1.0000000  
## rpart -0.6666667 0.000000e+00 0.00000000 0.007316238 0.05877976 0.3333333  
## rf -0.5625000 -6.938894e-17 0.05505952 0.103485904 0.28571429 0.6666667  
## bagging -0.5625000 -1.011905e-01 0.00000000 0.070597299 0.19956140 1.0000000  
## svm -0.3888889 -8.307453e-02 0.00000000 0.084225254 0.19956140 1.0000000  
## NA's  
## glmnet 0  
## rpart 0  
## rf 0  
## bagging 0  
## svm 0



## glmnet   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (5 held-out with a fixed window)   
## Summary of sample sizes: 146, 146, 146, 146, 146, 146, ...   
## Resampling results across tuning parameters:  
##   
## alpha lambda Accuracy Kappa   
## 0.1000000 6.526951e-05 0.2965517 0.04432955  
## 0.1000000 1.816163e-04 0.3000000 0.04795932  
## 0.1000000 5.053581e-04 0.3034483 0.04806270  
## 0.1000000 1.406189e-03 0.3517241 0.08591143  
## 0.1000000 3.912804e-03 0.3724138 0.11082303  
## 0.1000000 1.088761e-02 0.3896552 0.12692995  
## 0.1000000 3.029542e-02 0.4000000 0.14087344  
## 0.1000000 8.429882e-02 0.3551724 0.03301671  
## 0.2285714 6.526951e-05 0.2896552 0.03661630  
## 0.2285714 1.816163e-04 0.2965517 0.04553161  
## 0.2285714 5.053581e-04 0.3000000 0.04661905  
## 0.2285714 1.406189e-03 0.3551724 0.09005331  
## 0.2285714 3.912804e-03 0.3655172 0.10760708  
## 0.2285714 1.088761e-02 0.3965517 0.13526834  
## 0.2285714 3.029542e-02 0.3965517 0.11508011  
## 0.2285714 8.429882e-02 0.3586207 0.01974634  
## 0.3571429 6.526951e-05 0.2931034 0.04058456  
## 0.3571429 1.816163e-04 0.2896552 0.03772834  
## 0.3571429 5.053581e-04 0.3034483 0.05110144  
## 0.3571429 1.406189e-03 0.3413793 0.07507341  
## 0.3571429 3.912804e-03 0.3620690 0.10088330  
## 0.3571429 1.088761e-02 0.3758621 0.09025131  
## 0.3571429 3.029542e-02 0.3724138 0.07160499  
## 0.3571429 8.429882e-02 0.4103448 0.05536980  
## 0.4857143 6.526951e-05 0.2896552 0.03968276  
## 0.4857143 1.816163e-04 0.3000000 0.04953858  
## 0.4857143 5.053581e-04 0.3068966 0.05586657  
## 0.4857143 1.406189e-03 0.3413793 0.07734848  
## 0.4857143 3.912804e-03 0.3655172 0.09995737  
## 0.4857143 1.088761e-02 0.3758621 0.09083209  
## 0.4857143 3.029542e-02 0.3758621 0.05885476  
## 0.4857143 8.429882e-02 0.4241379 0.07097815  
## 0.6142857 6.526951e-05 0.2965517 0.05118200  
## 0.6142857 1.816163e-04 0.3000000 0.05113846  
## 0.6142857 5.053581e-04 0.2965517 0.04477014  
## 0.6142857 1.406189e-03 0.3448276 0.08111221  
## 0.6142857 3.912804e-03 0.3586207 0.09255311  
## 0.6142857 1.088761e-02 0.3724138 0.07770444  
## 0.6142857 3.029542e-02 0.3827586 0.03777447  
## 0.6142857 8.429882e-02 0.4413793 0.08529011  
## 0.7428571 6.526951e-05 0.2896552 0.04440388  
## 0.7428571 1.816163e-04 0.2896552 0.04331745  
## 0.7428571 5.053581e-04 0.3034483 0.05867722  
## 0.7428571 1.406189e-03 0.3310345 0.07543948  
## 0.7428571 3.912804e-03 0.3551724 0.09028169  
## 0.7428571 1.088761e-02 0.3758621 0.07263321  
## 0.7428571 3.029542e-02 0.3689655 0.01120454  
## 0.7428571 8.429882e-02 0.4413793 0.08247709  
## 0.8714286 6.526951e-05 0.2965517 0.05408643  
## 0.8714286 1.816163e-04 0.3000000 0.06016000  
## 0.8714286 5.053581e-04 0.3137931 0.07755657  
## 0.8714286 1.406189e-03 0.3310345 0.08879871  
## 0.8714286 3.912804e-03 0.3620690 0.09983260  
## 0.8714286 1.088761e-02 0.3758621 0.07214279  
## 0.8714286 3.029542e-02 0.3862069 0.03564271  
## 0.8714286 8.429882e-02 0.4379310 0.09112959  
## 1.0000000 6.526951e-05 0.3310345 0.09545119  
## 1.0000000 1.816163e-04 0.3241379 0.08732130  
## 1.0000000 5.053581e-04 0.3206897 0.08306883  
## 1.0000000 1.406189e-03 0.3068966 0.06220373  
## 1.0000000 3.912804e-03 0.3724138 0.10869152  
## 1.0000000 1.088761e-02 0.3827586 0.09318138  
## 1.0000000 3.029542e-02 0.4068966 0.06215439  
## 1.0000000 8.429882e-02 0.4241379 0.06786762  
##   
## Accuracy was used to select the optimal model using the largest value.  
## The final values used for the model were alpha = 0.6142857 and lambda  
## = 0.08429882.

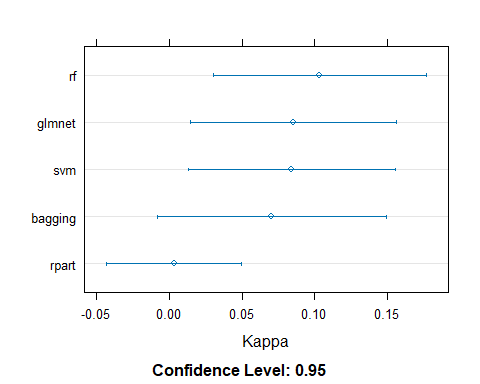
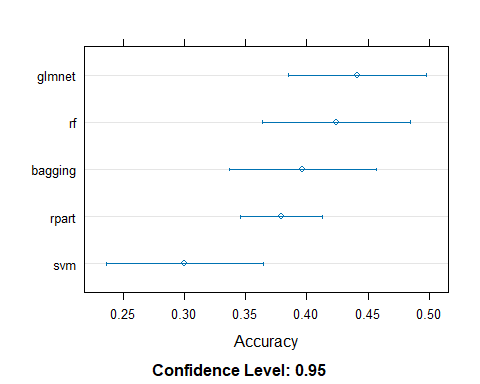
## Bagged CART   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (5 held-out with a fixed window)   
## Summary of sample sizes: 146, 146, 146, 146, 146, 146, ...   
## Resampling results:  
##   
## Accuracy Kappa   
## 0.3965517 0.0705973

## Support Vector Machines with Linear Kernel   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (5 held-out with a fixed window)   
## Summary of sample sizes: 146, 146, 146, 146, 146, 146, ...   
## Resampling results:  
##   
## Accuracy Kappa   
## 0.3 0.08422525  
##   
## Tuning parameter 'C' was held constant at a value of 1

## CART   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (5 held-out with a fixed window)   
## Summary of sample sizes: 146, 146, 146, 146, 146, 146, ...   
## Resampling results across tuning parameters:  
##   
## cp Accuracy Kappa   
## 0.00000000 0.3103448 -3.853452e-02  
## 0.01428571 0.3172414 -1.877257e-02  
## 0.02857143 0.3275862 -2.180541e-02  
## 0.04285714 0.3689655 5.554746e-06  
## 0.05714286 0.3758621 7.316238e-03  
## 0.07142857 0.3758621 2.124231e-03  
## 0.08571429 0.3793103 3.201818e-03  
## 0.10000000 0.3689655 7.852799e-04  
##   
## Accuracy was used to select the optimal model using the largest value.  
## The final value used for the model was cp = 0.08571429.

## Random Forest   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (5 held-out with a fixed window)   
## Summary of sample sizes: 146, 146, 146, 146, 146, 146, ...   
## Resampling results across tuning parameters:  
##   
## mtry Accuracy Kappa   
## 2 0.3965517 0.03100272  
## 22 0.3965517 0.06434515  
## 42 0.3965517 0.07651521  
## 63 0.4103448 0.08364886  
## 83 0.4103448 0.08141489  
## 104 0.4137931 0.10027604  
## 124 0.4034483 0.08416732  
## 145 0.4241379 0.10348590  
##   
## Accuracy was used to select the optimal model using the largest value.  
## The final value used for the model was mtry = 145.

##   
## Call:  
## summary.resamples(object = resamps)  
##   
## Models: glmnet, rpart, rf, bagging, svm   
## Number of resamples: 58   
##   
## Accuracy   
## Min. 1st Qu. Median Mean 3rd Qu. Max. NA's  
## glmnet 0.0 0.20 0.4 0.4413793 0.6 1.0 0  
## rpart 0.2 0.25 0.4 0.3793103 0.4 0.6 0  
## rf 0.0 0.20 0.4 0.4241379 0.6 0.8 0  
## bagging 0.0 0.20 0.4 0.3965517 0.6 1.0 0  
## svm 0.0 0.20 0.2 0.3000000 0.4 1.0 0  
##   
## Kappa   
## Min. 1st Qu. Median Mean 3rd Qu. Max.  
## glmnet -0.4285714 -5.263158e-02 0.00000000 0.085290109 0.2401316 1.0000000  
## rpart -0.6666667 0.000000e+00 0.00000000 0.003201818 0.0625000 0.3333333  
## rf -0.5625000 -6.938894e-17 0.05505952 0.103485904 0.2857143 0.6666667  
## bagging -0.5625000 -1.011905e-01 0.00000000 0.070597299 0.1995614 1.0000000  
## svm -0.3888889 -8.307453e-02 0.00000000 0.084225254 0.1995614 1.0000000  
## NA's  
## glmnet 0  
## rpart 0  
## rf 0  
## bagging 0  
## svm 0

 # FTSE TTR Non-fixed window 1 step

## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## glmnet   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with no fixed window)   
## Summary of sample sizes: 146, 147, 148, 149, 150, 151, ...   
## Resampling results across tuning parameters:  
##   
## alpha lambda Accuracy Kappa  
## 0.1000000 6.526951e-05 0.2741935 0   
## 0.1000000 1.816163e-04 0.2741935 0   
## 0.1000000 5.053581e-04 0.2741935 0   
## 0.1000000 1.406189e-03 0.2419355 0   
## 0.1000000 3.912804e-03 0.3064516 0   
## 0.1000000 1.088761e-02 0.3225806 0   
## 0.1000000 3.029542e-02 0.3387097 0   
## 0.1000000 8.429882e-02 0.3387097 0   
## 0.2285714 6.526951e-05 0.2258065 0   
## 0.2285714 1.816163e-04 0.2741935 0   
## 0.2285714 5.053581e-04 0.2741935 0   
## 0.2285714 1.406189e-03 0.2741935 0   
## 0.2285714 3.912804e-03 0.3064516 0   
## 0.2285714 1.088761e-02 0.3387097 0   
## 0.2285714 3.029542e-02 0.3709677 0   
## 0.2285714 8.429882e-02 0.3870968 0   
## 0.3571429 6.526951e-05 0.2419355 0   
## 0.3571429 1.816163e-04 0.2741935 0   
## 0.3571429 5.053581e-04 0.2741935 0   
## 0.3571429 1.406189e-03 0.2580645 0   
## 0.3571429 3.912804e-03 0.3387097 0   
## 0.3571429 1.088761e-02 0.3548387 0   
## 0.3571429 3.029542e-02 0.3709677 0   
## 0.3571429 8.429882e-02 0.4516129 0   
## 0.4857143 6.526951e-05 0.2419355 0   
## 0.4857143 1.816163e-04 0.2741935 0   
## 0.4857143 5.053581e-04 0.2741935 0   
## 0.4857143 1.406189e-03 0.2580645 0   
## 0.4857143 3.912804e-03 0.3225806 0   
## 0.4857143 1.088761e-02 0.3548387 0   
## 0.4857143 3.029542e-02 0.3548387 0   
## 0.4857143 8.429882e-02 0.4516129 0   
## 0.6142857 6.526951e-05 0.2580645 0   
## 0.6142857 1.816163e-04 0.2741935 0   
## 0.6142857 5.053581e-04 0.2741935 0   
## 0.6142857 1.406189e-03 0.2580645 0   
## 0.6142857 3.912804e-03 0.3225806 0   
## 0.6142857 1.088761e-02 0.3709677 0   
## 0.6142857 3.029542e-02 0.3548387 0   
## 0.6142857 8.429882e-02 0.4516129 0   
## 0.7428571 6.526951e-05 0.2741935 0   
## 0.7428571 1.816163e-04 0.2741935 0   
## 0.7428571 5.053581e-04 0.2741935 0   
## 0.7428571 1.406189e-03 0.2580645 0   
## 0.7428571 3.912804e-03 0.3064516 0   
## 0.7428571 1.088761e-02 0.3870968 0   
## 0.7428571 3.029542e-02 0.3870968 0   
## 0.7428571 8.429882e-02 0.4516129 0   
## 0.8714286 6.526951e-05 0.2741935 0   
## 0.8714286 1.816163e-04 0.2741935 0   
## 0.8714286 5.053581e-04 0.2741935 0   
## 0.8714286 1.406189e-03 0.2903226 0   
## 0.8714286 3.912804e-03 0.2903226 0   
## 0.8714286 1.088761e-02 0.4032258 0   
## 0.8714286 3.029542e-02 0.3870968 0   
## 0.8714286 8.429882e-02 0.4677419 0   
## 1.0000000 6.526951e-05 0.2741935 0   
## 1.0000000 1.816163e-04 0.2903226 0   
## 1.0000000 5.053581e-04 0.2903226 0   
## 1.0000000 1.406189e-03 0.3225806 0   
## 1.0000000 3.912804e-03 0.2903226 0   
## 1.0000000 1.088761e-02 0.4032258 0   
## 1.0000000 3.029542e-02 0.4193548 0   
## 1.0000000 8.429882e-02 0.4354839 0   
##   
## Kappa was used to select the optimal model using the largest value.  
## The final values used for the model were alpha = 0.1 and lambda = 0.08429882.

## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## Bagged CART   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with no fixed window)   
## Summary of sample sizes: 146, 147, 148, 149, 150, 151, ...   
## Resampling results:  
##   
## Accuracy Kappa  
## 0.3709677 0

## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## Support Vector Machines with Linear Kernel   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with no fixed window)   
## Summary of sample sizes: 146, 147, 148, 149, 150, 151, ...   
## Resampling results:  
##   
## Accuracy Kappa  
## 0.1935484 0   
##   
## Tuning parameter 'C' was held constant at a value of 1

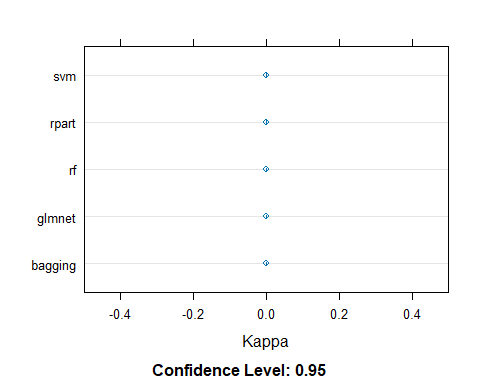
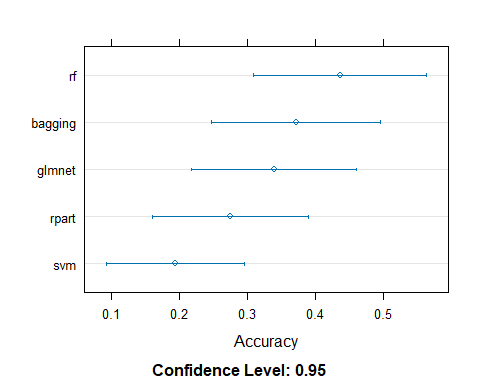
## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## CART   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with no fixed window)   
## Summary of sample sizes: 146, 147, 148, 149, 150, 151, ...   
## Resampling results across tuning parameters:  
##   
## cp Accuracy Kappa  
## 0.00000000 0.3870968 0   
## 0.01428571 0.3870968 0   
## 0.02857143 0.3548387 0   
## 0.04285714 0.3548387 0   
## 0.05714286 0.3387097 0   
## 0.07142857 0.2741935 0   
## 0.08571429 0.2741935 0   
## 0.10000000 0.2741935 0   
##   
## Kappa was used to select the optimal model using the largest value.  
## The final value used for the model was cp = 0.1.

## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## Random Forest   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with no fixed window)   
## Summary of sample sizes: 146, 147, 148, 149, 150, 151, ...   
## Resampling results across tuning parameters:  
##   
## mtry Accuracy Kappa  
## 2 0.4354839 0   
## 22 0.4516129 0   
## 42 0.4516129 0   
## 63 0.4354839 0   
## 83 0.4354839 0   
## 104 0.4193548 0   
## 124 0.4193548 0   
## 145 0.4032258 0   
##   
## Kappa was used to select the optimal model using the largest value.  
## The final value used for the model was mtry = 2.

##   
## Call:  
## summary.resamples(object = resamps)  
##   
## Models: glmnet, rpart, rf, bagging, svm   
## Number of resamples: 62   
##   
## Accuracy   
## Min. 1st Qu. Median Mean 3rd Qu. Max. NA's  
## glmnet 0 0 0 0.3387097 1 1 0  
## rpart 0 0 0 0.2741935 1 1 0  
## rf 0 0 0 0.4354839 1 1 0  
## bagging 0 0 0 0.3709677 1 1 0  
## svm 0 0 0 0.1935484 0 1 0  
##   
## Kappa   
## Min. 1st Qu. Median Mean 3rd Qu. Max. NA's  
## glmnet 0 0 0 0 0 0 21  
## rpart 0 0 0 0 0 0 17  
## rf 0 0 0 0 0 0 27  
## bagging 0 0 0 0 0 0 23  
## svm 0 0 0 0 0 0 12



## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## glmnet   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with no fixed window)   
## Summary of sample sizes: 146, 147, 148, 149, 150, 151, ...   
## Resampling results across tuning parameters:  
##   
## alpha lambda Accuracy Kappa  
## 0.1000000 6.526951e-05 0.2741935 0   
## 0.1000000 1.816163e-04 0.2741935 0   
## 0.1000000 5.053581e-04 0.2741935 0   
## 0.1000000 1.406189e-03 0.2419355 0   
## 0.1000000 3.912804e-03 0.3064516 0   
## 0.1000000 1.088761e-02 0.3225806 0   
## 0.1000000 3.029542e-02 0.3387097 0   
## 0.1000000 8.429882e-02 0.3387097 0   
## 0.2285714 6.526951e-05 0.2258065 0   
## 0.2285714 1.816163e-04 0.2741935 0   
## 0.2285714 5.053581e-04 0.2741935 0   
## 0.2285714 1.406189e-03 0.2741935 0   
## 0.2285714 3.912804e-03 0.3064516 0   
## 0.2285714 1.088761e-02 0.3387097 0   
## 0.2285714 3.029542e-02 0.3709677 0   
## 0.2285714 8.429882e-02 0.3870968 0   
## 0.3571429 6.526951e-05 0.2419355 0   
## 0.3571429 1.816163e-04 0.2741935 0   
## 0.3571429 5.053581e-04 0.2741935 0   
## 0.3571429 1.406189e-03 0.2580645 0   
## 0.3571429 3.912804e-03 0.3387097 0   
## 0.3571429 1.088761e-02 0.3548387 0   
## 0.3571429 3.029542e-02 0.3709677 0   
## 0.3571429 8.429882e-02 0.4516129 0   
## 0.4857143 6.526951e-05 0.2419355 0   
## 0.4857143 1.816163e-04 0.2741935 0   
## 0.4857143 5.053581e-04 0.2741935 0   
## 0.4857143 1.406189e-03 0.2580645 0   
## 0.4857143 3.912804e-03 0.3225806 0   
## 0.4857143 1.088761e-02 0.3548387 0   
## 0.4857143 3.029542e-02 0.3548387 0   
## 0.4857143 8.429882e-02 0.4516129 0   
## 0.6142857 6.526951e-05 0.2580645 0   
## 0.6142857 1.816163e-04 0.2741935 0   
## 0.6142857 5.053581e-04 0.2741935 0   
## 0.6142857 1.406189e-03 0.2580645 0   
## 0.6142857 3.912804e-03 0.3225806 0   
## 0.6142857 1.088761e-02 0.3709677 0   
## 0.6142857 3.029542e-02 0.3548387 0   
## 0.6142857 8.429882e-02 0.4516129 0   
## 0.7428571 6.526951e-05 0.2741935 0   
## 0.7428571 1.816163e-04 0.2741935 0   
## 0.7428571 5.053581e-04 0.2741935 0   
## 0.7428571 1.406189e-03 0.2580645 0   
## 0.7428571 3.912804e-03 0.3064516 0   
## 0.7428571 1.088761e-02 0.3870968 0   
## 0.7428571 3.029542e-02 0.3870968 0   
## 0.7428571 8.429882e-02 0.4516129 0   
## 0.8714286 6.526951e-05 0.2741935 0   
## 0.8714286 1.816163e-04 0.2741935 0   
## 0.8714286 5.053581e-04 0.2741935 0   
## 0.8714286 1.406189e-03 0.2903226 0   
## 0.8714286 3.912804e-03 0.2903226 0   
## 0.8714286 1.088761e-02 0.4032258 0   
## 0.8714286 3.029542e-02 0.3870968 0   
## 0.8714286 8.429882e-02 0.4677419 0   
## 1.0000000 6.526951e-05 0.2741935 0   
## 1.0000000 1.816163e-04 0.2903226 0   
## 1.0000000 5.053581e-04 0.2903226 0   
## 1.0000000 1.406189e-03 0.3225806 0   
## 1.0000000 3.912804e-03 0.2903226 0   
## 1.0000000 1.088761e-02 0.4032258 0   
## 1.0000000 3.029542e-02 0.4193548 0   
## 1.0000000 8.429882e-02 0.4354839 0   
##   
## Accuracy was used to select the optimal model using the largest value.  
## The final values used for the model were alpha = 0.8714286 and lambda  
## = 0.08429882.

## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## Bagged CART   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with no fixed window)   
## Summary of sample sizes: 146, 147, 148, 149, 150, 151, ...   
## Resampling results:  
##   
## Accuracy Kappa  
## 0.3709677 0

## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## Support Vector Machines with Linear Kernel   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with no fixed window)   
## Summary of sample sizes: 146, 147, 148, 149, 150, 151, ...   
## Resampling results:  
##   
## Accuracy Kappa  
## 0.1935484 0   
##   
## Tuning parameter 'C' was held constant at a value of 1

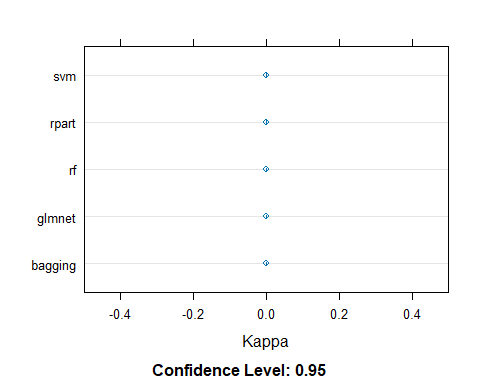
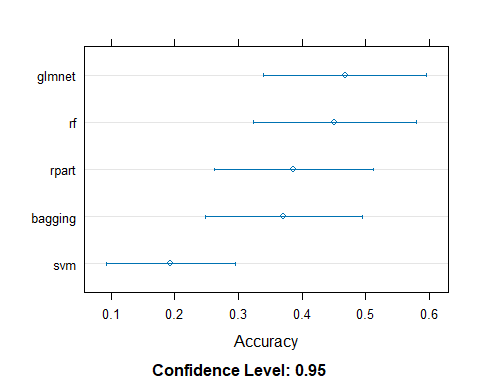
## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## CART   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with no fixed window)   
## Summary of sample sizes: 146, 147, 148, 149, 150, 151, ...   
## Resampling results across tuning parameters:  
##   
## cp Accuracy Kappa  
## 0.00000000 0.3870968 0   
## 0.01428571 0.3870968 0   
## 0.02857143 0.3548387 0   
## 0.04285714 0.3548387 0   
## 0.05714286 0.3387097 0   
## 0.07142857 0.2741935 0   
## 0.08571429 0.2741935 0   
## 0.10000000 0.2741935 0   
##   
## Accuracy was used to select the optimal model using the largest value.  
## The final value used for the model was cp = 0.01428571.

## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## Random Forest   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with no fixed window)   
## Summary of sample sizes: 146, 147, 148, 149, 150, 151, ...   
## Resampling results across tuning parameters:  
##   
## mtry Accuracy Kappa  
## 2 0.4354839 0   
## 22 0.4516129 0   
## 42 0.4516129 0   
## 63 0.4354839 0   
## 83 0.4354839 0   
## 104 0.4193548 0   
## 124 0.4193548 0   
## 145 0.4032258 0   
##   
## Accuracy was used to select the optimal model using the largest value.  
## The final value used for the model was mtry = 22.

##   
## Call:  
## summary.resamples(object = resamps)  
##   
## Models: glmnet, rpart, rf, bagging, svm   
## Number of resamples: 62   
##   
## Accuracy   
## Min. 1st Qu. Median Mean 3rd Qu. Max. NA's  
## glmnet 0 0 0 0.4677419 1 1 0  
## rpart 0 0 0 0.3870968 1 1 0  
## rf 0 0 0 0.4516129 1 1 0  
## bagging 0 0 0 0.3709677 1 1 0  
## svm 0 0 0 0.1935484 0 1 0  
##   
## Kappa   
## Min. 1st Qu. Median Mean 3rd Qu. Max. NA's  
## glmnet 0 0 0 0 0 0 29  
## rpart 0 0 0 0 0 0 24  
## rf 0 0 0 0 0 0 28  
## bagging 0 0 0 0 0 0 23  
## svm 0 0 0 0 0 0 12

 # FTSE TTR Non-fixed window 5 step

## glmnet   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (5 held-out with no fixed window)   
## Summary of sample sizes: 146, 147, 148, 149, 150, 151, ...   
## Resampling results across tuning parameters:  
##   
## alpha lambda Accuracy Kappa   
## 0.1000000 6.526951e-05 0.2310345 -0.0206434497  
## 0.1000000 1.816163e-04 0.2344828 -0.0199193805  
## 0.1000000 5.053581e-04 0.2482759 0.0031444577  
## 0.1000000 1.406189e-03 0.2724138 0.0322672513  
## 0.1000000 3.912804e-03 0.3206897 0.0739198101  
## 0.1000000 1.088761e-02 0.3517241 0.0891996931  
## 0.1000000 3.029542e-02 0.3758621 0.1000341299  
## 0.1000000 8.429882e-02 0.3724138 0.0635960559  
## 0.2285714 6.526951e-05 0.2000000 -0.0462094670  
## 0.2285714 1.816163e-04 0.2310345 -0.0235899323  
## 0.2285714 5.053581e-04 0.2482759 0.0021517163  
## 0.2285714 1.406189e-03 0.2827586 0.0403435733  
## 0.2285714 3.912804e-03 0.3241379 0.0739963991  
## 0.2285714 1.088761e-02 0.3551724 0.0772613927  
## 0.2285714 3.029542e-02 0.4034483 0.1372792602  
## 0.2285714 8.429882e-02 0.3896552 0.0523684547  
## 0.3571429 6.526951e-05 0.2103448 -0.0329407575  
## 0.3571429 1.816163e-04 0.2379310 -0.0128608827  
## 0.3571429 5.053581e-04 0.2482759 0.0057048481  
## 0.3571429 1.406189e-03 0.2827586 0.0470045037  
## 0.3571429 3.912804e-03 0.3275862 0.0812436945  
## 0.3571429 1.088761e-02 0.3758621 0.1042375051  
## 0.3571429 3.029542e-02 0.3931034 0.1048711675  
## 0.3571429 8.429882e-02 0.4310345 0.0758406214  
## 0.4857143 6.526951e-05 0.2206897 -0.0234111660  
## 0.4857143 1.816163e-04 0.2413793 -0.0083129500  
## 0.4857143 5.053581e-04 0.2413793 0.0001157750  
## 0.4857143 1.406189e-03 0.2862069 0.0519090064  
## 0.4857143 3.912804e-03 0.3241379 0.0693931588  
## 0.4857143 1.088761e-02 0.3827586 0.1111556982  
## 0.4857143 3.029542e-02 0.3931034 0.0858310375  
## 0.4857143 8.429882e-02 0.4482759 0.0953074425  
## 0.6142857 6.526951e-05 0.2448276 -0.0012471169  
## 0.6142857 1.816163e-04 0.2448276 0.0014438414  
## 0.6142857 5.053581e-04 0.2448276 -0.0029549217  
## 0.6142857 1.406189e-03 0.2758621 0.0370523232  
## 0.6142857 3.912804e-03 0.3310345 0.0858999430  
## 0.6142857 1.088761e-02 0.3827586 0.1116803258  
## 0.6142857 3.029542e-02 0.3862069 0.0678366972  
## 0.6142857 8.429882e-02 0.4482759 0.0845205739  
## 0.7428571 6.526951e-05 0.2551724 0.0064022901  
## 0.7428571 1.816163e-04 0.2620690 0.0158314491  
## 0.7428571 5.053581e-04 0.2413793 0.0009720456  
## 0.7428571 1.406189e-03 0.2724138 0.0174272728  
## 0.7428571 3.912804e-03 0.3241379 0.0730333021  
## 0.7428571 1.088761e-02 0.4000000 0.1331706219  
## 0.7428571 3.029542e-02 0.3827586 0.0437485614  
## 0.7428571 8.429882e-02 0.4413793 0.0753142630  
## 0.8714286 6.526951e-05 0.2551724 -0.0021658765  
## 0.8714286 1.816163e-04 0.2655172 0.0178664454  
## 0.8714286 5.053581e-04 0.2310345 -0.0135147609  
## 0.8714286 1.406189e-03 0.2724138 0.0251358360  
## 0.8714286 3.912804e-03 0.3275862 0.0704889074  
## 0.8714286 1.088761e-02 0.4068966 0.1421438345  
## 0.8714286 3.029542e-02 0.3896552 0.0399923227  
## 0.8714286 8.429882e-02 0.4344828 0.0616176424  
## 1.0000000 6.526951e-05 0.2620690 0.0050314134  
## 1.0000000 1.816163e-04 0.2655172 0.0101098211  
## 1.0000000 5.053581e-04 0.2620690 0.0028673695  
## 1.0000000 1.406189e-03 0.2793103 0.0328394139  
## 1.0000000 3.912804e-03 0.3275862 0.0713538384  
## 1.0000000 1.088761e-02 0.4068966 0.1388462587  
## 1.0000000 3.029542e-02 0.4206897 0.0713250221  
## 1.0000000 8.429882e-02 0.4310345 0.0655054732  
##   
## Kappa was used to select the optimal model using the largest value.  
## The final values used for the model were alpha = 0.8714286 and lambda  
## = 0.01088761.

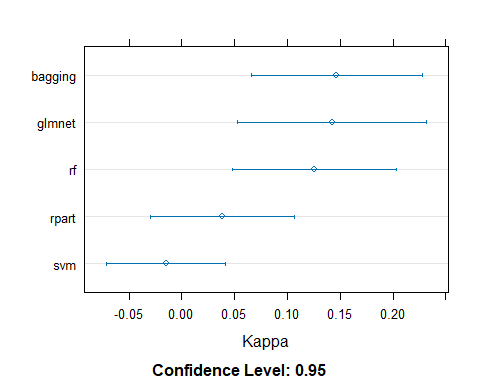
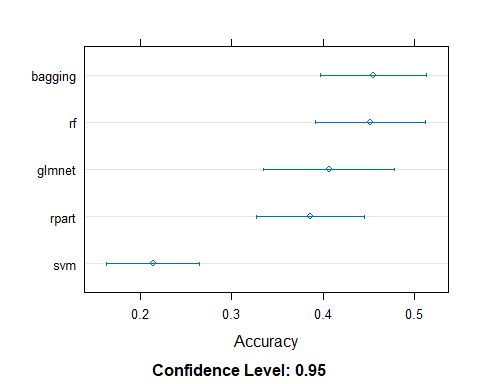
## Bagged CART   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (5 held-out with no fixed window)   
## Summary of sample sizes: 146, 147, 148, 149, 150, 151, ...   
## Resampling results:  
##   
## Accuracy Kappa   
## 0.4551724 0.1467161

## Support Vector Machines with Linear Kernel   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (5 held-out with no fixed window)   
## Summary of sample sizes: 146, 147, 148, 149, 150, 151, ...   
## Resampling results:  
##   
## Accuracy Kappa   
## 0.2137931 -0.01497917  
##   
## Tuning parameter 'C' was held constant at a value of 1

## CART   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (5 held-out with no fixed window)   
## Summary of sample sizes: 146, 147, 148, 149, 150, 151, ...   
## Resampling results across tuning parameters:  
##   
## cp Accuracy Kappa   
## 0.00000000 0.3862069 0.03854770  
## 0.01428571 0.3655172 0.02536010  
## 0.02857143 0.3379310 -0.01859698  
## 0.04285714 0.3482759 -0.01276232  
## 0.05714286 0.3172414 -0.05011576  
## 0.07142857 0.2862069 -0.11423672  
## 0.08571429 0.2965517 -0.11838565  
## 0.10000000 0.3000000 -0.10532333  
##   
## Kappa was used to select the optimal model using the largest value.  
## The final value used for the model was cp = 0.

## Random Forest   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (5 held-out with no fixed window)   
## Summary of sample sizes: 146, 147, 148, 149, 150, 151, ...   
## Resampling results across tuning parameters:  
##   
## mtry Accuracy Kappa   
## 2 0.4275862 0.06753059  
## 22 0.4206897 0.07103640  
## 42 0.4482759 0.12289219  
## 63 0.4517241 0.12553368  
## 83 0.4310345 0.10521549  
## 104 0.4413793 0.12480599  
## 124 0.4448276 0.11593303  
## 145 0.4275862 0.09487535  
##   
## Kappa was used to select the optimal model using the largest value.  
## The final value used for the model was mtry = 63.

##   
## Call:  
## summary.resamples(object = resamps)  
##   
## Models: glmnet, rpart, rf, bagging, svm   
## Number of resamples: 58   
##   
## Accuracy   
## Min. 1st Qu. Median Mean 3rd Qu. Max. NA's  
## glmnet 0 0.2 0.4 0.4068966 0.6 1.0 0  
## rpart 0 0.2 0.4 0.3862069 0.6 0.8 0  
## rf 0 0.4 0.4 0.4517241 0.6 1.0 0  
## bagging 0 0.4 0.4 0.4551724 0.6 1.0 0  
## svm 0 0.0 0.2 0.2137931 0.4 0.6 0  
##   
## Kappa   
## Min. 1st Qu. Median Mean 3rd Qu. Max.  
## glmnet -0.3888889 -5.263158e-02 0.00000000 0.14214383 0.3645833 1.0000000  
## rpart -0.5625000 -1.431624e-01 0.00000000 0.03854770 0.1666667 0.6666667  
## rf -0.5625000 0.000000e+00 0.06250000 0.12553368 0.3125000 1.0000000  
## bagging -0.4285714 -6.938894e-17 0.11764706 0.14671607 0.3076923 1.0000000  
## svm -0.3888889 -1.904762e-01 -0.05263158 -0.01497917 0.1666667 0.4736842  
## NA's  
## glmnet 0  
## rpart 0  
## rf 0  
## bagging 0  
## svm 0



## glmnet   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (5 held-out with no fixed window)   
## Summary of sample sizes: 146, 147, 148, 149, 150, 151, ...   
## Resampling results across tuning parameters:  
##   
## alpha lambda Accuracy Kappa   
## 0.1000000 6.526951e-05 0.2310345 -0.0206434497  
## 0.1000000 1.816163e-04 0.2344828 -0.0199193805  
## 0.1000000 5.053581e-04 0.2482759 0.0031444577  
## 0.1000000 1.406189e-03 0.2724138 0.0322672513  
## 0.1000000 3.912804e-03 0.3206897 0.0739198101  
## 0.1000000 1.088761e-02 0.3517241 0.0891996931  
## 0.1000000 3.029542e-02 0.3758621 0.1000341299  
## 0.1000000 8.429882e-02 0.3724138 0.0635960559  
## 0.2285714 6.526951e-05 0.2000000 -0.0462094670  
## 0.2285714 1.816163e-04 0.2310345 -0.0235899323  
## 0.2285714 5.053581e-04 0.2482759 0.0021517163  
## 0.2285714 1.406189e-03 0.2827586 0.0403435733  
## 0.2285714 3.912804e-03 0.3241379 0.0739963991  
## 0.2285714 1.088761e-02 0.3551724 0.0772613927  
## 0.2285714 3.029542e-02 0.4034483 0.1372792602  
## 0.2285714 8.429882e-02 0.3896552 0.0523684547  
## 0.3571429 6.526951e-05 0.2103448 -0.0329407575  
## 0.3571429 1.816163e-04 0.2379310 -0.0128608827  
## 0.3571429 5.053581e-04 0.2482759 0.0057048481  
## 0.3571429 1.406189e-03 0.2827586 0.0470045037  
## 0.3571429 3.912804e-03 0.3275862 0.0812436945  
## 0.3571429 1.088761e-02 0.3758621 0.1042375051  
## 0.3571429 3.029542e-02 0.3931034 0.1048711675  
## 0.3571429 8.429882e-02 0.4310345 0.0758406214  
## 0.4857143 6.526951e-05 0.2206897 -0.0234111660  
## 0.4857143 1.816163e-04 0.2413793 -0.0083129500  
## 0.4857143 5.053581e-04 0.2413793 0.0001157750  
## 0.4857143 1.406189e-03 0.2862069 0.0519090064  
## 0.4857143 3.912804e-03 0.3241379 0.0693931588  
## 0.4857143 1.088761e-02 0.3827586 0.1111556982  
## 0.4857143 3.029542e-02 0.3931034 0.0858310375  
## 0.4857143 8.429882e-02 0.4482759 0.0953074425  
## 0.6142857 6.526951e-05 0.2448276 -0.0012471169  
## 0.6142857 1.816163e-04 0.2448276 0.0014438414  
## 0.6142857 5.053581e-04 0.2448276 -0.0029549217  
## 0.6142857 1.406189e-03 0.2758621 0.0370523232  
## 0.6142857 3.912804e-03 0.3310345 0.0858999430  
## 0.6142857 1.088761e-02 0.3827586 0.1116803258  
## 0.6142857 3.029542e-02 0.3862069 0.0678366972  
## 0.6142857 8.429882e-02 0.4482759 0.0845205739  
## 0.7428571 6.526951e-05 0.2551724 0.0064022901  
## 0.7428571 1.816163e-04 0.2620690 0.0158314491  
## 0.7428571 5.053581e-04 0.2413793 0.0009720456  
## 0.7428571 1.406189e-03 0.2724138 0.0174272728  
## 0.7428571 3.912804e-03 0.3241379 0.0730333021  
## 0.7428571 1.088761e-02 0.4000000 0.1331706219  
## 0.7428571 3.029542e-02 0.3827586 0.0437485614  
## 0.7428571 8.429882e-02 0.4413793 0.0753142630  
## 0.8714286 6.526951e-05 0.2551724 -0.0021658765  
## 0.8714286 1.816163e-04 0.2655172 0.0178664454  
## 0.8714286 5.053581e-04 0.2310345 -0.0135147609  
## 0.8714286 1.406189e-03 0.2724138 0.0251358360  
## 0.8714286 3.912804e-03 0.3275862 0.0704889074  
## 0.8714286 1.088761e-02 0.4068966 0.1421438345  
## 0.8714286 3.029542e-02 0.3896552 0.0399923227  
## 0.8714286 8.429882e-02 0.4344828 0.0616176424  
## 1.0000000 6.526951e-05 0.2620690 0.0050314134  
## 1.0000000 1.816163e-04 0.2655172 0.0101098211  
## 1.0000000 5.053581e-04 0.2620690 0.0028673695  
## 1.0000000 1.406189e-03 0.2793103 0.0328394139  
## 1.0000000 3.912804e-03 0.3275862 0.0713538384  
## 1.0000000 1.088761e-02 0.4068966 0.1388462587  
## 1.0000000 3.029542e-02 0.4206897 0.0713250221  
## 1.0000000 8.429882e-02 0.4310345 0.0655054732  
##   
## Accuracy was used to select the optimal model using the largest value.  
## The final values used for the model were alpha = 0.4857143 and lambda  
## = 0.08429882.

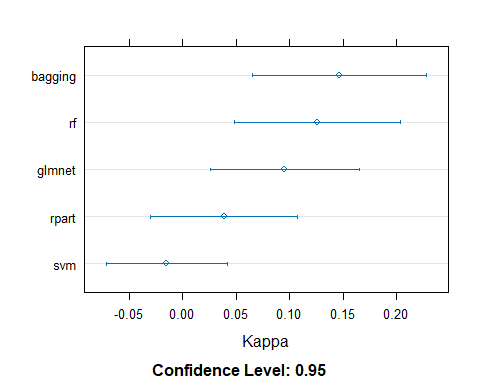
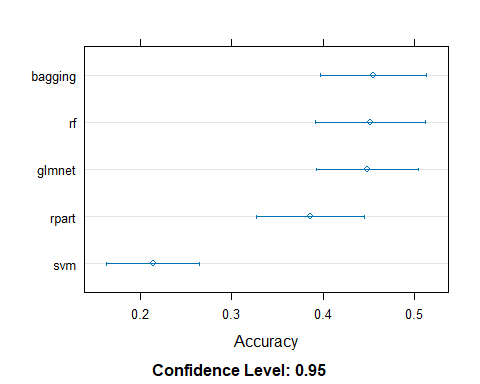
## Bagged CART   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (5 held-out with no fixed window)   
## Summary of sample sizes: 146, 147, 148, 149, 150, 151, ...   
## Resampling results:  
##   
## Accuracy Kappa   
## 0.4551724 0.1467161

## Support Vector Machines with Linear Kernel   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (5 held-out with no fixed window)   
## Summary of sample sizes: 146, 147, 148, 149, 150, 151, ...   
## Resampling results:  
##   
## Accuracy Kappa   
## 0.2137931 -0.01497917  
##   
## Tuning parameter 'C' was held constant at a value of 1

## CART   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (5 held-out with no fixed window)   
## Summary of sample sizes: 146, 147, 148, 149, 150, 151, ...   
## Resampling results across tuning parameters:  
##   
## cp Accuracy Kappa   
## 0.00000000 0.3862069 0.03854770  
## 0.01428571 0.3655172 0.02536010  
## 0.02857143 0.3379310 -0.01859698  
## 0.04285714 0.3482759 -0.01276232  
## 0.05714286 0.3172414 -0.05011576  
## 0.07142857 0.2862069 -0.11423672  
## 0.08571429 0.2965517 -0.11838565  
## 0.10000000 0.3000000 -0.10532333  
##   
## Accuracy was used to select the optimal model using the largest value.  
## The final value used for the model was cp = 0.

## Random Forest   
##   
## 208 samples  
## 88 predictor  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (5 held-out with no fixed window)   
## Summary of sample sizes: 146, 147, 148, 149, 150, 151, ...   
## Resampling results across tuning parameters:  
##   
## mtry Accuracy Kappa   
## 2 0.4275862 0.06753059  
## 22 0.4206897 0.07103640  
## 42 0.4482759 0.12289219  
## 63 0.4517241 0.12553368  
## 83 0.4310345 0.10521549  
## 104 0.4413793 0.12480599  
## 124 0.4448276 0.11593303  
## 145 0.4275862 0.09487535  
##   
## Accuracy was used to select the optimal model using the largest value.  
## The final value used for the model was mtry = 63.

##   
## Call:  
## summary.resamples(object = resamps)  
##   
## Models: glmnet, rpart, rf, bagging, svm   
## Number of resamples: 58   
##   
## Accuracy   
## Min. 1st Qu. Median Mean 3rd Qu. Max. NA's  
## glmnet 0 0.25 0.4 0.4482759 0.6 1.0 0  
## rpart 0 0.20 0.4 0.3862069 0.6 0.8 0  
## rf 0 0.40 0.4 0.4517241 0.6 1.0 0  
## bagging 0 0.40 0.4 0.4551724 0.6 1.0 0  
## svm 0 0.00 0.2 0.2137931 0.4 0.6 0  
##   
## Kappa   
## Min. 1st Qu. Median Mean 3rd Qu. Max.  
## glmnet -0.3157895 -6.938894e-17 0.00000000 0.09530744 0.1666667 1.0000000  
## rpart -0.5625000 -1.431624e-01 0.00000000 0.03854770 0.1666667 0.6666667  
## rf -0.5625000 0.000000e+00 0.06250000 0.12553368 0.3125000 1.0000000  
## bagging -0.4285714 -6.938894e-17 0.11764706 0.14671607 0.3076923 1.0000000  
## svm -0.3888889 -1.904762e-01 -0.05263158 -0.01497917 0.1666667 0.4736842  
## NA's  
## glmnet 0  
## rpart 0  
## rf 0  
## bagging 0  
## svm 0

 ## FTSE external

## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## glmnet   
##   
## 461 samples  
## 107 predictors  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with a fixed window)   
## Summary of sample sizes: 146, 146, 146, 146, 146, 146, ...   
## Resampling results across tuning parameters:  
##   
## alpha lambda Accuracy Kappa  
## 0.1000000 0.0000496097 0.2412698 0   
## 0.1000000 0.0001380419 0.2412698 0   
## 0.1000000 0.0003841099 0.2412698 0   
## 0.1000000 0.0010688086 0.2412698 0   
## 0.1000000 0.0029740235 0.2412698 0   
## 0.1000000 0.0082753971 0.2412698 0   
## 0.1000000 0.0230267841 0.2380952 0   
## 0.1000000 0.0640733945 0.2825397 0   
## 0.2285714 0.0000496097 0.2380952 0   
## 0.2285714 0.0001380419 0.2380952 0   
## 0.2285714 0.0003841099 0.2380952 0   
## 0.2285714 0.0010688086 0.2380952 0   
## 0.2285714 0.0029740235 0.2380952 0   
## 0.2285714 0.0082753971 0.2444444 0   
## 0.2285714 0.0230267841 0.2476190 0   
## 0.2285714 0.0640733945 0.3079365 0   
## 0.3571429 0.0000496097 0.2349206 0   
## 0.3571429 0.0001380419 0.2349206 0   
## 0.3571429 0.0003841099 0.2349206 0   
## 0.3571429 0.0010688086 0.2349206 0   
## 0.3571429 0.0029740235 0.2349206 0   
## 0.3571429 0.0082753971 0.2507937 0   
## 0.3571429 0.0230267841 0.2761905 0   
## 0.3571429 0.0640733945 0.2920635 0   
## 0.4857143 0.0000496097 0.2285714 0   
## 0.4857143 0.0001380419 0.2285714 0   
## 0.4857143 0.0003841099 0.2285714 0   
## 0.4857143 0.0010688086 0.2285714 0   
## 0.4857143 0.0029740235 0.2285714 0   
## 0.4857143 0.0082753971 0.2571429 0   
## 0.4857143 0.0230267841 0.2825397 0   
## 0.4857143 0.0640733945 0.2984127 0   
## 0.6142857 0.0000496097 0.2380952 0   
## 0.6142857 0.0001380419 0.2380952 0   
## 0.6142857 0.0003841099 0.2380952 0   
## 0.6142857 0.0010688086 0.2380952 0   
## 0.6142857 0.0029740235 0.2380952 0   
## 0.6142857 0.0082753971 0.2507937 0   
## 0.6142857 0.0230267841 0.2920635 0   
## 0.6142857 0.0640733945 0.2730159 0   
## 0.7428571 0.0000496097 0.2444444 0   
## 0.7428571 0.0001380419 0.2444444 0   
## 0.7428571 0.0003841099 0.2444444 0   
## 0.7428571 0.0010688086 0.2444444 0   
## 0.7428571 0.0029740235 0.2476190 0   
## 0.7428571 0.0082753971 0.2539683 0   
## 0.7428571 0.0230267841 0.2888889 0   
## 0.7428571 0.0640733945 0.2825397 0   
## 0.8714286 0.0000496097 0.2476190 0   
## 0.8714286 0.0001380419 0.2476190 0   
## 0.8714286 0.0003841099 0.2476190 0   
## 0.8714286 0.0010688086 0.2476190 0   
## 0.8714286 0.0029740235 0.2444444 0   
## 0.8714286 0.0082753971 0.2603175 0   
## 0.8714286 0.0230267841 0.3079365 0   
## 0.8714286 0.0640733945 0.2793651 0   
## 1.0000000 0.0000496097 0.2571429 0   
## 1.0000000 0.0001380419 0.2571429 0   
## 1.0000000 0.0003841099 0.2571429 0   
## 1.0000000 0.0010688086 0.2571429 0   
## 1.0000000 0.0029740235 0.2539683 0   
## 1.0000000 0.0082753971 0.2698413 0   
## 1.0000000 0.0230267841 0.2984127 0   
## 1.0000000 0.0640733945 0.2857143 0   
##   
## Kappa was used to select the optimal model using the largest value.  
## The final values used for the model were alpha = 0.1 and lambda = 0.06407339.

## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## Bagged CART   
##   
## 461 samples  
## 107 predictors  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with a fixed window)   
## Summary of sample sizes: 146, 146, 146, 146, 146, 146, ...   
## Resampling results:  
##   
## Accuracy Kappa  
## 0.2920635 0

## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## Support Vector Machines with Linear Kernel   
##   
## 461 samples  
## 107 predictors  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with a fixed window)   
## Summary of sample sizes: 146, 146, 146, 146, 146, 146, ...   
## Resampling results:  
##   
## Accuracy Kappa  
## 0.2571429 0   
##   
## Tuning parameter 'C' was held constant at a value of 1

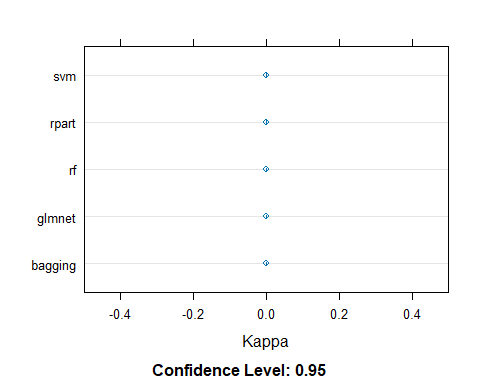
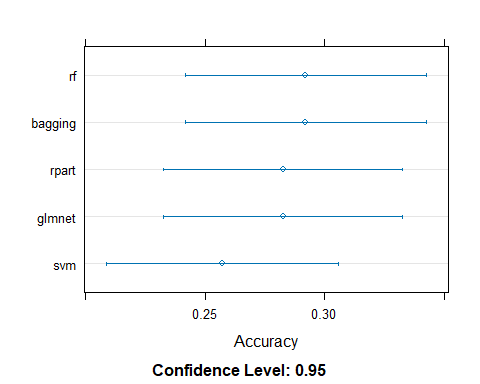
## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## CART   
##   
## 461 samples  
## 107 predictors  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with a fixed window)   
## Summary of sample sizes: 146, 146, 146, 146, 146, 146, ...   
## Resampling results across tuning parameters:  
##   
## cp Accuracy Kappa  
## 0.004966887 0.2603175 0   
## 0.006622517 0.2634921 0   
## 0.009933775 0.2698413 0   
## 0.013245033 0.2793651 0   
## 0.016556291 0.2698413 0   
## 0.017660044 0.2698413 0   
## 0.019867550 0.2761905 0   
## 0.046357616 0.2825397 0   
##   
## Kappa was used to select the optimal model using the largest value.  
## The final value used for the model was cp = 0.04635762.

## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## Random Forest   
##   
## 461 samples  
## 107 predictors  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with a fixed window)   
## Summary of sample sizes: 146, 146, 146, 146, 146, 146, ...   
## Resampling results across tuning parameters:  
##   
## mtry Accuracy Kappa  
## 2 0.2920635 0   
## 25 0.2920635 0   
## 48 0.3047619 0   
## 71 0.2952381 0   
## 94 0.2888889 0   
## 117 0.2793651 0   
## 140 0.2761905 0   
## 164 0.2952381 0   
##   
## Kappa was used to select the optimal model using the largest value.  
## The final value used for the model was mtry = 2.

##   
## Call:  
## summary.resamples(object = resamps)  
##   
## Models: glmnet, rpart, rf, bagging, svm   
## Number of resamples: 315   
##   
## Accuracy   
## Min. 1st Qu. Median Mean 3rd Qu. Max. NA's  
## glmnet 0 0 0 0.2825397 1 1 0  
## rpart 0 0 0 0.2825397 1 1 0  
## rf 0 0 0 0.2920635 1 1 0  
## bagging 0 0 0 0.2920635 1 1 0  
## svm 0 0 0 0.2571429 1 1 0  
##   
## Kappa   
## Min. 1st Qu. Median Mean 3rd Qu. Max. NA's  
## glmnet 0 0 0 0 0 0 89  
## rpart 0 0 0 0 0 0 89  
## rf 0 0 0 0 0 0 92  
## bagging 0 0 0 0 0 0 92  
## svm 0 0 0 0 0 0 81



## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## glmnet   
##   
## 461 samples  
## 107 predictors  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with a fixed window)   
## Summary of sample sizes: 146, 146, 146, 146, 146, 146, ...   
## Resampling results across tuning parameters:  
##   
## alpha lambda Accuracy Kappa  
## 0.1000000 0.0000496097 0.2412698 0   
## 0.1000000 0.0001380419 0.2412698 0   
## 0.1000000 0.0003841099 0.2412698 0   
## 0.1000000 0.0010688086 0.2412698 0   
## 0.1000000 0.0029740235 0.2412698 0   
## 0.1000000 0.0082753971 0.2412698 0   
## 0.1000000 0.0230267841 0.2380952 0   
## 0.1000000 0.0640733945 0.2825397 0   
## 0.2285714 0.0000496097 0.2380952 0   
## 0.2285714 0.0001380419 0.2380952 0   
## 0.2285714 0.0003841099 0.2380952 0   
## 0.2285714 0.0010688086 0.2380952 0   
## 0.2285714 0.0029740235 0.2380952 0   
## 0.2285714 0.0082753971 0.2444444 0   
## 0.2285714 0.0230267841 0.2476190 0   
## 0.2285714 0.0640733945 0.3079365 0   
## 0.3571429 0.0000496097 0.2349206 0   
## 0.3571429 0.0001380419 0.2349206 0   
## 0.3571429 0.0003841099 0.2349206 0   
## 0.3571429 0.0010688086 0.2349206 0   
## 0.3571429 0.0029740235 0.2349206 0   
## 0.3571429 0.0082753971 0.2507937 0   
## 0.3571429 0.0230267841 0.2761905 0   
## 0.3571429 0.0640733945 0.2920635 0   
## 0.4857143 0.0000496097 0.2285714 0   
## 0.4857143 0.0001380419 0.2285714 0   
## 0.4857143 0.0003841099 0.2285714 0   
## 0.4857143 0.0010688086 0.2285714 0   
## 0.4857143 0.0029740235 0.2285714 0   
## 0.4857143 0.0082753971 0.2571429 0   
## 0.4857143 0.0230267841 0.2825397 0   
## 0.4857143 0.0640733945 0.2984127 0   
## 0.6142857 0.0000496097 0.2380952 0   
## 0.6142857 0.0001380419 0.2380952 0   
## 0.6142857 0.0003841099 0.2380952 0   
## 0.6142857 0.0010688086 0.2380952 0   
## 0.6142857 0.0029740235 0.2380952 0   
## 0.6142857 0.0082753971 0.2507937 0   
## 0.6142857 0.0230267841 0.2920635 0   
## 0.6142857 0.0640733945 0.2730159 0   
## 0.7428571 0.0000496097 0.2444444 0   
## 0.7428571 0.0001380419 0.2444444 0   
## 0.7428571 0.0003841099 0.2444444 0   
## 0.7428571 0.0010688086 0.2444444 0   
## 0.7428571 0.0029740235 0.2476190 0   
## 0.7428571 0.0082753971 0.2539683 0   
## 0.7428571 0.0230267841 0.2888889 0   
## 0.7428571 0.0640733945 0.2825397 0   
## 0.8714286 0.0000496097 0.2476190 0   
## 0.8714286 0.0001380419 0.2476190 0   
## 0.8714286 0.0003841099 0.2476190 0   
## 0.8714286 0.0010688086 0.2476190 0   
## 0.8714286 0.0029740235 0.2444444 0   
## 0.8714286 0.0082753971 0.2603175 0   
## 0.8714286 0.0230267841 0.3079365 0   
## 0.8714286 0.0640733945 0.2793651 0   
## 1.0000000 0.0000496097 0.2571429 0   
## 1.0000000 0.0001380419 0.2571429 0   
## 1.0000000 0.0003841099 0.2571429 0   
## 1.0000000 0.0010688086 0.2571429 0   
## 1.0000000 0.0029740235 0.2539683 0   
## 1.0000000 0.0082753971 0.2698413 0   
## 1.0000000 0.0230267841 0.2984127 0   
## 1.0000000 0.0640733945 0.2857143 0   
##   
## Accuracy was used to select the optimal model using the largest value.  
## The final values used for the model were alpha = 0.2285714 and lambda  
## = 0.06407339.

## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## Bagged CART   
##   
## 461 samples  
## 107 predictors  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with a fixed window)   
## Summary of sample sizes: 146, 146, 146, 146, 146, 146, ...   
## Resampling results:  
##   
## Accuracy Kappa  
## 0.2920635 0

## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## Support Vector Machines with Linear Kernel   
##   
## 461 samples  
## 107 predictors  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with a fixed window)   
## Summary of sample sizes: 146, 146, 146, 146, 146, 146, ...   
## Resampling results:  
##   
## Accuracy Kappa  
## 0.2571429 0   
##   
## Tuning parameter 'C' was held constant at a value of 1

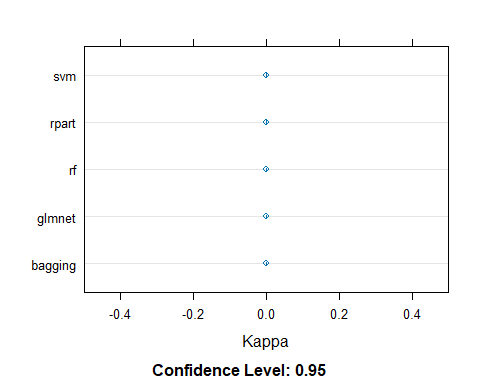
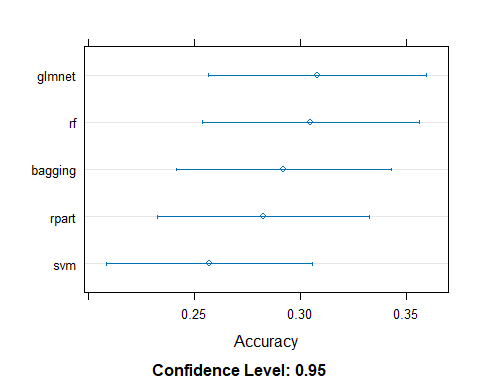
## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## CART   
##   
## 461 samples  
## 107 predictors  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with a fixed window)   
## Summary of sample sizes: 146, 146, 146, 146, 146, 146, ...   
## Resampling results across tuning parameters:  
##   
## cp Accuracy Kappa  
## 0.004966887 0.2603175 0   
## 0.006622517 0.2634921 0   
## 0.009933775 0.2698413 0   
## 0.013245033 0.2793651 0   
## 0.016556291 0.2698413 0   
## 0.017660044 0.2698413 0   
## 0.019867550 0.2761905 0   
## 0.046357616 0.2825397 0   
##   
## Accuracy was used to select the optimal model using the largest value.  
## The final value used for the model was cp = 0.04635762.

## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## Random Forest   
##   
## 461 samples  
## 107 predictors  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with a fixed window)   
## Summary of sample sizes: 146, 146, 146, 146, 146, 146, ...   
## Resampling results across tuning parameters:  
##   
## mtry Accuracy Kappa  
## 2 0.2920635 0   
## 25 0.2920635 0   
## 48 0.3047619 0   
## 71 0.2952381 0   
## 94 0.2888889 0   
## 117 0.2793651 0   
## 140 0.2761905 0   
## 164 0.2952381 0   
##   
## Accuracy was used to select the optimal model using the largest value.  
## The final value used for the model was mtry = 48.

##   
## Call:  
## summary.resamples(object = resamps)  
##   
## Models: glmnet, rpart, rf, bagging, svm   
## Number of resamples: 315   
##   
## Accuracy   
## Min. 1st Qu. Median Mean 3rd Qu. Max. NA's  
## glmnet 0 0 0 0.3079365 1 1 0  
## rpart 0 0 0 0.2825397 1 1 0  
## rf 0 0 0 0.3047619 1 1 0  
## bagging 0 0 0 0.2920635 1 1 0  
## svm 0 0 0 0.2571429 1 1 0  
##   
## Kappa   
## Min. 1st Qu. Median Mean 3rd Qu. Max. NA's  
## glmnet 0 0 0 0 0 0 97  
## rpart 0 0 0 0 0 0 89  
## rf 0 0 0 0 0 0 96  
## bagging 0 0 0 0 0 0 92  
## svm 0 0 0 0 0 0 81

 ### FTSE external non-fixed window

## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## glmnet   
##   
## 461 samples  
## 107 predictors  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with no fixed window)   
## Summary of sample sizes: 146, 147, 148, 149, 150, 151, ...   
## Resampling results across tuning parameters:  
##   
## alpha lambda Accuracy Kappa  
## 0.1000000 0.0000496097 0.2634921 0   
## 0.1000000 0.0001380419 0.2666667 0   
## 0.1000000 0.0003841099 0.2761905 0   
## 0.1000000 0.0010688086 0.2825397 0   
## 0.1000000 0.0029740235 0.2730159 0   
## 0.1000000 0.0082753971 0.2666667 0   
## 0.1000000 0.0230267841 0.2793651 0   
## 0.1000000 0.0640733945 0.3206349 0   
## 0.2285714 0.0000496097 0.2571429 0   
## 0.2285714 0.0001380419 0.2634921 0   
## 0.2285714 0.0003841099 0.2761905 0   
## 0.2285714 0.0010688086 0.2793651 0   
## 0.2285714 0.0029740235 0.2825397 0   
## 0.2285714 0.0082753971 0.2698413 0   
## 0.2285714 0.0230267841 0.2952381 0   
## 0.2285714 0.0640733945 0.3142857 0   
## 0.3571429 0.0000496097 0.2603175 0   
## 0.3571429 0.0001380419 0.2571429 0   
## 0.3571429 0.0003841099 0.2761905 0   
## 0.3571429 0.0010688086 0.2793651 0   
## 0.3571429 0.0029740235 0.2730159 0   
## 0.3571429 0.0082753971 0.2666667 0   
## 0.3571429 0.0230267841 0.2984127 0   
## 0.3571429 0.0640733945 0.2920635 0   
## 0.4857143 0.0000496097 0.2539683 0   
## 0.4857143 0.0001380419 0.2571429 0   
## 0.4857143 0.0003841099 0.2761905 0   
## 0.4857143 0.0010688086 0.2761905 0   
## 0.4857143 0.0029740235 0.2761905 0   
## 0.4857143 0.0082753971 0.2793651 0   
## 0.4857143 0.0230267841 0.3111111 0   
## 0.4857143 0.0640733945 0.3047619 0   
## 0.6142857 0.0000496097 0.2539683 0   
## 0.6142857 0.0001380419 0.2571429 0   
## 0.6142857 0.0003841099 0.2698413 0   
## 0.6142857 0.0010688086 0.2730159 0   
## 0.6142857 0.0029740235 0.2698413 0   
## 0.6142857 0.0082753971 0.2888889 0   
## 0.6142857 0.0230267841 0.3174603 0   
## 0.6142857 0.0640733945 0.3238095 0   
## 0.7428571 0.0000496097 0.2444444 0   
## 0.7428571 0.0001380419 0.2476190 0   
## 0.7428571 0.0003841099 0.2698413 0   
## 0.7428571 0.0010688086 0.2666667 0   
## 0.7428571 0.0029740235 0.2761905 0   
## 0.7428571 0.0082753971 0.2984127 0   
## 0.7428571 0.0230267841 0.3015873 0   
## 0.7428571 0.0640733945 0.3333333 0   
## 0.8714286 0.0000496097 0.2349206 0   
## 0.8714286 0.0001380419 0.2507937 0   
## 0.8714286 0.0003841099 0.2666667 0   
## 0.8714286 0.0010688086 0.2571429 0   
## 0.8714286 0.0029740235 0.2730159 0   
## 0.8714286 0.0082753971 0.2952381 0   
## 0.8714286 0.0230267841 0.2952381 0   
## 0.8714286 0.0640733945 0.3301587 0   
## 1.0000000 0.0000496097 0.2539683 0   
## 1.0000000 0.0001380419 0.2603175 0   
## 1.0000000 0.0003841099 0.2666667 0   
## 1.0000000 0.0010688086 0.2571429 0   
## 1.0000000 0.0029740235 0.2730159 0   
## 1.0000000 0.0082753971 0.2857143 0   
## 1.0000000 0.0230267841 0.2952381 0   
## 1.0000000 0.0640733945 0.3269841 0   
##   
## Kappa was used to select the optimal model using the largest value.  
## The final values used for the model were alpha = 0.1 and lambda = 0.06407339.

## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## Bagged CART   
##   
## 461 samples  
## 107 predictors  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with no fixed window)   
## Summary of sample sizes: 146, 147, 148, 149, 150, 151, ...   
## Resampling results:  
##   
## Accuracy Kappa  
## 0.3111111 0

## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## Support Vector Machines with Linear Kernel   
##   
## 461 samples  
## 107 predictors  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with no fixed window)   
## Summary of sample sizes: 146, 147, 148, 149, 150, 151, ...   
## Resampling results:  
##   
## Accuracy Kappa  
## 0.2666667 0   
##   
## Tuning parameter 'C' was held constant at a value of 1

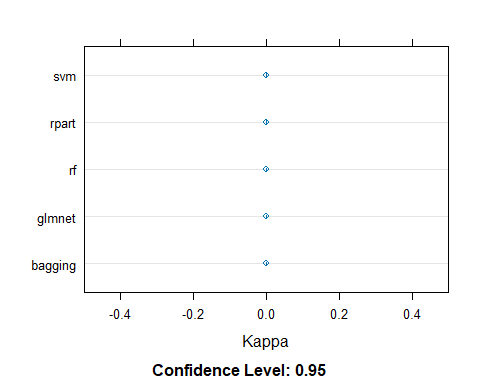
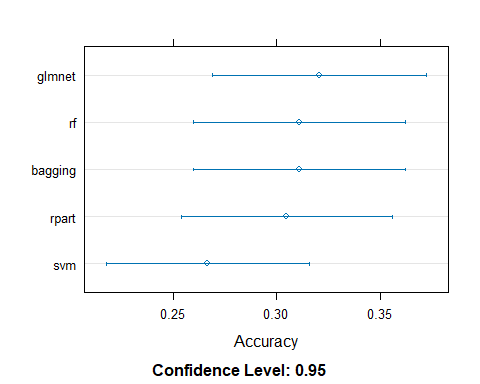
## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## CART   
##   
## 461 samples  
## 107 predictors  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with no fixed window)   
## Summary of sample sizes: 146, 147, 148, 149, 150, 151, ...   
## Resampling results across tuning parameters:  
##   
## cp Accuracy Kappa  
## 0.004966887 0.3206349 0   
## 0.006622517 0.3238095 0   
## 0.009933775 0.3206349 0   
## 0.013245033 0.3142857 0   
## 0.016556291 0.3142857 0   
## 0.017660044 0.3111111 0   
## 0.019867550 0.2952381 0   
## 0.046357616 0.3047619 0   
##   
## Kappa was used to select the optimal model using the largest value.  
## The final value used for the model was cp = 0.04635762.

## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## Random Forest   
##   
## 461 samples  
## 107 predictors  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with no fixed window)   
## Summary of sample sizes: 146, 147, 148, 149, 150, 151, ...   
## Resampling results across tuning parameters:  
##   
## mtry Accuracy Kappa  
## 2 0.3111111 0   
## 25 0.3079365 0   
## 48 0.3047619 0   
## 71 0.2857143 0   
## 94 0.3015873 0   
## 117 0.2952381 0   
## 140 0.3142857 0   
## 164 0.3047619 0   
##   
## Kappa was used to select the optimal model using the largest value.  
## The final value used for the model was mtry = 2.

##   
## Call:  
## summary.resamples(object = resamps)  
##   
## Models: glmnet, rpart, rf, bagging, svm   
## Number of resamples: 315   
##   
## Accuracy   
## Min. 1st Qu. Median Mean 3rd Qu. Max. NA's  
## glmnet 0 0 0 0.3206349 1 1 0  
## rpart 0 0 0 0.3047619 1 1 0  
## rf 0 0 0 0.3111111 1 1 0  
## bagging 0 0 0 0.3111111 1 1 0  
## svm 0 0 0 0.2666667 1 1 0  
##   
## Kappa   
## Min. 1st Qu. Median Mean 3rd Qu. Max. NA's  
## glmnet 0 0 0 0 0 0 101  
## rpart 0 0 0 0 0 0 96  
## rf 0 0 0 0 0 0 98  
## bagging 0 0 0 0 0 0 98  
## svm 0 0 0 0 0 0 84



## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## glmnet   
##   
## 461 samples  
## 107 predictors  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with no fixed window)   
## Summary of sample sizes: 146, 147, 148, 149, 150, 151, ...   
## Resampling results across tuning parameters:  
##   
## alpha lambda Accuracy Kappa  
## 0.1000000 0.0000496097 0.2634921 0   
## 0.1000000 0.0001380419 0.2666667 0   
## 0.1000000 0.0003841099 0.2761905 0   
## 0.1000000 0.0010688086 0.2825397 0   
## 0.1000000 0.0029740235 0.2730159 0   
## 0.1000000 0.0082753971 0.2666667 0   
## 0.1000000 0.0230267841 0.2793651 0   
## 0.1000000 0.0640733945 0.3206349 0   
## 0.2285714 0.0000496097 0.2571429 0   
## 0.2285714 0.0001380419 0.2634921 0   
## 0.2285714 0.0003841099 0.2761905 0   
## 0.2285714 0.0010688086 0.2793651 0   
## 0.2285714 0.0029740235 0.2825397 0   
## 0.2285714 0.0082753971 0.2698413 0   
## 0.2285714 0.0230267841 0.2952381 0   
## 0.2285714 0.0640733945 0.3142857 0   
## 0.3571429 0.0000496097 0.2603175 0   
## 0.3571429 0.0001380419 0.2571429 0   
## 0.3571429 0.0003841099 0.2761905 0   
## 0.3571429 0.0010688086 0.2793651 0   
## 0.3571429 0.0029740235 0.2730159 0   
## 0.3571429 0.0082753971 0.2666667 0   
## 0.3571429 0.0230267841 0.2984127 0   
## 0.3571429 0.0640733945 0.2920635 0   
## 0.4857143 0.0000496097 0.2539683 0   
## 0.4857143 0.0001380419 0.2571429 0   
## 0.4857143 0.0003841099 0.2761905 0   
## 0.4857143 0.0010688086 0.2761905 0   
## 0.4857143 0.0029740235 0.2761905 0   
## 0.4857143 0.0082753971 0.2793651 0   
## 0.4857143 0.0230267841 0.3111111 0   
## 0.4857143 0.0640733945 0.3047619 0   
## 0.6142857 0.0000496097 0.2539683 0   
## 0.6142857 0.0001380419 0.2571429 0   
## 0.6142857 0.0003841099 0.2698413 0   
## 0.6142857 0.0010688086 0.2730159 0   
## 0.6142857 0.0029740235 0.2698413 0   
## 0.6142857 0.0082753971 0.2888889 0   
## 0.6142857 0.0230267841 0.3174603 0   
## 0.6142857 0.0640733945 0.3238095 0   
## 0.7428571 0.0000496097 0.2444444 0   
## 0.7428571 0.0001380419 0.2476190 0   
## 0.7428571 0.0003841099 0.2698413 0   
## 0.7428571 0.0010688086 0.2666667 0   
## 0.7428571 0.0029740235 0.2761905 0   
## 0.7428571 0.0082753971 0.2984127 0   
## 0.7428571 0.0230267841 0.3015873 0   
## 0.7428571 0.0640733945 0.3333333 0   
## 0.8714286 0.0000496097 0.2349206 0   
## 0.8714286 0.0001380419 0.2507937 0   
## 0.8714286 0.0003841099 0.2666667 0   
## 0.8714286 0.0010688086 0.2571429 0   
## 0.8714286 0.0029740235 0.2730159 0   
## 0.8714286 0.0082753971 0.2952381 0   
## 0.8714286 0.0230267841 0.2952381 0   
## 0.8714286 0.0640733945 0.3301587 0   
## 1.0000000 0.0000496097 0.2539683 0   
## 1.0000000 0.0001380419 0.2603175 0   
## 1.0000000 0.0003841099 0.2666667 0   
## 1.0000000 0.0010688086 0.2571429 0   
## 1.0000000 0.0029740235 0.2730159 0   
## 1.0000000 0.0082753971 0.2857143 0   
## 1.0000000 0.0230267841 0.2952381 0   
## 1.0000000 0.0640733945 0.3269841 0   
##   
## Accuracy was used to select the optimal model using the largest value.  
## The final values used for the model were alpha = 0.7428571 and lambda  
## = 0.06407339.

## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## Bagged CART   
##   
## 461 samples  
## 107 predictors  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with no fixed window)   
## Summary of sample sizes: 146, 147, 148, 149, 150, 151, ...   
## Resampling results:  
##   
## Accuracy Kappa  
## 0.3111111 0

## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## Support Vector Machines with Linear Kernel   
##   
## 461 samples  
## 107 predictors  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with no fixed window)   
## Summary of sample sizes: 146, 147, 148, 149, 150, 151, ...   
## Resampling results:  
##   
## Accuracy Kappa  
## 0.2666667 0   
##   
## Tuning parameter 'C' was held constant at a value of 1

## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## CART   
##   
## 461 samples  
## 107 predictors  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with no fixed window)   
## Summary of sample sizes: 146, 147, 148, 149, 150, 151, ...   
## Resampling results across tuning parameters:  
##   
## cp Accuracy Kappa  
## 0.004966887 0.3206349 0   
## 0.006622517 0.3238095 0   
## 0.009933775 0.3206349 0   
## 0.013245033 0.3142857 0   
## 0.016556291 0.3142857 0   
## 0.017660044 0.3111111 0   
## 0.019867550 0.2952381 0   
## 0.046357616 0.3047619 0   
##   
## Accuracy was used to select the optimal model using the largest value.  
## The final value used for the model was cp = 0.006622517.

## Warning in nominalTrainWorkflow(x = x, y = y, wts = weights, info = trainInfo,  
## : There were missing values in resampled performance measures.

## Random Forest   
##   
## 461 samples  
## 107 predictors  
## 4 classes: 'LARGE\_DOWN', 'LARGE\_UP', 'SMALL\_DOWN', 'SMALL\_UP'   
##   
## No pre-processing  
## Resampling: Rolling Forecasting Origin Resampling (1 held-out with no fixed window)   
## Summary of sample sizes: 146, 147, 148, 149, 150, 151, ...   
## Resampling results across tuning parameters:  
##   
## mtry Accuracy Kappa  
## 2 0.3111111 0   
## 25 0.3079365 0   
## 48 0.3047619 0   
## 71 0.2857143 0   
## 94 0.3015873 0   
## 117 0.2952381 0   
## 140 0.3142857 0   
## 164 0.3047619 0   
##   
## Accuracy was used to select the optimal model using the largest value.  
## The final value used for the model was mtry = 140.

##   
## Call:  
## summary.resamples(object = resamps)  
##   
## Models: glmnet, rpart, rf, bagging, svm   
## Number of resamples: 315   
##   
## Accuracy   
## Min. 1st Qu. Median Mean 3rd Qu. Max. NA's  
## glmnet 0 0 0 0.3333333 1 1 0  
## rpart 0 0 0 0.3238095 1 1 0  
## rf 0 0 0 0.3142857 1 1 0  
## bagging 0 0 0 0.3111111 1 1 0  
## svm 0 0 0 0.2666667 1 1 0  
##   
## Kappa   
## Min. 1st Qu. Median Mean 3rd Qu. Max. NA's  
## glmnet 0 0 0 0 0 0 105  
## rpart 0 0 0 0 0 0 102  
## rf 0 0 0 0 0 0 99  
## bagging 0 0 0 0 0 0 98  
## svm 0 0 0 0 0 0 84

