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Development and evaluation of an artificial intelligence-enhanced dietary intake reporting application in young adults

Submission date
05/11/2022

Recruitment status
No longer recruiting

Registration date
28/11/2022

Overall study status
Completed

Last Edited
24/11/2022

Condition category
Other

[ ] Prospectively registered
[ ] Protocol
[ ] Statistical analysis plan
[ ] Results
[ ] Individual participant data
[ ] Record updated in last year

Plain English summary of protocol

Background and study aims
The recent advancement in computer vision and deep learning makes photo-based dietary tracking possible through automatic food image recognition. Photo-based dietary tracking is more intuitive, more faithful, and easier to perform than text-based approaches. To perform subsequent nutrition value analysis, the recognized food category is used to look up nutrition databases. When a food type is not covered, nutrition can still be estimated by ingredient recognition. However, the user experience and usability of artificial intelligence (AI)-based applications (apps) for food reporting by the young adult population requires further investigation. To study these areas, the researchers have developed two reporting approaches, namely AI-based reporting and voice-only reporting. Each of the two apps features a unique user interaction design. In AI-based reporting, users report the food items by using food image recognition technology, while voice-only reporting allows users to report the food items by voice.

Who can participate?
Young people aged between 20 and 25 years old, capable of reading and operating the app on their mobile phone

What does the study involve?
Participants will be randomly allocated to use either the AI-based or voice-only version of the reporting app. The participants will be required to use the app to report their food intake on a single day.

What are the possible benefits and risks of participating?
By following this study, the participants will gain knowledge in reporting their dietary intake using AI-based apps. This study has no risks for the participants.

Where is the study run from?
Chang Gung University (Taiwan)

When is the study starting and how long is it expected to run for?
December 2020 to June 2023

Who is funding the study?
Ministry of Science and Technology (Taiwan)

Who is the main contact?
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Contact information

Type(s)
Public

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Study information

Scientific Title
Development and evaluation study of AI-enhanced dietary intake reporting application on the young adults: a randomized controlled trial

Study objectives
This study seeks to develop and assess the relative effectiveness and acceptability of two application prototypes in the test of young adults reporting their dietary intakes in a realistic context.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Approved 22/12/2021, Ethics Committee of Chang Gung Memorial Hospital (No. 199, Dunhua North Road, Taipei 105, Taiwan; +886 33196200 3716; yijiun@cgmh.org.tw), ref: 202101985B0

Primary study design
Interventional

Study design
Interventional randomized controlled trial

Study type(s)
Quality of life

Health condition(s) or problem(s) studied
Dietary intake in young adults

Interventions
Each participant will complete a questionnaire to collect background and baseline data that allows the assistant researchers to contact them and perform randomization. The baseline data will be randomized to allocate participants either to the AI-based or voice-only reporting group. To ensure an even age distribution, two random number lists will be generated by SAS software (SAS Institute Inc., Cary, North Carolina).

Young adults aged 20-25 are recruited and randomized into two experimental groups, i.e., namely AI-based reporting and voice-only reporting (VOR). Each of the groups utilizes a specific application (app) featuring a unique user interaction design. In the AI-based group, users report the food items using food image recognition technology, while the VOR allows users to report the food items by only using voice.

All participants use a 6.5-inch Android phone for the test and all participant trials will be conducted on a single day. Each participant is tested one by one for about one hour each. Each participant first watches an instructional video explaining the operation of the mobile app and the food reporting method each participant is assigned to use. Following the written and video instructions, the researchers spend several minutes teaching each participant how to navigate to ensure familiarity with the app's operation and features and conduct a 'dry-run' that involves assessing voice reporting of five food items. Participants will be encouraged to use the system to assess these items until they feel comfortable with the application's operations. For the trial, participants will be informed that their time to completion is also a performance consideration.

Intervention Type
Behavioural

Primary outcome(s)
1. Accuracy of reporting measured using reporting errors made in the application (app) at the time of intervention
2. Response time recorded and embedded in the apps in milliseconds for the time elapsed from a user starting to completion of food reporting

Key secondary outcome(s)
Participants' perceptions of the utility of each app were measured using the System Usability Scale (SUS), with ten items scored using a 5-point Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree) at the end of the intervention.

Completion date

30/06/2023

Eligibility

Key inclusion criteria
1. Aged 20-25 years old
2. Capable of reading and operating the application on their mobile phone

Participant type(s)
Healthy volunteer

Healthy volunteers allowed
No

Age group
Adult

Sex
All

Key exclusion criteria
1. Under any form of dietary control
2. Engaged in deliberate weight loss
3. On medication
4. Pregnancy
5. Diabetic
6. High cholesterol
7. High blood pressure

Date of first enrolment
22/12/2021

Date of final enrolment
30/12/2022

Locations

Countries of recruitment
Taiwan

Study participating centre
Chang Gung University
No. 259 Wenhua 1st Road
Guishan District
Taoyuan
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333

Sponsor information

Organisation
National Science and Technology Council

ROR
https://ror.org/00wnb9798

Organisation
Chang Gung Memorial Hospital

ROR
https://ror.org/02verss31

Funder(s)

Funder type
Government

Funder Name
Ministry of Science and Technology, Taiwan

Alternative Name(s)
Ministry of Science and Technology, R.O.C. (Taiwan), Ministry of Science and Technology of Taiwan, MOST

Funding Body Type
Government organisation

Funding Body Subtype
National government

Location
Taiwan

Results and Publications

Individual participant data (IPD) sharing plan
The data sharing plans for the current study are unknown and will be made available at a later date

IPD sharing plan summary

Data sharing statement to be made available at a later date