

Clinical Trial Protocol

Iranian Registry of Clinical Trials

11 Sep 2026

Design and implement of emotion recognition system based on dynamic adaptive fusion of forehead biopotentials and physiological signals

Protocol summary

Forehead biopotential signals, Physiological signals

Study aim

Comparison of both forehead biopotentials and physiological signals before and after emotional intervention in healthy individuals

Design

Quasi-experimental clinical trial, Before-after design, One intervention group with 25 healthy subjects

Settings and conduct

This study focuses on the development of a reliable emotion recognition system using biological signals, at Tarbiat Modares University of Iran. The procedure: 1. Gathering validated emotional videos to induce basic emotions, 2. Biological signal acquisition from the participants before and after emotional interventions, 3. Analyzing acquired biosignals and designing a reliable emotion recognition system. In this step, we will use pattern recognition and classification methods based on biosignals information fusion. The recorded forehead biopotentials contain the electrical activities of the brain, heart, facial muscles, and eye movements, which will be separated at the signal processing step.

Participants/Inclusion and exclusion criteria

Inclusion criteria: Male, aged between 23 to 32 years, healthy, normal or corrected-to-normal vision, university student. Exclusion criteria: History of neurological diseases, medication use.

Intervention groups

Intervention group: 25 healthy males. In one session: 1. Recording forehead biopotentials and physiological signals at rest, 2. Displaying emotional videos to participants to induce six basic emotions (Happiness, Sadness, Anger, Fear, Surprise, Disgust), while recording forehead biopotentials and physiological signals. A neutral video will be displayed before each emotional video. Golden electrodes and Skin Conductance (SC) and Blood Volume Pulse (BVP) sensors will be used, respectively, to record forehead biopotentials and physiological signals.

Main outcome variables

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20200212046473N3**

Registration date: **2020-06-13, 1399/03/24**

Registration timing: **retrospective**

Last update: **2020-06-13, 1399/03/24**

Update count: **0**

Registration date

2020-06-13, 1399/03/24

Registrant information

Name

Zeynab Khodakarami

Name of organization / entity

Country

Iran (Islamic Republic of)

Phone

+98 21 5121 5080

Email address

z.khodakarami@modares.ac.ir

Recruitment status

Recruitment complete

Funding source

Expected recruitment start date

2013-02-25, 1391/12/07

Expected recruitment end date

2013-03-18, 1391/12/28

Actual recruitment start date

2013-02-25, 1391/12/07

Actual recruitment end date

2013-03-18, 1391/12/28

Trial completion date

2013-03-18, 1391/12/28

Scientific title

Design and implement of emotion recognition system based on dynamic adaptive fusion of forehead biopotentials and physiological signals

Public title

Emotion recognition using forehead biopotentials and physiological signals

Purpose

Supportive

Inclusion/Exclusion criteria

Inclusion criteria:

Aged between 23 to 32 years Healthy individuals Normal or corrected-to-normal vision University student

Exclusion criteria:

History of neurological diseases (e.g. migraine or epilepsy) Medication use

Age

From **23 years** old to **32 years** old

Gender

Male

Phase

N/A

Groups that have been masked

No information

Sample size

Target sample size: **25**

Actual sample size reached: **25**

Randomization (investigator's opinion)

N/A

Randomization description

Blinding (investigator's opinion)

Not blinded

Blinding description

Placebo

Not used

Assignment

Single

Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee

Research Ethics Committee of Tarbiat Modares University

Street address

Tarbiat Modares University, Nasr Bridge, Jalal-Ale-Ahmad

City

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Province

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Postal code

14115-111

Approval date

2013-02-16, 1391/11/28

Ethics committee reference number

IR.TMU.REC.D52/5119, Dated: 2013-02-16

Health conditions studied

1

Description of health condition studied

Healthy individuals

ICD-10 code

ICD-10 code description

2

Description of health condition studied

Emotional states

ICD-10 code

ICD-10 code description

3

Description of health condition studied

Forehead biopotentials

ICD-10 code

ICD-10 code description

4

Description of health condition studied

Physiological signals

ICD-10 code

ICD-10 code description

Primary outcomes

1

Description

Forehead biopotential signals (contain electrical activities of the brain, heart, facial muscles and eye movements)

Timepoint

Before the intervention at the beginning of the session, While displaying the neutral videos, While displaying the emotional videos

Method of measurement

Recording forehead biopotential signals using golden electrodes

2

Description

Physiological signals

Timepoint

Before the intervention at the beginning of the session, While displaying the neutral videos, While displaying the emotional videos

Method of measurement

Measuring the physiological signals of Skin Conductance (SC), Blood Volume Pulse (BVP) and Interbeat Interval

(IBI)

Secondary outcomes

empty

Intervention groups

1

Description

Intervention group: 25 healthy males. In one session: 1. Recording forehead biopotentials and physiological signals at eyes-closed and eyes-open rest, 2. Displaying emotional videos to participants to induce six basic emotions (Happiness, Sadness, Anger, Fear, Surprise, Disgust), while recording forehead biopotentials and physiological signals. A neutral video will be displayed before each emotional video. The device FlexComp Infiniti (Thought Technology Ltd, Montreal, QC), along with the golden electrodes, will be used to record forehead biopotentials. Skin Conductance (SC) and Blood Volume Pulse (BVP) sensors placed on the participant's fingers will be used to record physiological signals.

Category

Other

Recruitment centers

1

Recruitment center

Name of recruitment center

Tarbiat Modares University

Full name of responsible person

Zeynab Khodakarami

Street address

Department of Biomedical Engineering, Faculty of Electrical and Computer Engineering, Tarbiat Modares University, Nasr Bridge, Jalal-Ale-Ahmad

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Sponsors / Funding sources

1

Sponsor

Name of organization / entity

Tarbiat Modares University

Full name of responsible person

Yaghoub Fathollahi

Street address

Vice Chancellor for Research and Technology, Tarbiat

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res@modares.ac.ir

Grant name

Grant code / Reference number

Is the source of funding the same sponsor organization/entity?

Yes

Title of funding source

Tarbiat Modares University

Proportion provided by this source

100

Public or private sector

Public

Domestic or foreign origin

Domestic

Category of foreign source of funding

empty

Country of origin

Type of organization providing the funding

Academic

Person responsible for general inquiries

Contact

Name of organization / entity

Modares Science and Technology Park

Full name of responsible person

Zeynab Khodakarami

Position

Researcher

Latest degree

Master

Other areas of specialty/work

Medical Engineering

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Person responsible for scientific inquiries

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Full name of responsible person

Mohammad Firoozabadi

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Professor

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Person responsible for updating data**Contact****Name of organization / entity**

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Position

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Latest degree

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Other areas of specialty/work

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Sharing plan**Deidentified Individual Participant Data Set (IPD)**

Yes - There is a plan to make this available

Study Protocol

Yes - There is a plan to make this available

Statistical Analysis Plan

Yes - There is a plan to make this available

Informed Consent Form

Yes - There is a plan to make this available

Clinical Study Report

Undecided - It is not yet known if there will be a plan to make this available

Analytic Code

Undecided - It is not yet known if there will be a plan to make this available

Data Dictionary

Undecided - It is not yet known if there will be a plan to make this available

Title and more details about the data/document

All participants' data, after anonymization, will be shared through local and international biosignal online databases. The study protocol, statistical analysis map and informed consent can also be shared.

When the data will become available and for how long

Data and documents will be available once the results are published for an unlimited period.

To whom data/document is available

University researchers

Under which criteria data/document could be used

Commitment to mention the source of data and the name of principal investigator for any use, commitment not to use for clinical purposes

From where data/document is obtainable

Correspondence with the representative of principal investigator, Zeynab Khodakarami, with email address: z.khodakarami@gmail.com

What processes are involved for a request to access data/document

Request review by the representative of principal investigator (2 weeks), sharing the application with the principal investigator (2 weeks), final statement by the representative of principal investigator

Comments