

Installation:

Unzip .zip file into a folder.

Download or copy desired SCRAM Excel spreadsheet into the same folder. The .zip file included a few that I used to develop and test the code.

Download or copy the Excel spreadsheet that contains the training data into the same folder. The .zip file contains the file **TAC-BrAC Conversion Dataset.xlsx** that I used to develop and test the code.

Execution:

Launch Matlab

Navigate (Click on the Browse icon on the far left just above the Current Folder window) to the folder you created in Installation above.

Either in the command window type:

Run_BrAC_Estimator

Or in the Current Folder window, point the mouse

Run_BrAC_Estimator

right click to bring down an action menu, and then left click on run.

The program will then prompt you to enter the requisite input information. Note that no, the participant identifier is simply a number rather than a character string, so no pops required. If the participant identifier number is less than 5 characters in length it is automatically padded with leading zeros to bring it to 5 characters in length. So if you enter 7401 it will automatically become 07401 to agree with the filename of the SCRAM spreadsheet. I assume all SCRAM filenames are five characters in length and include only numeric (i.e. no alphabetic characters). If this isn't correct, let me know and I can change it so you enter a character string. I just thought this would make it easier. Here is an example (what you type is in red, what the program types is in black):

```
>> Run_BrAC_Estimator
```

```
Enter participant ID number: 7401
```

```
Enter noise threshold (a nonnegative real number): .005
```

```
Enter the minimum number of zero TAC time intervals between drinking episodes (a positive integer): 3
```

```
Total number of drinking episodes found: 11
```

```
BrAC successfully estimated
```

```
Excel spreadsheet E_BrAC_07401.xlsx successfully created.
```

```
MATLAB workspace Data_07401.mat successfully created.
```

Or instead, you can also launch the program directly by typing in the command window

BrAC_Estimator('filename',Threshold,Min_Gap);

Where:

filename is the name of a SCRAM Excel spreadsheet. Note this must be a character string so it must be enclosed in pops (an old fashioned CS term for single quotes). Eventhough the filenames are numerical, I could not make this a numeric input because of the leading zeros, e.g. 07401.xlsx.

Threshold is a nonegative real number; all TAC readings less than Threshold are set to zero (for the purpose of eliminating noise). Note Threshold = 0 is allowable, but then many (likely extraneous) drinking episodes will be identified.

Min_Gap is a positive integer. The code identifies drinking episodes by looking for zero TAC values. Min_Gap = n implies that n or more consecutive zero TAC values indicates the start of a new episode. Consequently two episodes separated by fewer than n consecutive zero TAC values will be considered to be a single drinking episode. Examples of valid calls of **BrAC_Estimator**

BrAC_Estimator ('38701',0.0,5);

BrAC_Estimator ('07401',0.005,1);

BrAC_Estimator ('34703',0.007,3);

Output:

The code produces a plot of the identified drinking episodes, one plot for each of the drinking episodes identified that includes the estimated BrAC, the modeled TAC and the TAC data, and a plot of the training data that includes the estimated BrAC, the BrAC data, the modeled TAC, and the TAC data. The time axis is in hours from the start of the episode which in these plots is defined to be the time at which the last zero TAC value is recorded before becoming positive. The end of the episode is the time of first zero TAC value in the gap between the current identified episode and the next one. The negative time values are there because as you would expect, the BrAC will lead the TAC. Consequently with the beginning of the episode defined as it is in terms of the TAC, the BrAC must start sometime before time zero.

The code also produces a Matlab workspace named Data_<filename>.mat (e.g. Data_34703.mat) which can be loaded using the matlab load command (load Data_34703) or alternatively, highlight it in the Current Folder window, right click on it and click load. If you type who you will see a number of variables with the input and output data in them that can be viewed, plotted, etc. in Matlab.

The code also produces an Excel spreadsheet named E_BrAC_<filename>.xlsx (e.g. E_BrAC_34703.xlsx) with the estimated BrAC for each identified episode on a separate sheet. The first column is the actual date and time consistent with the dates and times in the SCRAM spreadsheet from which the TAC data came, the second column is elapsed time from the start of the episode in hours (Note that here the start of the episode is defined to be the last zero value of e_BrAC before the e_BrAC becomes positive), and the third column is e_BrAC in % alcohol._

Notes:

When the program runs the first thing it does is clear all the plots from the previous run if there was one. So if you want to keep any of the plots click on the file – save as menu for any that you want to save and then choose the picture filetype you desire (e.g. .jpeg, .tiff, .eps, etc.) and give it the name you desire in the dialog box. Note that the plots appear one on top of the other. To move the top one out of the way, place the mouse on the top border and left click and drag it where you want it.

This is not commercial software. I built in a little error checking (e.g. if you enter a filename for which no training data exists, etc.) but if you crash it and can't figure out why, just call or email me.

If you change the form of the file **TAC-BrAC Conversion Dataset.xlsx**, the code probably won't work anymore. Also, if there is any variation in the SCRAM spreadsheets, that will probably also screw things up. But it worked on the random sampling of 6 that I tested it on.