

Task 4

[Bitalino kit](#) offers a simple measurement method for bio signals (ECG, EMG, EEG,..). Important insights about the health condition can be deduced from these signals. So, we will investigate this through our experiment. The experiment will pass two stages:

Stage 1: Data Acquisition

Tools needed:

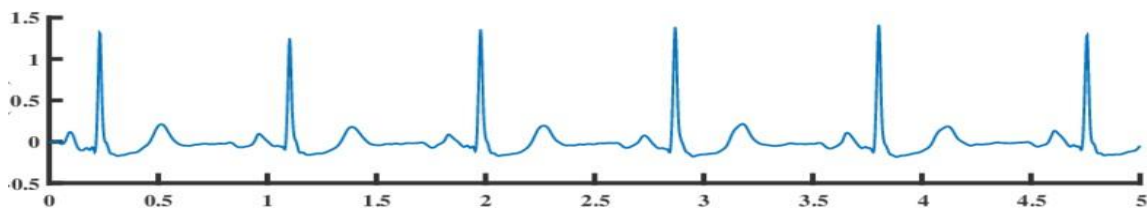
- Download [opensignals](#) application (mobile version)
- Get your own disposable electrodes
- Mobile charger



Stage 2: Data Processing (Work on either one of the following or choose another bio signal and choose a property in it to count it)

- Heart rate counter:

Calculate number of signal peaks per minute, preferably use [hand mode](#).



- Forearm flexion counter:

Calculate number of flexions in signal, preferably place electrodes on [biceps muscle](#).

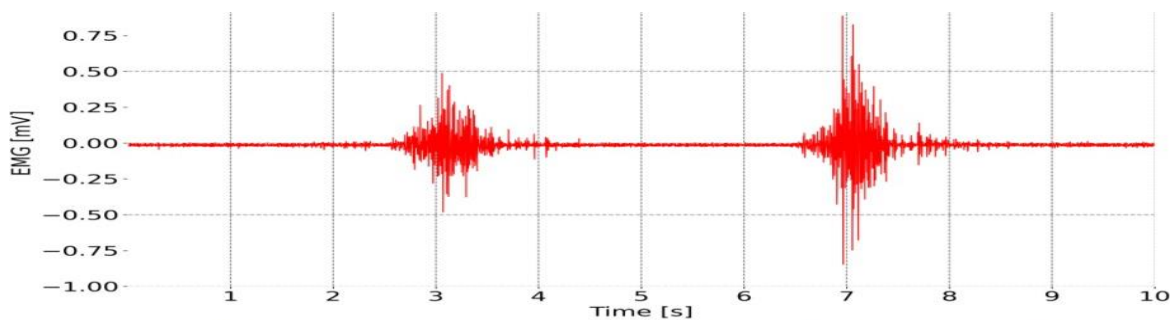


Figure 2: Typical unfiltered sensor output (signal acquired from the biceps while flexion of elbow and forearm in supination).

Results will be shown as signal plotted and counts number as output.

Grading Criteria:

Data Acquisition (3 marks):

- Proper download and setup of the opensignals application on the mobile device.
- Correct use of disposable electrodes for signal measurement.
- Ensuring the availability and connection of a mobile charger.

Signal Measurement and Quality (2 marks):

- Accurate measurement of the chosen bio signal (ECG for heart rate, EMG for flexion).
- Proper placement of electrodes for reliable signal acquisition.
- Ensuring signal quality and minimizing noise during measurement.

Data Processing (3 marks):

- **For Heart Rate Counter:**
Correct calculation of the number of signal peaks per minute.
Accurate determination of heart rate.
Clear presentation of results on the opensignals app.
- **For Forearm Flexion Counter:**
Correct calculation of the number of flexions in the signal.
Accurate interpretation of forearm muscle activity.
Clear presentation of results on the opensignals app.

Report (1 marks):

- Submission of a brief report summarizing the experiment.
- Inclusion of a concise explanation of the work conducted.
- Attachments of relevant screenshots, including signal plots and counts.

Group Discussion (1 marks)

Submission and Naming:

- One team member should upload the report to the Google Classroom for this course.
- File Naming Format: Team_x_Task_4
(Please adhere to this naming format to avoid a one-point deduction.)

Due Date: December 3th, Week 10, Tutorial Time.

Late Submission Penalty: There is a penalty of 10% for every day the task is delayed