Nao Meditation Assistant

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***Abstract*—The present paper investigates the comparative efficacy of a robot and a smartphone application as meditation assistants. We hypothesise that the robot's human-like gestures, physical presence, and emotional support would enhance the meditative experience and mood outcomes. We randomly assign the participant's first scenario to either the robot or application condition and measure their emotional state before and after a guided meditation session in a relaxing setting. We then used questionnaires and a system usability scale to collect subjective data. The results show that participants who engaged first in robot-assisted meditation reported a significant improvement in mood levels compared to those using the application, with the robot condition having a mean improvement of 75.22% and a standard deviation of 14.31%. In contrast, the application condition had a mean improvement of 68.83% and a standard deviation of 16.14%. The SUS ratings also show a high level of satisfaction with the robot's performance. We infer that the robot's social and affective qualities make it a more effective meditation assistant than the application.**

I. Introduction

The utilisation of socially assistive robots has garnered significant attention in recent years due to their versatile applications across various domains, including entertainment, medicine, and mental health enhancement. These robots are specifically designed to engage in social interactions, comprehend human emotions, and provide personalised assistance. The deployment of socially assistive robots holds tremendous promise in supporting the elderly population, assisting children with developmental disabilities, delivering counselling services, and facilitating physical health recovery. Among the diverse range of socially assistive robots, the NAO robot has emerged as a prominent candidate owing to its human-like appearance, extensive range of movement (25 degrees of freedom), advanced sensory capabilities, and multilingual dialogue support. It is worth noting that the appearance of a robot plays a pivotal role in facilitating human-robot interaction.

This paper presents a study investigating whether a robot, specifically the NAO robot, can be more helpful than a smartphone app as a meditation assistant. The research question focuses on comparing the effectiveness of a robot and a smartphone app in providing support during meditation practices. The underlying hypothesis postulates that the human-like gestures, physical presence, and emotional support exhibited by the NAO robot render it more advantageous than a smartphone app.

To address this research question, a user study was conducted involving two experimental conditions: one with the NAO robot as the meditation assistant and another with a smartphone app guiding a video. The study sought to assess the impact of the robot on participants' emotional state and stress levels. Questionnaires, including the Profile of Mood States (POMS) and the System Usability Scale (SUS), were administered to measure participants' emotional state and their impressions of interacting with the robot.

A total of Sixteen participants took part in the study, with alternating sequences of robot-assisted and app-assisted meditation. The POMS results showed that participants reported a significant improvement in mood levels when utilising the NAO robot-assisted meditation technique compared to the smartphone app-assisted technique. Furthermore, the SUS ratings indicated a high level of engagement with the robot, thus suggesting positive user experiences.

In summary, our study contributes to understanding the benefits of robots assisting in meditation and their effectiveness in supporting meditation practices. The results provide insights into the role of robots in our study and highlight the importance of Human-Robot interaction in enhancing the quality of meditation. Further research is recommended to extend the investigation to diverse populations and settings.

II. Related Work

A. Socially assistive robots

In recent years, robots' application has expanded to entertainment, medicine, and mental health enhancement. While research has centred on companion robots, advancements enable them to forge more relationships for targeted well-being [1]. Feil-Seifer D has mentioned in [2] that socially assistive robots are characterised by their capacity to engage in social interactions, comprehend human emotions, and deliver personalised assistance. Consequently, the individualised requirements for assistance in people's daily lives give rise to a diverse array of potential applications for socially assistive robots. These applications encompass supporting the elderly in their daily activities, aiding children with developmental disabilities in therapy, providing psychological counselling assistance, and offering guidance for physical health recovery. As technology evolves and research progresses, socially assistive robots promise to transform numerous fields and positively influence individuals' lives.

The appearance of a robot is a crucial aspect of human-robot interaction, as it contributes to its physical presence and must align with its cognitive and interactive capabilities.

The degree to which a robot resembles a human influences people's expectations regarding interaction. In socially assistive robotics, believability outweighs realism in importance. Therefore, for assistive tasks, a child-like appearance or an anthropomorphic but not overly realistic appearance is often deemed more suitable [3].

The NAO robot serves as an exemplary illustration, featuring a human-like appearance and design. With 25 degrees of freedom, it possesses the ability to manoeuvre and adjust to its surroundings. Additionally, equipped with two 2D cameras, seven tactile sensors, four directional microphones, and integrated speakers for human and environmental interaction, the NAO robot provides a comprehensive array of sensory capabilities. Moreover, it offers voice recognition and supports dialogue in 20 diverse languages [4]. These remarkable features collectively establish NAO as a well-suited Socially Assistive Robot (SAR).

B. Human emotions and meditation

Tang, Hölzel, and Posner [5] conducted a comprehensive review of the neuroscience of orthomolecular meditation, providing valuable insights into its impact on emotion regulation and cognitive function. Their work elucidated the neural correlates associated with meditation practices, shedding light on its effects.

In a study by Zeidan et al. [6], the cognitive effects of orthomolecular meditation were examined, demonstrating the efficacy of brief mental training through meditation. The findings revealed improvements in cognitive performance and positive effects on emotion regulation and attention.

A randomised controlled trial conducted by Hoge et al. [7] investigated the effects of orthomolecular meditation on individuals with generalised anxiety disorder. The results revealed a positive impact on reducing anxiety and stress reactivity, suggesting its potential as an effective intervention for anxiety-related symptoms.

Keng, Smoski, and Robins [8] conducted a comprehensive review of empirical research on positive meditation and its impact on mental health. Their analysis underscored the positive effects of meditation on emotion regulation, coping skills, and self-awareness, highlighting its potential for enhancing overall mental well-being.

C. Meditation Robot

The trend towards automated devices or intelligent machines serving humans is mainstream today and mainly used in manufacturing and industry. However, with medical and neuroscience technology advances, barriers to integrating robots with human perception systems will also be filled. Meditation robots refer to intelligent devices that can assist participants in meditation exercises and positive thinking interventions aimed at improving mental health and reducing symptoms of stress and anxiety. [9] A study by Oliveira focused on examining HRI used to enhance pro-social behaviour. Approximately 50% of the studies analysed the positive changes induced by HRI in pro-social behaviour. [10] Hudlicka (2013) assessed the impact of virtual positive thinking coaching on the performance of positive thinking meditation. Data was collected in the form of a Likert scale survey, which participants completed. The results demonstrate that positive meditation guided by a virtual agent is achievable and may be more advantageous than unsupervised meditation. [11] Björling's research revealed that individual user characteristics, including personality, stress levels, and perceptions of the robot, influence the mental health interventions of HRI. [12]

III. METHODS

Our study aimed to investigate whether using a robot to guide short meditation exercises and rhythmic breathing can enhance the quality of meditation. The experiment consisted of two parts. The first involved the robot verbally guiding the participant through the meditation routine, while the second part featured a video that the participant followed along with. To assess the impact of the robot on the participant's mental state, we measured their emotional state before and after the experiment.

To ensure that the data collected was unbiased, we alternated between using the robot as the first assistant and the video as the first assistant. We administered a questionnaire to the participants at the beginning of both parts of the experiment and at the end of the entire study to compare their emotional states. These questionnaires, in addition to another questionnaire, constitute our entire database.

A. Research Question and Hypothesis

We have had this question, "Would a robot be able to do this better?" since we formed this group. So, what could be a better comparison to a robot than a smartphone we use daily? We decided to compare a meditation routine application and replicate the same in our robot, Nao.

Research Question - "Can a robot be more helpful than a smartphone app as a meditation assistant?"

Hypothesis - "A robot can be more helpful than a smartphone app as a meditation assistant because it can provide more human-like gestures, physical presence, and emotional support."

B. User Study Design

The study necessitates a room with adequate lighting where the participant can view the screen. The participant should sit in a position that is comfortable for them. The robot will be positioned on a table facing the participant at a suitable height. The room will be silent to avoid any disturbances during the meditation practice, and there will be gentle music playing in the background to create a soothing atmosphere.

We aspire to create a comfortable and soothing atmosphere that will support the meditation practice and enhance the participant's well-being.

Following the meditation routine in the video, the robot will imitate the rising and falling of its upper limbs per the instructions. We have two experimental conditions: one with a

smartphone app where the app will lead the user through the form of a video, and another where the NAO robot will act as the guide for the routine. We will compare the effects of these two conditions on the participant's mood, stress level, and mindfulness.

C. User Study Procedure

The study commenced with the participants being provided with a comprehensive briefing regarding their involvement in the experiment, the data collection process, and the lack of any adverse impact on them. Following this, an information sheet was presented to them containing all the requisite details concerning the experiment, the researchers' particulars, and the experiment's procedure. After the participants had the opportunity to review the information, we requested them to consent to participate in the experiment by signing the consent form, to which all of them acquiesced.

Subsequently, an online questionnaire was administered to gauge the participants' emotional state. This measure was the sole data we collected since anything else was removed from the data. Following this, the participants were requested to make themselves comfortable before the experiment commenced.

At this juncture, the experiment was ready to begin. Data were collected from 20 participants, with half experiencing the robot performing the meditation routine. We ensured that the data collected remained unbiased; thus, we divided the participants into two groups. One group viewed the video before the robot performed the meditation routine, while the other group had the robot perform the routine first, followed by the video. The impact of this arrangement on the participants is elaborated on in the subsequent results section.

During the transition between the video and the robot, the participants were requested to complete another questionnaire concerning their current emotional state—the questionnaire aimed to capture their emotions after a meditation session. Upon completion of the second session, the participants were requested to fill out a final questionnaire concerning their emotional state after the experiment. This questionnaire enabled us to evaluate how the meditation routine, either from the video or the robot, affected the participants. Additionally, we requested that the participants fill out a system usability scale to measure their impressions of interacting with the robot.

This entire study was conducted over four hours or two practical sessions of the Human-Robot Interaction Module. We ensured that the experiment duration was at most five minutes to prevent overburdening the participants. Furthermore, we ensured that our research adhered to all ethical guidelines regarding human participants.

D. Dependent Measures

In research studies, there are typically two types of measurements - subjective measurements, such as questionnaires or interviews, and objective measurements, such as the time and location of the experiment. However, our study only considered subjective measurements.

We utilised two questionnaires for our participants. The first questionnaire measured the participants' emotional state at that particular moment using the Profile of Mood State (POMS) [19]. McNair, Lorr, and Droppleman initially developed the POMS in 1971, and it is a validated psychological test consisting of 65 words and statements that describe feelings. We only utilised the related mood states for our experiment from the comprehensive list of states. In sports, the POMS is widely utilised to measure an athlete's transient, distinct mood states over time.

The second questionnaire, The System Usability Scale (SUS) [20] was released into this world by John Brooke in 1986. It was initially created as a "quick and dirty" scale for administering after usability tests on systems like VT100 Terminal ("Green-Screen") applications. SUS is technology independent and has since been tested on hardware, consumer software, websites, cell phones, IVRs and even the yellow pages. This aimed to evaluate how the participants felt about interacting with the robot, including whether they felt uncomfortable during the interaction.

E. Participants

The participants in our study fell within the age range of 20 to 30 years old. While we initially aimed to recruit a diverse group of participants ranging from 20 to 60 years old, we could only collect data from individuals within the 20 to 30-year-old age group due to limiting conditions.

IV. Results

The study was completed by 16 participants, with a mean age of 22 years. The primary objective of the research was to examine whether NAO Robot acting as a meditation assistant could result in a more significant improvement in meditation experience compared to utilising a meditation video alone. To accomplish this, participants were instructed to follow the two conditions: NAO Robot-assisted meditation and smartphone app-assisted meditation in random order.

The POMS [19] results of the study, as demonstrated in figure 1, display that participants who utilised the NAO Robot-assisted meditation technique reported a substantial enhancement in mood levels, with an overall mean improvement of 75.22%, and a standard deviation of 14.31%. Conversely, when utilising the smartphone app-assisted meditation technique, the overall mean improvement in mood was 68.83%, with a standard deviation of 16.14%. Table I presents the mean and standard deviation of the change in score for each parameter of the questionnaire, which ranged from 0 to 4.

Moreover, based on the SUS ratings, the participants in the NAO Robot-assisted meditation condition reported a high level of engagement with mean ratings of 77.69% and a standard deviation of 7.31%. This rating falls in the B+ rating category on the SUS scale [20].

The figure 2 displays the histogram plot for change in mood scores of both the experiment conditions, which follows a normal distribution. Based on the t-test to check the difference between the two datasets, the test reported the p-value

Method	Parameter	Tense	Angry	Worn out	Unhappy	Hopeless	Uncertain	Uneasy	Restless	Annoyed	Resentful	Nervous	Exhausted	Anxious	Furious
App	Mean	1.19	1.44	0.94	1.13	1.38	1.00	1.00	0.25	1.00	0.81	1.25	1.06	1.06	1.38
	SD	0.73	1.17	0.97	0.78	1.22	0.71	0.79	0.43	0.79	0.88	1.03	0.75	0.75	1.05
Robot	Mean	1.06	0.94	1.31	0.69	1.44	1.63	0.63	0.88	1.56	0.75	1.00	1.44	0.81	1.63
	SD	0.83	0.66	0.68	0.46	1.17	0.86	0.78	0.99	0.79	0.90	0.87	0.93	0.88	1.17

TABLE I: Mean and Standard deviation of change in each parameter of the questionnaire

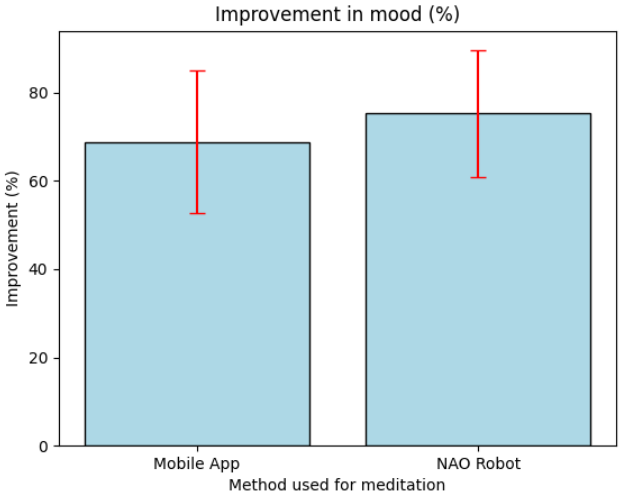

Fig. 1: Comparison of the mean improvement in mood percentage between the mobile app and the robot as a meditation assistant.

for change in overall mood scores of both the experiment conditions to be 0.0013. However, the Cohen-d test for the same dataset gave a value of 0.28, suggesting that the effect size is small.

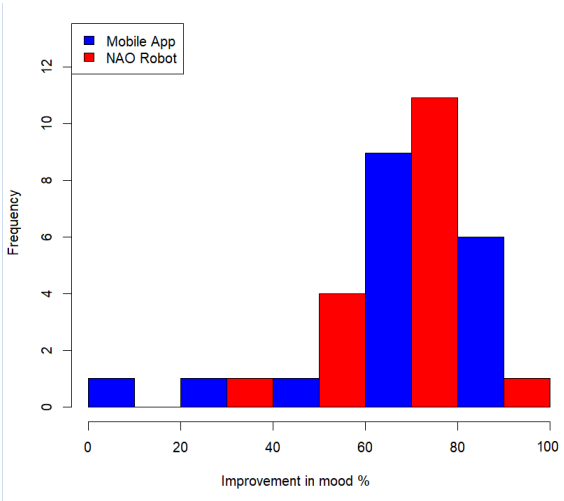

Fig. 2: Histogram plot of change in mood scores for both the experiment conditions

V. Discussion

Our study aimed to compare the effectiveness of a robot and a smartphone application in assisting humans with a meditation routine. Results from unbiased data support the hypothesis that the robot's human-like gestures, physical presence, and emotional support enhance the meditative experience and mood outcomes. Participants using the robot reported a significant improvement in mood levels compared to those using the smartphone (fig. 1). The robot group showed a mean mood improvement of 75.22%, while the smartphone group had a mean improvement of 68.33%. Standard deviations of 14.31% for the robot group and 16.14% for the smartphone group indicated some variability in responses but overall consistent improvements in mood.

The statistical analysis using a t-test showed a significant difference between the two conditions, with a p-value of 0.0013. Although the effect size, as measured by Cohen's d test, was small, it is worth noting that the NAO robot had a noticeable impact. The mean SUS rating of 77.69%, falling within the B+ rating category, suggests a positive reception of the NAO robot's usability as a meditation assistant These findings are consistent with previous research on the benefits of meditation and assistance [6], [7], [9], [10]. Previous studies have demonstrated the positive impact of meditation on emotion regulation, cognitive function, and mental well-being. The present study contributes to this research by specifically comparing the performance of a robot and a smartphone application as meditation assistants.

However, the study had limitations, including a small sample size of 16 participants aged 20 to 30 years old, which limits generalizability. The study focused on short-term effects and did not examine long-term effects or sustained mood improvements. Future research should consider participant characteristics, such as meditation experience and comfort with technology, and incorporate objective measures like physiological data or performance-based assessments to gain a more comprehensive understanding.

VI. Conclusion

In this study, we compared the efficacy of a robot and a smartphone application as meditation assistants. We hypothesised that the robot's human-like gestures, physical presence, and emotional support would enhance the meditative experience and mood outcomes. We conducted a user study with alternating sequences of robot-assisted and app-assisted meditation and collected subjective data through questionnaires and the System Usability Scale (SUS).

Our results show that the participants who engaged in the robot-assisted meditation first reported a substantial improve-

ment in mood levels than the ones who used the smartphone. While the smartphone case saw a mean improvement of 68.83% and an S.D. of 16.14%, the assistive robot saw a mean improvement of 75.22% and an S.D. of 14.31%. These findings indicate that the robot's social and affective qualities make it a more effective meditation assistant.

The high SUS ratings also demonstrated a high level of satisfaction with the robot's performance, further supporting its effectiveness as a meditation assistant. Our study contributes to the understanding of the potential benefits of meditation guidance robots and highlights their importance in improving the quality of meditation experiences.

In future research, we recommend extending the study to include diverse populations and settings to validate the findings. Additionally, we could explore the long-term effects of robot-assisted meditation and compare it with human-guided or even audio recordings. These would provide a more comprehensive understanding of the role of robots in supporting meditation and other applications in mental health and well-being.

Overall, this study demonstrates the comparative efficacy of a robot and a smartphone application as meditation assistants, with the robot showing superior results in enhancing mood levels. The findings pave the way for future research and development of socially assistive robots in meditation and mental health enhancement.

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Group number: ____1F_____

Group members: _Sri Kadimisetty, Diptanshu Mann, Ruilin Wang, Yifan Yang, Mohammed Magdoom Jahan_

Research Question (Main question that will be answered by the user study.)

"Can a robot be more helpful than a smartphone app as a meditation assistant?"

Hypotheses (A hypothesis states your predictions about what your research will find. It is a tentative answer to your research question that has not yet been tested. Example: For the research question "Do people prefer a robot with personality over a robot without personality?" you could state the hypothesis "Introvert people will prefer a robot that displays introvert personality traits and extrovert people will prefer an extrovert robot.")

A robot can be more helpful than a smartphone app as a meditation assistant because it can provide more human-like gestures, physical presence, and emotional support.

Study Setup (Description of implementation in bullet points. Describe the environment in which the study takes place and the placement of robot and participants in this environment (you can draw a picture for that), the implemented robot behaviour, experiment conditions, and tasks carried out by user and robot.)

Environment and robot/participant placement:

The study will take place in a quiet, well-lit room. The participant needs to be seated in a comfortable position. The robot will be placed opposite to the participant on a table at an optimal height. The room will be quiet to minimize any distractions during the meditation practice, white noise or soft music will be played to create a calming atmosphere.

Overall, the environment setup for this user study will aim to create a comfortable and calming atmosphere to facilitate the meditation practice and the participant's overall experience.

Robot behaviour:

In accordance with the prescribed meditation routine, the robot is capable of synchronously elevating and depressing its upper extremities in response to the provided directives.

Experiment conditions:

- With Smartphone App: The smartphone app will guide the user with meditation.
- With NAO Robot: The NAO robot will guide the user with meditation.

Robot/participant tasks:

Phase 1: Robot greets the participant and ask how they are doing.
Phase 2: Robot guides participant through the mediation routine.
Phase 3: After the meditation session, the robot inquires whether the participant found it helpful.

Participants (Description of the *ideal* participants. We will not be able to run user studies with many participants, but please describe who your end user group would be assuming we do have access.)

Ideal Participants: General population who are comfortable using technology.

Measurements (Any measurements taken during the study. Separate the measurements into subjective measurements, e.g. a questionnaire or interview, and objective measurements, e.g. time needed to complete the task.)

Subjective:

- System Usability Scale (SUS)
- Questionnaire to measure user's emotional state before and after the experiment.

Faculty of Environment & Technology
Faculty Research Ethics Committee (FREC)

Ethical Review Checklist for Undergraduate and Postgraduate Modules

Staff and PG research students must not use this form, but should instead, if appropriate, submit a full application for ethical approval to the Faculty Research Ethics Committee (FREC).

Please provide project details and complete the checklist below.

Project Details:

Module name	**Human-Robot Interaction**
Module code	**UFMFHP-15-M**
Module leader	Paul Bremner
Project Supervisor	**Professor Manuel Giuliani**
Proposed project title	**Nao as a meditation assistant(tentative)**

Applicant Details:

Name of Student	Diptanshu Mann, Sri Kadimisetty, Mohammed Magdoom Jahan, Yifan Yang, Ruilin Wang
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	CHECKLIST QUESTIONS	Yes/No	Explanation
1.	Does the proposed project involve **human tissue, human participants, animals, environmental damage, or the NHS.**	Yes	The proposed study involves human participants as they will be interacting with the Nao Robot. However, it does not involve human tissue, animals, environmental damage, or the NHS.
	Will participants be clearly asked to give consent to take part in the research and informed about how data collected in the research will be used?	Yes	They will be explained about the way the data would be used and how their identity would not be linked to the data collected from them. A consent form will be provided before the experiment, and everything will be explained in detail.

	CHECKLIST QUESTIONS	Yes/No	Explanation
2.	If they choose, can a participant withdraw at any time (prior to a point of "no return" in the use of their data)? Are they told this?	Yes	Participants will be informed that they can withdraw from the study at any time without any reason, and that they can contact emails in the form.
3.	Are measures in place to provide confidentiality for participants and ensure secure management and disposal of data collected from them?	Yes	All data will be anonymized, and any identifying information will be removed before analysis.
4.	Does the study involve people who are particularly vulnerable or unable to give informed consent (eg, children or people with learning difficulties)?	No	Experiment will not involve anyone who are unable to give a consent.
5.	Could your research cause stress, physical or psychological harm to humans or animals, or environmental damage?	No	The Study will not cause stress, physical or psychological harm to humans or animals, or environmental damage.
6.	Could any aspects of the research lead to unethical behaviour by participants or researchers (eg, invasion of privacy, deceit, coercion, fraud, abuse)?	No	There will be no unethical behaviour involved.
7.	Does the research involve the NHS or collection or storage of human tissue (includes anything containing human cells, such as saliva and urine)?	No	It does not involve the NHS or collection or storage of human tissue.

Your explanations should indicate briefly for Qs 2-4 how these requirements will be met, and for Qs 5-8 what the pertinent concerns are.

- **Minimal Risk:** If **Q 1 is answered 'No'**, then no ethics approval is needed.
- **Low Risk:** If **Qs 2-4 are answered 'Yes' and Qs 5-8 are answered 'No'**, then no approval is needed from the *Faculty Research Ethics Committee* (FREC). However, your supervisor must approve (a) your information and consent forms (Qs 2 & 3) and (b) your measures for participant confidentiality and secure data management (Q4).
- **High Risk:** If **any of Qs 5-8 are answered 'Yes'**, then you must submit an application for full ethics approval *before* the project can start. This can take up to 6 weeks. Consult your supervisor about how to apply for full ethics approval.

Risk Assessment: Separate guidance on risk assessment can be found on UWE's Health and Safety forms webpage at https://go.uwe.ac.uk/RiskAssessment. If needed, you must complete a Risk Assessment form. This must also be attached to your application for full ethics approval if your project is **High Risk**.

Your supervisor must check your responses above before you submit this form.
Submit this completed form via the *Assignments* area in Blackboard (or elsewhere if so

directed by the module leader or your supervisor).
After you have uploaded this form, your supervisor will confirm it has been correctly completed by "marking" it as *Passed*/100% via the *My Grades* link on the Blackboard.

Further research ethics guidance is available at http://www1.uwe.ac.uk/research/researchethics

Privacy Notice

Study Title: *Nao as a Meditation Assistant*

Purpose of the Privacy Notice

This privacy notice explains how the University of the West of England, Bristol (UWE) collects, manages and uses your personal data before, during and after you participate in this focus group. 'Personal data' means any information relating to an identified or identifiable natural person (the data subject). An 'identifiable natural person' is one who can be identified, directly or indirectly, including by reference to an identifier such as a name, an identification number, location data, an online identifier, or to one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person.

This privacy notice adheres to the General Data Protection Regulation (GDPR) principle of transparency. This means it gives information about:

- How and why your data will be used for the research;
- What your rights are under GDPR; and
- How to contact UWE Bristol and the project lead in relation to questions, concerns or exercising your rights regarding the use of your personal data.

This Privacy Notice should be read in conjunction with the Participant Information Sheet and Consent Form provided to you before you agree to take part in the research.

Why are we processing your personal data?

UWE Bristol undertakes research under its public function to provide research for the benefit of society. As a data controller we are committed to protecting the privacy and security of your personal data in accordance with the (EU) 2016/679 the General Data Protection Regulation (GDPR), the Data Protection Act 2018 (or any successor legislation) and any other legislation directly relating to privacy laws that apply (together "the Data Protection Legislation"). General information on Data Protection law is available from the Information Commissioner's Office (https://ico.org.uk/).

How do we use your personal data?

We use your personal data for research with appropriate safeguards in place on the lawful bases of fulfilling tasks in the public interest, and for archiving purposes in the public interest, for scientific or historical research purposes.

We will always tell you about the information we wish to collect from you and how we will use it.

We will not use your personal data for automated decision making about you or for profiling purposes.

Our research is governed by robust policies and procedures and, where human participants are involved, is subject to ethical approval from either UWE Bristol's Faculty or University Research Ethics Committees. This research has been approved by UWE Bristol's Ethics Committee. The research team adhere to the **Ethical guidelines of the British Educational Research Association (and/or the principles of the Declaration of Helsinki, 2013) and the principles of the General Data Protection Regulation (GDPR).**

For more information about UWE Bristol's research ethics approval process please see our Research Ethics webpages at:
www1.uwe.ac.uk/research/researchethics

What data do we collect?

The data we collect will vary from project to project. Researchers will only collect data that is essential for their project. The specific categories of personal data processed are described in the Participant Information Sheet provided to you with this Privacy Notice.

Who do we share your data with?

We will only share your personal data in accordance with the attached Participant Information Sheet and your Consent.

How do we keep your data secure?

We take a robust approach to protecting your information with secure electronic and physical storage areas for research data with controlled access. If you are participating in a particularly sensitive project UWE Bristol puts into place additional layers of security. UWE Bristol has Cyber Essentials information security certification.

Alongside these technical measures there are comprehensive and effective policies and processes in place to ensure that users and administrators of information are aware of their obligations and responsibilities for the data they have access to. By default, people are only granted access to the information they require to perform their duties. Mandatory data protection and information security training is provided to staff and expert advice available if needed.

How long do we keep your data for?

Your personal data will only be retained for as long as is necessary to fulfil the cited purpose of the research. The length of time we keep your personal data will depend on several factors including the significance of the data, funder requirements, and the nature of the study. Specific details are provided in the attached Participant Information Sheet. Anonymised data that falls outside the scope of data protection legislation as it contains no identifying or identifiable information may be stored in UWE Bristol's research data archive or another carefully selected appropriate data archive.

Your Rights and how to exercise them

Under the Data Protection legislation you have the following **qualified** rights:

(1) The right to access your personal data held by or on behalf of the University;
(2) The right to rectification if the information is inaccurate or incomplete;
(3) The right to restrict processing and/or erasure of your personal data;
(4) The right to data portability;
(5) The right to object to processing;
(6) The right to object to automated decision making and profiling;
(7) The right to complain to the Information Commissioner's Office (ICO).

Please note, however, that some of these rights do not apply when the data is being used for research purposes if appropriate safeguards have been put in place.

We will always respond to concerns or queries you may have. If you wish to exercise your rights or have any other general data protection queries, please contact UWE Bristol's Data Protection Officer (dataprotection@uwe.ac.uk).

If you have any complaints or queries relating to the research in which you are taking part please contact either the research project lead, whose details are in the attached Participant Information Sheet, UWE Bristol's Research Ethics Committees (research.ethics@uwe.ac.uk) or UWE Bristol's research governance manager (Ros.Rouse@uwe.ac.uk)

Study Information Sheet

Study Title: Nao as a Meditation assistant

PLEASE READ THIS SHEET IN ITS ENTIRETY

You are invited to take part in research taking place at the University of the West of England, Bristol. It is carried out as assignment for module UFMFHP-15-M Human-Robot Interaction. Before you decide whether to take part, it is important for you to understand why the study is being done and what it will involve. Please read the following information carefully and if you have any queries or would like more information please contact Diptanshu Mann, Sri Kadimisetty, Yifan Yang, Ruilin Wang, Mohammed Magdoom Jahan, Faculty of Environment and Technology, Bristol Robotics Laboratory, University of the West of England, Bristol, yifan3.yang@live.uwe.ac.uk, sri2.kadimisetty@live.uwe.ac.uk, mohammed2.magdoomjahan@live.uwe.ac.uk, Diptanshu2.Mann@live.uwe.ac.uk, ruilin2.wang@live.uwe.ac.uk

Who is organising the research?

The project is led by Diptanshu Mann, Sri Kadimisetty, Yifan Yang, Ruilin Wang, Mohammed Magdoom Jahan, and University of the West of England. Manuel Giuliani is the supervisor for this research. Please find their details at the end of this document.

What is the aim of the research?

The overall aim of the research is “Can a robot be more helpful than a video as a meditation assistant?”

The purpose of this study is to assess the efficacy of a robot in promoting relaxation over a video.

Why have I been invited to take part?

We are recruiting participants who are already working at the University of the West of England and are aware of the current risk and safety procedures due to COVID-19 restrictions.

Do I have to take part?

You do not have to take part in this research. It is up to you to decide whether or not you want to be involved. If you do decide to take part, you will be given a copy of this information sheet to keep and will be asked to sign a consent form. If you do decide to take part, you are free to stop and withdraw from the study at any time without giving a reason.

What will happen to me if I take part and what do I have to do?

You will first be asked to sign a consent form, read a privacy notice, and provide some basic demographic information. The meditation robot will then endeavour to guide you through a meditation routine and assess its efficacy in promoting relaxation. The study will take approximately 7 minutes.

Data will be gathered using the following methods:

Questionnaires

- Profile of Mood State (POMS) Questionnaire

Written Feedback/Comments

- System Usability Scale

What are the possible risks of taking part?

Participating in this experiment does not involve any risks.

What will happen to your information?

All the information we receive from you will be treated in the strictest confidence.
All the information that you give will be kept confidential and anonymised. You will be assigned a participant ID that you can use to request the removal of your data from the study up to 7 days after completion of the experiment. After this point, the anonymised data will be analysed, and we will ensure that there is no possibility of identification or re-identification from this point.

Hard copy material (the consent form) will be kept in a locked and secure setting to which only the researchers will have access in accordance with the University's and the Data Protection Act 2018 and General Data Protection Regulation (GDPR) requirements.

Where will the results of the research study be published?

The results of this usability study will be reported in the coursework report for UWE module UFMFHP-15-M Human-Robot Interaction.

Who has ethically approved this research?

The project has been reviewed and approved by University of the West of England University Research Ethics Committee. Any comments, questions or complaints about the ethical conduct of this study can be addressed to the Research Ethics Committee at the University of the West of England at: Researchethics@uwe.ac.uk

What if something goes wrong?

If you have any questions about the ethical conduct of this research, have any complaints or concerns, or are uncertain about any aspect of your participation please contact the project supervisors or the University's research ethics committee.

Project Supervisor:
Professor Manuel Giuliani manuel.giuliani@uwe.ac.uk

What if I have more questions or do not understand something?

If you would like any further information about the research please contact in the first instance:

yifan3.yang@live.uwe.ac.uk, sri2.kadimisetty@live.uwe.ac.uk, mohammed2.magdoomjahan@live.uwe.ac.uk, Diptanshu2.Mann@live.uwe.ac.uk, ruilin2.wang@live.uwe.ac.uk

Thank you for agreeing to take part in this study.

You will be given a copy of this Participant Information Sheet and your signed Consent Form to keep.

Consent Form

Study Title: *NAO as Meditation Assistant*

This consent form will have been given to you with the Participant Information Sheet. Please ensure that you have read and understood the information contained in the Participant Information Sheet and asked any questions before you sign this form. If you have any questions please contact a member of the research team, whose details are set out on the Participant Information Sheet.

If you are happy to take part in this study please sign and date the form. You will be given a copy to keep for your records.

Please read the statements below and sign below to give consent:

I have read and understood the information sheet
I have been given the opportunity to ask questions and have had my questions answered to my satisfaction.
I am aware of the risks and benefits of taking part in the study
I am aware that data collected will be anonymised, kept in accordance with General Data Protection Regulation (GDPR), and will be viewed and analysed by the research team as part of their studies.
I am aware that I have the right to withdraw consent and discontinue participation without penalty before or during the study.
I am aware that I have the right to withdraw my data from the experiment up to 7 days after the completion of the experiment, using the participant ID that the researcher will provide.
I have freely volunteered and am willing to participate in this study.
I am willing to have my questionnaire responses collected.

Name (Printed)…….

Signature……. Date…….