Participant Information Sheet

Study Title: Protecting Prosthetics: Vibrotactile Haptic Feedback as Urgent Signals Under Cognitive Load

PLEASE READ THIS SHEET IN ITS ENTIRETY

You are invited to take part in research taking place at the Bristol Robotics Laboratory. 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 Finlo Heath, Faculty of Environment and Technology, Bristol Robotics Laboratory, University of the West of England, Bristol, finlo.heath.2022@bristol.ac.uk.

Who is organising the research?

The project is led by Finlo Heath, MSc Robotics at Bristol University. Dr Ben Ward-Cherrier & Dr Martin Pearson are the supervisors 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 to investigate the use of vibrotactile haptic (touch) feedback, in conjunction with prosthetics hands. If prosthesis users notice the vibrations and react quickly even under cognitive load, they could have useful applications as an urgent signal mechanism. These signals could warn of potential imminent damage to these expensive devices, helping improve user care of the device.

The purpose of this study is to test whether users can notice and localise the vibrotactile signals under cognitive load equally proficiently as when no cognitive load is applied. In addition, different signal variances will be tested to see if any produce superior reaction time and localisation.

Why have I been invited to take part?

Any adult individual is a suitable candidate for this study, provided they are aware of local health and safety procedures in the BRL as well as current Covid-19 guidelines.

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. You will then be fitted with an EMG controlled Prosthetic arm, mounted with an attachment for able-bodied users. Once fitted, and control of the arm verified, you will then take part in three experiment trials. In each you will aim to notice a vibrotactile signal when received and press a pedal to indicate this. In

condition A, you will focus only on this task. In condition B & C, you will have an additional task requiring use of the robotic hand. After these trials, you will provide responses to a questionnaire. The order of conditions may be either A,B,C or A,C,B.

The study will take approximately *30* minutes.

Data will be gathered using the following methods:

Questionnaires

- After each of the two trials, you will provide responses via a digital questionnaire. Your responses will be anonymised.

Written Feedback/Comments

- The researcher may record statements made by the participant outside of the questionnaire, with the participants consent.

Task Performance

- The reaction time to vibrotactile signals being sent, will be recorded.
- The performance in each of the tasks during condition B.

What are the possible risks of taking part?

The study is considered low risk. However, there is a small risk of physical strain given the weight of the robotic hand which is mounted on the right forearm. Rest between use is included within the study to mitigate this risk. If you have been advised by a doctor not to participate in physical activity, please inform the researcher before agreeing to take part in the study, to discuss whether doing so is safe.

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 MSc Dissertation of Finlo Heath. In addition, this may be submitted for journal publishing. If accepted, it then may be publicly available.

Who has ethically approved this research?

Ethical approval for this project falls under the Pre-approval granted for MSc Robotics studies on the module EMATM0055. For further details, please contact grp-dissertation_unit_2022@groups.bristol.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:
Dr Ben Ward-Cherrier, b.ward-cherrier@bristol.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:

Finlo Heath, finlo.heath.2022@bristol.ac.uk
Dr Ben Ward-Cherrier, b.ward-cherrier@bristol.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.