

Score behaviours out of experiment video

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Goal: create an Excel file that contains timeline for behaviours from an experimental video using Matlab R2019a.

When having a video, you may need to score a certain behaviour such as freezing, grooming, or even position in a plus maze. The following script permits you to score those behaviours simultaneously, while watching the video by simply pressing keys when the behaviours occur. You can then find start times and end times for every behaviour in different sheets of the same Excel file.

We will illustrate the explanations with the example of a plus maze experiment where we want to score position of the rat.

	A	B	C	D	E	F
1	5b	Open Arm	Control	1,3080896	4,1471433	2,8390537
2	5b	Open Arm	Control	6,3967781	13,376782	6,9800039
3	5b	Open Arm	Control	21,4171268	24,3367372	2,9196104
4	5b	Open Arm	Control	39,8669419	41,6467897	1,7798478
5	5b	Open Arm	Control	51,0970758	67,1370411	16,0399653

Sheet1

	A	B	C	D	E	F
1	5b	Middle	Control	4,14807	5,2567814	1,1087114
2	5b	Middle	Control	13,3579934	15,1070729	1,7490795
3	5b	Middle	Control	18,6068566	20,1766623	1,5698057
4	5b	Middle	Control	25,8866716	30,3671315	4,4804599
5	5b	Middle	Control	33,2165532	38,3564694	5,1399162
6	5b	Middle	Control	41,6066866	46,3765574	4,7698708
7	5b	Middle	Control	48,1169371	49,8465395	1,7296024
8	5b	Middle	Control	67,8865455	69,0264535	1,139908
9	5b	Middle	Control	74,8456439	77,9154634	3,0698195
10	5b	Middle	Control	96,8557133	100	3,1442867

Sheet2

	A	B	C	D	E	F
1	5b	Closed Arm	Control	5,436716	6,2666715	0,8299555
2	5b	Closed Arm	Control	15,2767262	18,636587	3,3598608
3	5b	Closed Arm	Control	20,1168795	21,4570856	1,3402061
4	5b	Closed Arm	Control	24,2964907	25,9166057	1,620115
5	5b	Closed Arm	Control	30,3670959	33,2376666	2,8705707
6	5b	Closed Arm	Control	38,336695	39,9165158	1,5798208
7	5b	Closed Arm	Control	46,3465952	48,1469746	1,8003794
8	5b	Closed Arm	Control	49,7968235	51,1966574	1,3998339
9	5b	Closed Arm	Control	67,0964216	67,9266847	0,8302631
10	5b	Closed Arm	Control	68,9865172	74,9055898	5,9190726
11	5b	Closed Arm	Control	77,8653931	96,8859618	19,0205687

Sheet3

Figure 1

'Fake' data for 100 seconds

behaviours={'Open arm','Closed arm','Middle'} and F1 corresponds to open arm, F2 closed arm and F3 middle. Note that if you have a doubt, when you run the program, the correspondence key/behaviour/sheet is reminded before trial starts and at the end of the scoring, in the Excel file, the behaviour that was recorded will be presented (see Figure 1).

5. Precise if you would like to add a column to put additional information on the trial. This information could be relative to the rat (control,lesion...), to the conditions of the experiment (low, normal volum CS...), the phases in the experiment (preCS, CS1...) by putting the Boolean '**descriptor**' to true or false. This additional column will be common to all the behaviours as you can see in Figure 1. In the case of a plus maze you could precise that the rat is a control animal for example. Note that if you want to use the script 'plotUSVFreezing.m' afterward, you need to have this column to distinguish the phases.
6. Fill '**totTime**' with the time length of the scoring. Here, we did a 'fake' scoring of 100 seconds for a maze experiment so totTime=100.
7. You can decide if you would like to add a count down before the trial recording start by filling '**countDown**' with the number of seconds you would like to have. It can be useful if the video starts directly with the part you are interested in. For our example, the rat is directly moving in the maze so it could be usefull to put a count down of 3 seconds and launch the video right at the beginning of the trial. If you don't want any count down, the trial starts directly after you push enter when the script ask you that, for that say countdown=0.

- While you run the script, before the actual start of recording, you have to indicate the name of the rat being studied in apostrophies (in example, '5b') and, if you said that you want the additional column to appear, the text that you want to write in it, also in apostrophies (in example, 'Control').

Then, the different keys that you can use will be reminded to you. You can study maximum 12 behaviours (from F1 to F12). **The keys are the 'FX'** with X being the number of the sheet corresponding to the key. For example, if you say that open arm is in sheet 1 of the Excel file, then when the rat is in the open arm in the video, you have to press 'F1'.

The command window on Matlab will look like the following, with no count down on the left and a 3sec count down on the right.

```
>> scoreAny
Which rat is being observed? (Write name in apostrophies): Rat '5b'
Which phase is this? or any descriptor (Write name in apostrophies): 'Control'
Recording for 100 seconds
Press F1 for Open Arm, recorded in sheet 1
Press F2 for Closed Arm, recorded in sheet 2
Press F3 for Middle, recorded in sheet 3
Press enter to start
Trial Started
fx F1 pressed - Open Arm
```

Figure 2: No count down

```
>> scoreAny
Which rat is being observed? (Write name in apostrophies): Rat '5b'
Which phase is this? or any descriptor (Write name in apostrophies): 'Control'
Recording for 100 seconds
Press F1 for Open Arm, recorded in sheet 1
Press F2 for Closed Arm, recorded in sheet 2
Press F3 for Middle, recorded in sheet 3
Press enter to start with a count down of 3 seconds
3 2 1 Trial Started
fx F1 pressed - Open Arm
```

Figure 3: Count down of 3 seconds

The final output Excel file will look like the following table (with column C in option).

A	B	C	D	E	F
#Rat	Behaviour	Descriptor	Time Start	Time End	Duration
...	...	...	...	...	...

Remarks:

- Make sure that you **close your output Excel file** before running the script. If you don't, the script still run until the end but can't save the data in the Excel file and you have to re-do the scoring.
- It is possible to press 2 keys at the same time, which could be useful when scoring certain mutually non-exclusive behaviours. Take that into account while recording mutually exclusive behaviours, such as being in the open arm OR closed arm of the plus maze.
- It is possible to add some data even after having modified the rest of the sheet. For that, there are certain restrictions:
 - You have to keep the same number of columns when recording (you can't remove the 'descriptor' column for example).
 - You can't write in the 6 or 7 first columns as they may be filled with more data except if you fill the all line you are writing in. This way, you can add titles, remarks, separations...

	A	B	C	D	E	F
1	Rat	Position	Type	Start time	End time	Duration
2	5b	Middle	Control	4,14807	5,2567814	1,1087114
3	5b	Middle	Control	13,3579934	15,1070729	1,7490795

Title at the beginning for all the columns

Title at the beginning for all the columns

A	B	C	D	E	F	
1	Rat	Position	Type	Start time	End time	Duration
2	5b	Middle	Control	4,14807	5,2567814	1,1087114
3	5b	Middle	Control	13,3579934	15,1070729	1,7490795
4	Rat	Position	Type	Start time	End time	Duration

Multiple lines added but all the cells are filled

4	5b	Middle	Control	18,6068566	20,1766623	1,5698057
5	5b	Middle	Control	25,8866716	30,3671315	4,4804599
6	Different Rat					
7	5c	Middle	Control	33,2165532	38,3564694	5,1399162
8	5c	Middle	Control	41,6066866	46,3765574	4,7698708

Line added BUT not all the cells are filled: won't compute