Clinical Trial Protocol
Iranian Registry of Clinical Trials

10 Jun 2026

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

Protocol summary

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
Forehead biopotential signals, Physiological signals

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
Tehran
Province
Tehran
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

City
Tehran

Province
Tehran

Postal code
14115-331

Phone
+98 21 8288 3821

Email
z.khodakarami@gmail.com

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 Modares University, Nasr Bridge, Jalal-Ale-Ahmad

City
Tehran

Province
Tehran

Postal code
14115-111

Phone
+98 21 8288 2009

Email
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

Street address
No. 15, Heyat St., Eshraghi Alley, North Karegar Ave.

City
Tehran

Province
Tehran

Postal code
1411893171

Phone
+98 21 6691 9131

Email
z.khodakarami@gmail.com

Person responsible for scientific inquiries

Contact

Name of organization / entity
Tarbiat Modares University

Full name of responsible person
Mohammad Firoozabadi
Position
Professor
Latest degree
Ph.D.
Other areas of specialty/work
Medical Engineering
Street address
Department of Medical Physics, Faculty of Medical Sciences, Tarbiat Modares University
City
Tehran
Province
Tehran
Postal code
14115-331
Phone
+98 21 8288 3821
Email
pourmir@modares.ac.ir

Person responsible for updating data

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
Street address
No. 15, Heyat St., Eshraghi Alley, North Karegar Ave.
City
Tehran
Province
Tehran
Postal code
1411893171
Phone
+98 21 6691 9131
Email
z.khodakarami@gmail.com

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