Those scripts should work on Matlab 2017a.

Required tool box: Psychtoolbox-3 installation is required.

This is the folder for all three experiments. To run the study, run all three experiments from the original folder one after another following a balanced design for each subject, meaning the order by which the three experiments are conducted is counter-balanced, for example:

|  |  |  |  |
| --- | --- | --- | --- |
| Subject ID | Test order | | |
| S1 | Experiment 1 | Experiment 2 | Experiment 3 |
| S2 | Experiment 1 | Experiment 3 | Experiment 2 |
| S3 | Experiment 2 | Experiment 1 | Experiment 3 |
| S4 | Experiment 2 | Experiment 3 | Experiment 1 |
| S5 | Experiment 3 | Experiment 1 | Experiment 2 |
| S6 | Experiment 3 | Experiment 2 | Experiment 1 |

Subject ID needs to be consistent for all three experiments. For the same subject, please use the same subject coding for all three experiment when asked.

**Experiment 1**

This is the experiment of target detection with notched noise or notched tonal as masker. The corresponding .m file to run are 1) **experiment\_1\_noise\_IM.m**, and 2) **experiment\_1\_tonal\_IM.m** respectively. Subjects need to finish both task to complete experiment 1.

1. When running the **experiment\_1\_noise\_IM.m** script, matlab will ask for a subject ID, type in the subject code (TXX for example) and press enter.
2. A GUI window will open, this window will help you monitor subject progress in the experiment. Select the file with the subject code that was typed in and click on “load selected condition”.
3. Once loaded the experiment interface for the subject will appear. Subject needs to be trained on the target sound first. Click on the “Target Sound Training” button to begin training.
4. This is a target detection task in quiet. Instruct the subject to press the A button if using Xbox controller, or mouse left click if don’t have one.
5. Subject’s progress will show up on the monitoring GUI window. Once done, a window will pop up and subject can begin the experiment.
6. Click on “stop training” to exit training. Instruct the subject to begin the experiment by clicking the “begin” button.
7. When the experiment started, subject will respond by clicking “yes” or “no” to indicate whether they can detect the target sound.
8. Once finished a window will pop up. Click “stop experiment” to end the experiment.
9. Repeat the same process when running **experiment\_1\_tonal\_IM.m**

**Experiment 2**

This the speech target identification task with another speech or noise as the masker. To run the experiment, run the script called **experiment\_2\_speech\_IM.m.**

1. Once ran, matlab will ask for a subject ID again, type in the ID and be consistent with the ID for this subject used for other 2 experiments (TXX for example).
2. The interface will appear after pressing enter. This is the training block of 20 trials in total. This part of the experiment has only target speaker with no masker, instruct the subject to answer the question “where did baron go” after hearing the sentence with the structure “Ready Baron Go To [color] [number] now” by choosing the correct color and number. Once training is finished, press enter, the experiment inter face will show up.
3. The experiment has 200 trials in total divided to 2 blocks of 100 trails each. Subject needs to perform the task in the same way by choosing correct color and number. But this time, there will be a speech or noise masker played at the same time.
4. Once finished, press enter to end the experiment.

**Experiment 3**

Experiment 3 is the visual crowding task. Run the script **experiment\_3\_visual\_crowding.m** to begin.

1. Once run, follow the instruction on the screen.
2. This experiment needs to be ran twice, one for training, the second run’s result is used. To indicate that add ‘\_1’ and ‘\_2’ at the end of the subject code. For example: TXX\_1, TXX\_2.
3. The script will end when the experiment is finished.

**Data analysis**

Once all 3 experiments are finished, run “**analysis\_save\_to\_excel.m”**. The summarized results will be stored in the excel file called **“summarized\_results.xlsx”.**