Experimental Guidelines for Task Classification Using Electroencephalographic Data

1. **-1 Week**– Make sure that other students and faculty who utilize the BIM lab are informed with at least one week in advance that an experimental session would take place at the lab.

2. **-1 Week**– Make sure that the consent letter, pre-experiment and post-experiment questionnaires were sent to the human subject at least one week in advance.

3. **-1 Week**– Make sure the batteries are charged.

4. Place outside the door a sign that says "PLEASE do not disturb".

5. Cover the opening of the door with paper and tape. Also cover the top of computer 2 with black cardboard to hide Matlab's toolbar.

6. Set the taskbar (start menu) of Windowsto auto-hide.

7. Setup the BioSemi and Patriot equipment before the test subject arrives the laboratory.

   - Connect the battery box to the AD-box.
   - The AD-box goes connected to the USB2 Receiver with an optical cable.
   - The USB link output of the USB2 receiver goes connected to Computer 1.
   - The USB2 Receiver trigger in/out (37 pin Sub-D connector) goes connected into the parallel port (25 pin Sub-D connector) Black Box (adapter) which goes connected to Computer 2.
   - Computer 2 will generate a signal using Matlab to synchonize the task being generated the signals acquired with the Biosemi system. To run the software type at the command window run_stimuli('stimuli'). Make sure you are in the correct directory.
   - On Computer 1 go to C:\Documents and Settings\BPILab\Desktop\ActiView Program and Files\ActiView - All. This will open the folder for the ActiveView. Then go to the Default.CFG file and open it with notepad; at the end of the file there are two lines of code make sure that they are set as follow:

     PauseOff=240 //-1 is disabled, 0-255 is enabled
     PauseOn=241 //-1 is disabled, 0-255 is enabled

   - On the same folder on Computer 1 open the ActiveView605-laptop file. Once the Active View software is open follow the next instructions:
     (a) Press 'Start' on the top left side of the window.
     (b) Press 'Start File'.
     (c) The file name will be the code name given to you previously.

(d) The Biosemi system setup is done and ready to collect data.

- Setup the Patriot electrode tracking system by connecting the data acquisition to Computer 2 and using the pen as the sensor. Make sure that the Reference Box and the collection of the data is done far from any metal object to avoid any interference with the system.
- Run the PiMgr software which will collect the Patriot electrode tracking system data. To setup the software make sure to follow the instructions below:
  (a) Maximize the PiMgr window.
  (b) Go to Device at the top of the PiMgr window.
  (c) Go to Station Configuration. This will open another window with five tabs.
  (d) Go to the Stylus tab and select 'Point/Track', press 'Apply' and OK.
  (e) Go to the top right side of the window and press on 'Toggle Recording' which is the red circle.
  (f) The Patriot data collection is ready.
- Place the electrodes in distillate water and salt. Make sure the electrodes do not stay in the ionized solution more than 10 minutes. Be careful that the bucket with the solution is not close to any computer or any electrical outlet, preferably place it on the floor.

8. At least two test administrators should be present in the lab. In case of a female test subject at least one of the test administrators should also be female.

9. Once the test subject arrives ask him/her to sign the consent letter.

10. Ask the test subject to answer the pre-questionnaire.

11. Explain the experiment to the test subject, including:

    - The function of the EEG.
    - The duration and nature of each segment of the experiment.
    - The environmental conditions (light level, sound, etc.).
    - The function of the recording cap and the electrolytic gel.

12. Instruct the test subject to not touch or scratch the recording cap or equipment during the experimental session.

13. Seat the test subject in a comfortable and stationary chair. Make sure he/she is comfortable and if he/she believes he/she will be capable of remaining seated in this position during the experiment.

14. Ask to the test subject if he/she wants to go to the restroom. This is his/her last chance to go before the data collection starts.

15. Measure the test subject's head circumference to determine the correct cap size.

16. Measure from the depression above the nose and below the forehead to the occipital protuberance (the natural bump in the back of a human head). Take note of the location of the halfway point of this measurement.

17. Record and measured from the base of the ear opening to the other base of the ear opening. When taking this measurement the tape should pass over the position of the first measurement.

18. Electrode A1 should be located at the intersection of the two previous measurements.

19. Once the cap is placed properly, ask the test subject about the comfort of the cap. Make sure to adjust the Velcro.

20. Using the Patriot electrode localization system record each of the 128 electrodes position using the PiMgr software data acquisition. Follow the instructions below:

    - Make sure you take at least 3 recordings per electrode.
    - Once you are done, press 'Stop', which is the black square located on the top right side of the PiMrg software window.
    - Go to file and select 'Export Motion Recording'. This will take you to another window where you will be able to save the data collection with the file name provided to you previously. Make sure that you save the data collection as a *.csv file.
    - Now disconnect and put away the Patriot system.

21. Apply electrolytic gel using the plastic syringes. After all the plastic caps have been filled with the gel install each electrode in the proper location.

22. Each bundle of electrodes should be taped to the back of the human subject's chair.

23. The human subject should now be positioned to observe the assigned monitor (computer 2).

24. Instruct the test subject not to move during the data collection.

25. Make sure that the human subject is aware of the sequence of the test. He/she will see images (flashes, static, arrows, arithmetic operations) and hear tunes. Instruct him/her that when a simple arithmetic operation appears, he/she should try to solve it mentally; also whenever an arrow appears he/she should try mentally to move the arrow towards the pointed direction.

26. Create a new file with the previous name given to you by pressing 'start file' at the Biosemi window. Start the Matlab experiment and after it ends press stop at the Biosemi program.

27. After the data collection is done, remove the cap from the test subject.

28. Dismiss the test subject so he/she may rinse his/her hair. Provide a Neutral, hypoallergenic shampoo and a clean towel to the test subject if he/she wishes.

29. Give the post-questionnaire to the test subject.

30. Once the test subject has completed the questionnaire dismiss him/her.

31. Disconnect and clean the electrodes thoroughly. Use warm distilled water to clead the electrodes. Also do not forget to clean the cap with tap water.

32. Ensure that the equipment is properly store in the designated container.