Semnan university

SBSL-SSVEP-II dataset

About the dataset

Semnan biological signals laboratory stress dataset (SBSL-Stress-II). The SBSL- Stress -II Dataset, is a free dataset containing EMG signals from healthy subjects who had been stressed to evaluate the effect of stress on muscle activity. The dataset was produced as a part of a PhD thesis. All data were recorded using four electrodes (Surface EMG Sensor) during autumn 2018. The EMG signals were recorded from trapezius and erector spinae muscles (right and left). The purpose of this dataset is to detect stress using EMG signals and to compare the performance of the different muscles under stress. In EMG recording there are many Items that can effect on signal quality and should be noted. Electrodes may not be placed correctly, external noise can disturb the signal. Figure 1 shows the hardware setup that were used for all experiments, Datalog device and surface EMG electrodes were all from Biometrics Company.

Figure 1- Experiment devices.

The sampling frequency of the EMG recording system was set to 1000 Hz. The data are stored as .MAT files, typically opened using MATLAB.

Recording protocol and subjects

The whole experiments designed specifically for this project. Figure 2 illustrate a block diagram of the stress inducing protocol. The stress rating was done at the end and start of each task using the 5 point Likert Rating Score.Moreover electrodes were placed according to SENIAM standard. Figure 3 shows the location of the electrodes on the trapezius muscle and the erector spinae muscle in one of the participants.

Maximum voluntary contraction (MVC) for all mentioned muscles are recorded. Flexion 125° for trapezius muscles was done. Shoulder flexion 125° as resistance applied above elbow and at inferior angle of scapula attempting to de-rotate scapula with subject sitting in an erect posture with no back support. The prone laying position on a bench is a very productive MVC test position. Because all back muscles are facilitated within a muscle chain, MVCs for the erector spinae, attempting to get up the head and the leg with individual laying on the abdomen.

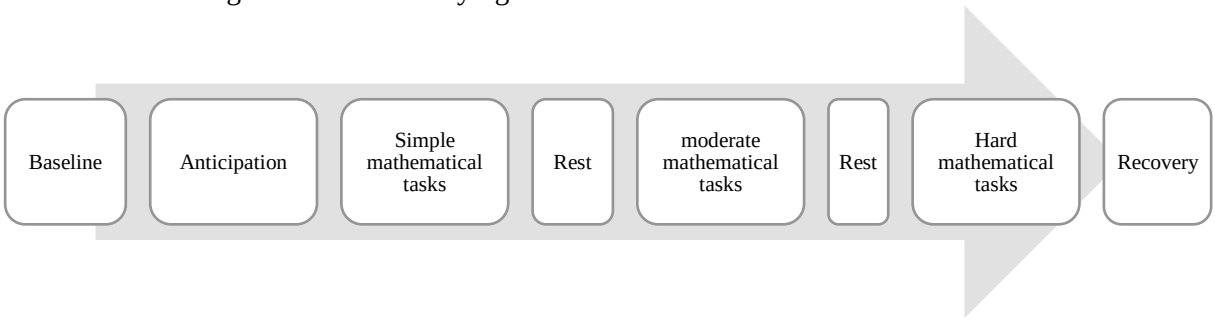

Figure 2. Experiment protocol.

Figure 3. The electrodes placement according to SENIAM.

The list for the details of the fifteen participants prepared in excel and can be find in attachments. The table 1 shows a list of the variables included in each of the recordings and a full description of each field.

Field description for each recording			
field	*Type*	*Size*	*Description*
EMG	Double[]	N×4	N sample for approximately 35 minutes recording data. 4 channels including right trapezius, left trapezius, right erector spinae and left erector spinae muscles.
MVCTrapezius	Double[]	M×2	M sample for maximum voluntary contraction. 2 channels including right trapezius and left trapezius muscles.
MVCelectrospinae	Double[]	O×2	O sample for maximum voluntary contraction 2 channels including right erector spinae and left erector spinae muscles.
marker	Double[]	1×9	Markers for experiment steps in minutes
SamplingFrequency	Double[]	1×1	Sampling rate of amplifier.
RecordingDate	Char[]	1×13	Date of experiment
RecordingTime	Char[]	1×5	Time of experiment
DominantHand	Char[]	1×5	Subject dominant hand
SubjectAge	Double[]	1×1	Age of subject
SunjectGender	Char[]	1×1	Gender of subject (Female; Male)
AccuracyTASK1	Double[]	1×1	Accuracy of mathematical task1
AccuracyTASK2	Double[]	1×1	Accuracy of mathematical task2
AccuracyTASK3	Double[]	1×1	Accuracy of mathematical task3
MonitorDevice	Char[]	1×14	Laptop 15 inch
Electrode	Char[]	1×26	'Surface EMG Sensor (SX230)
RecordingDevice	Char[]	1×27	Biometrics DataLOG (MWX8)