

# SSVEP BCI Game in Real – Exhibition Environment

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Citation: It will be updated soon. Please contact admin.

## Experimental paradigm

- **Experiment environment**
  - Exhibition (KES held in Coex, South Korea, 8 Oct 2019 ~ 11 Oct 2019)
- **Research Ethics**
  - The Institutional Review Board at Gwnagju Institute of Science and Technology approved this experiment (20190108-HR-41-01-02), and all subjects were informed of all experimental procedure and signed written informed consents.
- **Participants**
  - 71 Healthy participants (single-player mode: 11, two-player mode: 30 teams)
- **Task**
  - 3-class SSVEP BCI game (approximately 120sec.) – 14 targets
  - 10, 12, 15Hz flickering frequency (trigger information is given)
- **Experimental environment**
  - Experiment period
    - 8 Oct 2019 ~ 11 Oct 2019
  - Location
    - Coex Conference Hall, Seoul, South Korea



Figure 1 Experimental environment

## Data recording

- **Acquisition devices (Figure 2)**
  - DSI 24 wearable sensing EEG, 19 channels and wired setting
  - Single/two-player mode: 1 or 2 devices (concurrent recording)
  - Pz as CMS, left-right ear mastoid referencing



Figure 2 DSI 24 Wearable sensing EEG

- **Software**
  - OpenViBE
- **Channel location**
  - Total 19 channels:

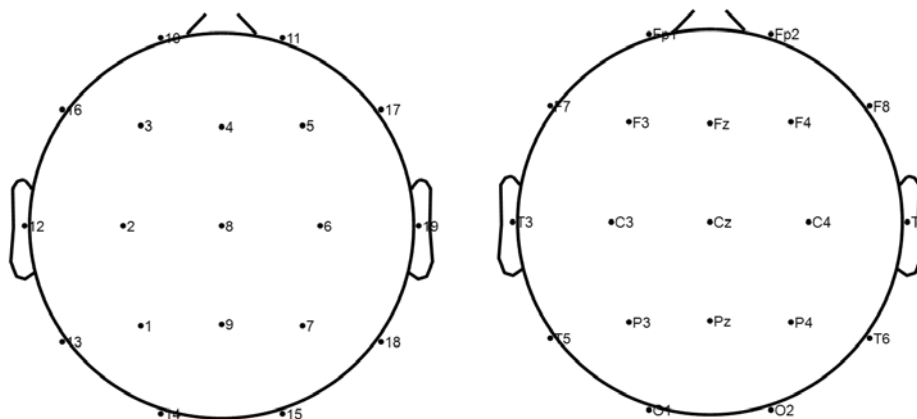


Figure 3 Electrode position used in experiment

## Data file description

- File extension
  - MATLAB format (\*.mat) (Recorded from OpenViBE and converted to mat)
- File information

- Each file includes structure format including data, sampling rate, channel location, event markers, and score.
- 23 Electrode channels (3 non-used extras and 1 reference)
- s%02d.mat – approximate 120sec. SSVEP BCI game
- Notch, band-pass filter is not applied. People should pre-process data in order to analyze the data (such as baseline correction, notch, band-pass filtering, ...)
- Good/Bad subjects are not identified
- Trigger (Marker) information

**Marker family for 2-player mode:**

- 4, 5: start, end
- 11, 21, 31: mole 1-3 appears (10, 12, 15Hz, respectively)
- 12, 22, 32: mole 1-3 disappears (miss)
- Online – [300 3300]ms epoch, [P3, P4, Pz, O1, O2], CCA
- 13[1], 13[2], 13[3] / 23[1], 23[2], 23[3] / 33[1], 33[2], 33[3]
- Mole 1-3 were caught by: p1, p2, and both, respectively

**Marker family for single-player mode:**

- 11, 21, 31: mole 1-3 appears (10, 12, 15Hz, respectively)
- 12, 22, 32: mole 1-3 disappears (miss)
- Online [1000 4000]ms epoch, [P3, P4, Pz, O1, O2], CCA
- 13: mole 1-3 was caught by p1