

Echoview Exports Data Merging

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Merge echoview exports from multiple EV files into one .csv file

This script will allow you to merge all .csv files stored in one folder based on the columns they have in common. This is useful in the case that the Echoview export properties were inconsistent across EV files from which you exported.

Before you begin, save all .csv exports from Echoview in one folder and set this folder as your working directory using the function `setwd()`.

Create a list of the files in this folder.

```
file.list<-list.files(path =  
"C:/Users/allwhite/Desktop/Autocorrelation/Manuscript/nasc5x5_2017/")  
file.list  
  
## [1] "MG111_8_22_2017_Night_NASC.csv" "MG111_8_23_2017_Day_NASC.csv"  
## [3] "MG111_9_5_2017_Day_NASC.csv"    "MG111_9_5_2017_night_NASC.csv"  
## [5] "WRT_8_22_2017_night_NASC.csv"   "WRT_8_23_2017_day_NASC.csv"  
## [7] "WRT_9_5_2017_day_NASC.csv"      "WRT_9_5_2017_night_NASC.csv"
```

Now make some empty lists to store each file in. We'll make one to store the files as dataframes, one to store the column names of each file, and one to store the dataframe containing only the columns that they all have in common.

```
allfiles<-vector('list',length=length(file.list)) #will store each file as a  
dataframe  
columns<-vector('list',length=length(file.list)) #will store the column names  
in each dataframe  
mergedfiles<-vector('list',length=length(file.list)) #will store each  
dataframe with only the columns that they all have in common
```

Next, make a loop where each iteration will store a file in your folder as a dataframe in the list "allfiles" and the column names of that file in the list "columns".

```
for(i in 1:length(file.list)){  
  file.i<-read.csv(file.list[i]) #opens the ith .csv file  
  file.i$file_name<-file.list[i] #adds a new column to each dataframe which  
contains the name of the original file  
  file.i$site<-i #adds a new column to each dataframe which assigns a number  
to each file  
  allfiles[[i]]<-file.i #stores the ith dataframe as the ith element in the  
list "allfiles"  
  columns[[i]]<-colnames(file.i) #stores the column names of the ith
```

dataframe as the ith element in the list "columns"

```
#Print the number of column names in each file to see if they match
print(length(colnames(file.i)))
}

## [1] 99
## [1] 99
## [1] 99
## [1] 99
## [1] 99
## [1] 99
## [1] 99
## [1] 100
```

By printing the number of column names in each file we can see that the 8th .csv file has one more column than the other 7 .csv files in this folder. As there are 99 columns in every other folder, it might take us some time to manually go through and find which column didn't match. Instead, we'll let R do it for us!

Find the column names that the 8 .csv files have in common and store these names as a list called "common.columns".

```
common.columns<-Reduce(intersect,c(columns)) #You will have to change the
number of columns[[]] here based on how many files you are merging.
```

This gives us a list of the column names that all files have in common.

```
common.columns

## [1] "Interval"
## [2] "Layer"
## [3] "Sv_mean"
## [4] "NASC"
## [5] "Sv_max"
## [6] "Sv_min"
## [7] "Sv_noise"
## [8] "NASC_noise"
## [9] "Height_mean"
## [10] "Depth_mean"
## [11] "Good_samples"
## [12] "Layer_depth_min"
## [13] "Layer_depth_max"
## [14] "Ping_S"
## [15] "Ping_E"
## [16] "Ping_M"
## [17] "Dist_S"
## [18] "Dist_E"
## [19] "Dist_M"
## [20] "VL_start"
## [21] "VL_end"
```

```
## [22] "VL_mid"
## [23] "Date_S"
## [24] "Time_S"
## [25] "Date_E"
## [26] "Time_E"
## [27] "Date_M"
## [28] "Time_M"
## [29] "Lat_S"
## [30] "Lon_S"
## [31] "Lat_E"
## [32] "Lon_E"
## [33] "Lat_M"
## [34] "Lon_M"
## [35] "Exclude_below_line_depth_mean"
## [36] "Program_version"
## [37] "Processing_version"
## [38] "Processing_date"
## [39] "Processing_time"
## [40] "EV_filename"
## [41] "Alpha"
## [42] "Gain_constant"
## [43] "Noise_Sv_1m"
## [44] "Minimum_Sv_threshold_applied"
## [45] "Minimum_integration_threshold"
## [46] "Maximum_Sv_threshold_applied"
## [47] "Maximum_integration_threshold"
## [48] "Exclude_above_line_applied"
## [49] "Exclude_above_line_depth_mean"
## [50] "Exclude_below_line_applied"
## [51] "Bottom_offset"
## [52] "Standard_deviation"
## [53] "Skewness"
## [54] "Kurtosis"
## [55] "ABC"
## [56] "ABC_noise"
## [57] "Area_Backscatter_Strength"
## [58] "Thickness_mean"
## [59] "Range_mean"
## [60] "Exclude_below_line_range_mean"
## [61] "Exclude_above_line_range_mean"
## [62] "Bad_data_no_data_samples"
## [63] "Beam_volume_sum"
## [64] "No_data_samples"
## [65] "Frequency"
## [66] "Grid_reference_line"
## [67] "Layer_top_to_reference_line_depth"
## [68] "Layer_top_to_reference_line_range"
## [69] "Layer_bottom_to_reference_line_depth"
## [70] "Layer_bottom_to_reference_line_range"
## [71] "Exclude_below_line_depth_min"
```

```
## [72] "Exclude_below_line_range_min"
## [73] "Exclude_below_line_depth_max"
## [74] "Exclude_below_line_range_max"
## [75] "Samples_Below_Bottom_Exclusion"
## [76] "Samples_Above_Surface_Exclusion"
## [77] "Samples_In_Domain"
## [78] "Bad_data_empty_water_samples"
## [79] "Bottom_roughness_normalized"
## [80] "Bottom_hardness_normalized"
## [81] "First_bottom_length_normalized"
## [82] "Second_bottom_length_normalized"
## [83] "Bottom_rise_time_normalized"
## [84] "Heave_source"
## [85] "Heave_min"
## [86] "Heave_max"
## [87] "Bottom_line_depth_mean"
## [88] "Bottom_max_sv"
## [89] "Bottom_kurtosis"
## [90] "Bottom_skewness"
## [91] "Heave_mean"
## [92] "Center_of_mass"
## [93] "Inertia"
## [94] "Proportion_occupied"
## [95] "Equivalent_area"
## [96] "Aggregation_index"
## [97] "file_name"
## [98] "site"
```

Now we can write a loop to subset each dataframe by the common.columns list and store these dataframes containing only columns that all the files have in the list “mergedfiles” that we created earlier.

```
for(i in 1:length(file.list)){
  file.i<-allfiles[[i]]
  m.file.i<-file.i[,common.columns]
  print(length(colnames(m.file.i)))
  mergedfiles[[i]]<-m.file.i
}

## [1] 98
## [1] 98
## [1] 98
## [1] 98
## [1] 98
## [1] 98
## [1] 98
## [1] 98
```

The number of columns should now be the same for all files.

Bind the subsetted dataframes by row into one dataframe.

```
merged.data<-as.data.frame(do.call(rbind,mergedfiles))
```

Check to make sure that this worked by printing the last 6 rows of your combined data.

```
tail(merged.data)
```

```
##      Interval Layer   Sv_mean   NASC   Sv_max   Sv_min   Sv_noise
## 922205    13038    18 -61.48385 30.354546 -56.13503 -74.14312 -973.9750
## 922206    13038    19 -64.38472 15.564547 -56.66190 -83.22583 -973.4822
## 922207    13038    20 -67.96291  6.828366 -62.69842 -83.94245 -973.0145
## 922208    13038    21 -62.17048 25.915533 -57.16562 -79.09296 -972.6832
## 922209    13038    22 -67.59994  7.423595 -59.97008 -83.44826 -972.2564
## 922210    13038    23 -77.51140  0.795532 -72.77773 -84.12834 -971.8546
##      NASC_noise Height_mean Depth_mean Good_samples Layer_depth_min
## 922205         0   0.991098   17.51765          40             17
## 922206         0   0.991098   18.50875          40             18
## 922207         0   0.991098   19.49985          40             19
## 922208         0   0.991098   20.49094          40             20
## 922209         0   0.991098   21.48204          40             21
## 922210         0   1.040652   22.49792          17             22
##      Layer_depth_max Ping_S Ping_E Ping_M   Dist_S   Dist_E   Dist_M
VL_start
## 922205          18  38019  38020  38019 13037.39 13037.95 13037.39
1511763
## 922206          19  38019  38020  38019 13037.39 13037.95 13037.39
1511763
## 922207          20  38019  38020  38019 13037.39 13037.95 13037.39
1511763
## 922208          21  38019  38020  38019 13037.39 13037.95 13037.39
1511763
## 922209          22  38019  38020  38019 13037.39 13037.95 13037.39
1511763
## 922210          23  38019  38020  38019 13037.39 13037.95 13037.39
1511763
##      VL_end  VL_mid   Date_S      Time_S   Date_E      Time_E
Date_M
## 922205 1511764 1511763 20170906  04:12:24.1240 20170906  04:12:24.2250
20170906
## 922206 1511764 1511763 20170906  04:12:24.1240 20170906  04:12:24.2250
20170906
## 922207 1511764 1511763 20170906  04:12:24.1240 20170906  04:12:24.2250
20170906
## 922208 1511764 1511763 20170906  04:12:24.1240 20170906  04:12:24.2250
20170906
## 922209 1511764 1511763 20170906  04:12:24.1240 20170906  04:12:24.2250
20170906
## 922210 1511764 1511763 20170906  04:12:24.1240 20170906  04:12:24.2250
20170906
##      Time_M Lat_S Lon_S Lat_E Lon_E Lat_M Lon_M
## 922205  04:12:24.1240   999   999   999   999   999   999
```

```

## 922206 04:12:24.1240 999 999 999 999 999 999
## 922207 04:12:24.1240 999 999 999 999 999 999
## 922208 04:12:24.1240 999 999 999 999 999 999
## 922209 04:12:24.1240 999 999 999 999 999 999
## 922210 04:12:24.1240 999 999 999 999 999 999
##      Exclude_below_line_depth_mean      Program_version Processing_version
## 922205      -9999 "10.0.298.38422" 3
## 922206      -9999 "10.0.298.38422" 3
## 922207      -9999 "10.0.298.38422" 3
## 922208      -9999 "10.0.298.38422" 3
## 922209      -9999 "10.0.298.38422" 3
## 922210      -9999 "10.0.298.38422" 3
##      Processing_date Processing_time
## 922205      20200223 14:10:15.0860
## 922206      20200223 14:10:15.0860
## 922207      20200223 14:10:15.0860
## 922208      20200223 14:10:15.0860
## 922209      20200223 14:10:15.0860
## 922210      20200223 14:10:15.0860
##      EV_filename      Alpha
Gain_constant
## 922205 "D:\\Echoview Files 2017\\WRT_9_5_2017_night.EV" 0.006197
-9999
## 922206 "D:\\Echoview Files 2017\\WRT_9_5_2017_night.EV" 0.006197
-9999
## 922207 "D:\\Echoview Files 2017\\WRT_9_5_2017_night.EV" 0.006197
-9999
## 922208 "D:\\Echoview Files 2017\\WRT_9_5_2017_night.EV" 0.006197
-9999
## 922209 "D:\\Echoview Files 2017\\WRT_9_5_2017_night.EV" 0.006197
-9999
## 922210 "D:\\Echoview Files 2017\\WRT_9_5_2017_night.EV" 0.006197
-9999
##      Noise_Sv_1m Minimum_Sv_threshold_applied
Minimum_integration_threshold
## 922205      -999      0
-70
## 922206      -999      0
-70
## 922207      -999      0
-70
## 922208      -999      0
-70
## 922209      -999      0
-70
## 922210      -999      0
-70
##      Maximum_Sv_threshold_applied Maximum_integration_threshold
## 922205      0      99
## 922206      0      99

```

## 922207	0	99	
## 922208	0	99	
## 922209	0	99	
## 922210	0	99	
##	Exclude_above_line_applied	Exclude_above_line_depth_mean	
## 922205	0	-9999	
## 922206	0	-9999	
## 922207	0	-9999	
## 922208	0	-9999	
## 922209	0	-9999	
## 922210	0	-9999	
##	Exclude_below_line_applied	Bottom_offset	Standard_deviation
Skewness			
## 922205	0	0	5.62e-07
1.228141			
## 922206	0	0	4.59e-07
2.186993			
## 922207	0	0	1.28e-07
0.940798			
## 922208	0	0	5.98e-07
1.057672			
## 922209	0	0	2.39e-07
2.397048			
## 922210	0	0	1.30e-08
1.658084			
##	Kurtosis	ABC	ABC_noise
Thickness_mean			Area_Backscatter_Strength
## 922205	1.566133	7.04e-07	0
0.991098			-61.52268
## 922206	5.861273	3.61e-07	0
0.991098			-64.42355
## 922207	0.507681	1.58e-07	0
0.991098			-68.00175
## 922208	-0.191099	6.01e-07	0
0.991098			-62.20932
## 922209	5.609874	1.72e-07	0
0.991098			-67.63878
## 922210	2.517204	1.85e-08	0
1.040652			-77.33834
##	Range_mean	Exclude_below_line_range_mean	
Exclude_above_line_range_mean			
## 922205	17.51765	-9999	-
9999			
## 922206	18.50875	-9999	-
9999			
## 922207	19.49985	-9999	-
9999			
## 922208	20.49094	-9999	-
9999			
## 922209	21.48204	-9999	-

```

9999
## 922210    22.49792                -9999                -
9999
##          Bad_data_no_data_samples Beam_volume_sum No_data_samples Frequency
## 922205                0          9.643039                0          38
## 922206                0         10.764757                0          38
## 922207                0         11.948193                0          38
## 922208                0         13.193346                0          38
## 922209                0         14.500217                0          38
## 922210                0         16.699279                25          38
##          Grid_reference_line Layer_top_to_reference_line_depth
## 922205 "Surface (depth of zero)"                17
## 922206 "Surface (depth of zero)"                18
## 922207 "Surface (depth of zero)"                19
## 922208 "Surface (depth of zero)"                20
## 922209 "Surface (depth of zero)"                21
## 922210 "Surface (depth of zero)"                22
##          Layer_top_to_reference_line_range
Layer_bottom_to_reference_line_depth
## 922205                17
18
## 922206                18
19
## 922207                19
20
## 922208                20
21
## 922209                21
22
## 922210                22
23
##          Layer_bottom_to_reference_line_range Exclude_below_line_depth_min
## 922205                18                -9999
## 922206                19                -9999
## 922207                20                -9999
## 922208                21                -9999
## 922209                22                -9999
## 922210                23                -9999
##          Exclude_below_line_range_min Exclude_below_line_depth_max
## 922205                -9999                -9999
## 922206                -9999                -9999
## 922207                -9999                -9999
## 922208                -9999                -9999
## 922209                -9999                -9999
## 922210                -9999                -9999
##          Exclude_below_line_range_max Samples_Below_Bottom_Exclusion
## 922205                -9999                0
## 922206                -9999                0
## 922207                -9999                0
## 922208                -9999                0

```


## 922209	-9999	0
## 922210	-9999	0
##	Samples_Above_Surface_Exclusion	Samples_In_Domain
## 922205	0	40
## 922206	0	40
## 922207	0	40
## 922208	0	40
## 922209	0	40
## 922210	0	42
##	Bad_data_empty_water_samples	Bottom_roughness_normalized
## 922205	0	-9.9e+37
## 922206	0	-9.9e+37
## 922207	0	-9.9e+37
## 922208	0	-9.9e+37
## 922209	0	-9.9e+37
## 922210	0	-9.9e+37
##	Bottom_hardness_normalized	First_bottom_length_normalized
## 922205	-9.9e+37	-9.9e+37
## 922206	-9.9e+37	-9.9e+37
## 922207	-9.9e+37	-9.9e+37
## 922208	-9.9e+37	-9.9e+37
## 922209	-9.9e+37	-9.9e+37
## 922210	-9.9e+37	-9.9e+37
##	Second_bottom_length_normalized	Bottom_rise_time_normalized
## 922205	-9.9e+37	-9.9e+37
## 922206	-9.9e+37	-9.9e+37
## 922207	-9.9e+37	-9.9e+37
## 922208	-9.9e+37	-9.9e+37
## 922209	-9.9e+37	-9.9e+37
## 922210	-9.9e+37	-9.9e+37
##	Heave_min	Heave_max
## 922205	-9.9e+37	-9.9e+37
## 922206	-9.9e+37	-9.9e+37
## 922207	-9.9e+37	-9.9e+37
## 922208	-9.9e+37	-9.9e+37
## 922209	-9.9e+37	-9.9e+37
## 922210	-9.9e+37	-9.9e+37
##	Bottom_kurtosis	Bottom_line_depth_mean
## 922205	0	-10000.99
## 922206	0	-10000.99
## 922207	0	-10000.99
## 922208	0	-10000.99
## 922209	0	-10000.99
## 922210	0	-10000.99
##	Bottom_max_sv	
## 922205	-9.9e+37	-
## 922206	-9.9e+37	-
## 922207	-9.9e+37	-
## 922208	-9.9e+37	-
## 922209	-9.9e+37	-
## 922210	-9.9e+37	-

```

9.9e+37
##      Bottom_skewness Heave_mean Center_of_mass  Inertia
Proportion_occupied
## 922205      -9.9e+37          0      17.55764 0.123671
1.000000
## 922206      -9.9e+37          0      18.43586 0.125497
1.000000
## 922207      -9.9e+37          0      19.53989 0.088841
1.000000
## 922208      -9.9e+37          0      20.50660 0.069504
0.975000
## 922209      -9.9e+37          0      21.46099 0.036548
0.975000
## 922210      -9.9e+37          0      22.19753 0.018039
0.404762
##      Equivalent_area Aggregation_index      file_name site
## 922205      24.84058      0.040257 WRT_9_5_2017_night_NASC.csv 8
## 922206      15.70667      0.063667 WRT_9_5_2017_night_NASC.csv 8
## 922207      24.54505      0.040741 WRT_9_5_2017_night_NASC.csv 8
## 922208      20.55056      0.048660 WRT_9_5_2017_night_NASC.csv 8
## 922209      14.04870      0.071181 WRT_9_5_2017_night_NASC.csv 8
## 922210      11.29825      0.088509 WRT_9_5_2017_night_NASC.csv 8

```

Scroll to the last few columns in your dataframe. You'll know that the merging worked if the values in the last four or so columns look reasonable for the variables they represent.

Finally, save your merged dataframe as a .csv file. In this example, the data has been saved in the folder "Manuscript" as "5x5nasc_2017".

```

write.csv(merged.data, 'C:/Users/allwhite/Desktop/Autocorrelation/Manuscript/5
x5nasc_2017.csv')

```