**Data description for ‘Noninvasive Electroencephalogram Based Control of a Robotic Arm for Reach and Grasp Tasks’**

Jianjun Meng1, Shuying Zhang1, Angeliki Bekyo2, Jaron Olsoe1, Bryan Baxter1 & Bin He1,2

1 Department of Biomedical Engineering, University of Minnesota

2 Institute for Engineering in Medicine, University of Minnesota

**Summary**

The shared data is organized into different folders corresponding to the description of experiment in our published paper. The first part is data for virtual cursor experiment. The data for left and right one dimensional cursor control is placed in VirtualCursor\1D\_PreRun\LR. The data for two dimensional virtual cursor control is placed in VirtualCursor\2D\_PreRun\F4Targets. The second part is data for robotic arm control. The data for grasping of 4 targets in fixed locations is organized in RoboticArm\_Grasping\2D\_Grasping\F4Targets. The data for grasping of 5 targets in fixed locations is organized in RoboticArm\_Grasping\2D\_Grasping\F5Targets. The data for grasping of a target in a random location is organized in RoboticArm\_Grasping\2D\_Grasping\F1RandTarget. The data for moving targets from table onto the shelf is organized in RoboticArm\_Grasping\2D\_Grasping\4STEP3DGrasping.

**Specification**

The whole experimental data set contains 13 subjects’ data. The data is saved as Matlab data file and is organized into different folders as described above. Each file is the data for a single session and the name of the mat file starts with a subject’s name, continued with the task name and end with a date (like S1\_LR\_20150130). Each file includes the BCI experimental online results for each run of that particular paradigm (saved in a cell variable ‘BCIResults’), key parameters for the experiment (saved in a structure ‘Experiment\_Parm’), key parameters for the state of the raw EEG signal (saved in a structure ‘Experimental\_states’), and the raw EEG signal (saved in a variable ‘output\_data’).

The raw EEG signal is composed of 10 channels (‘FC3’,’FC4’,’C5’,’C3’,’C1’,’C2’,’C4’,’C6’,’CP3’,’CP4’, the data of channel dimension is organized in the same sequence) of EEG data with a sampling frequency of 100Hz.

Take data ‘S1\_LR\_20150130.mat’ as an example, there are four variables including ‘BCIResults’, ‘Experiment\_Parm’, ‘Experimental\_states’ and ‘output\_data’ when the data is imported. In ‘BCIResults’, the number of trials for each of the five runs, the number of trials hitting or abort a target in each run, the percent valid correct and information transfer rate for each of the five runs are included. In ‘Experiment\_Parm’, the sampling frequency of 100Hz, the name of channels, prefeedbackduration, postfeedback duration and inter-trial interval duration are included. In ‘Experimental\_states’, ‘TargetCode’, ‘ResultCode’,’Feedback’,’CursorPosX’,’CursorPosY’ which indicate when does the status of system change are included. Please refer to BCI2000 for the meaning of the variables. In ‘output\_data’ it contains raw EEG signals of those five runs and organized in samples\*channel.

**Additional Information**

We request you cite the work shown below if you would use any of the data:

Meng, J., Zhang, S., Bekyo, A., Olsoe, J., Baxter, B. & He, B.Noninvasive Electroencephalogram Based Control of a Robotic Arm for Reach and Grasp Tasks. *Sci. Rep.* **6**, 38565; doi: 10.1038/srep38565 (2016).