Participant Information Leaflet

Study Title: Evaluating the Psychoacoustic Impact of Scene-Aware Sound Rendering Pipelines for Extended Reality Devices

Investigator(s): Mattia Colombo

Location: In-person, BCU CEBE, Steamhouse, Millennium Point

Introduction

You are invited to take part in a research study. Before you decide, you need to understand why the research is being done and what it would involve for you. Please take the time to read the following information carefully. Talk to others about the study if you wish.

Please ask us if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Who is organising and funding the study?

The project is organised as a part of Mattia Colombo's PhD programme at the DMT Lab, School of Computing and Digital Technology, Birmingham City University.

What is the study about?

The study looks into how well participants apply psychoacoustic abilities to specific tasks and evaluate how sound rendering systems affect those within augmented virtual environments. The study will collect data from the Head-Mounted Display that users will be wearing to complete tasks. Data will include the position and transformation of the users' heads in the scene with respect to the real and virtual space, with corresponding timestamps. It will include interactions between users and virtual objects like holograms or holographic interface elements such as holographic buttons or sliders.

What would taking part involve?

Partaking involves an in-person test, where participants would be wearing the Microsoft Hololens 2 augmented reality head-mounted display to complete a test. The test will comprise four tasks:
1. an initial listening set-up phase, conducted using headphones and a laptop;
2. Room volume estimation task - participants are asked to rank auditory stimuli according to their surrounding space;
3. Sound localisation task - participants are asked to pinpoint an invisible sound-emitting object's position, distance, and direction;.
4. Masking resolution task - participants are asked to resolve the number of sound sources simultaneously emitting audio;

The overall duration is around 60 to 70 minutes. Tasks can be completed one after the other, or independently with breaks.

Do I have to take part?

No. Participation in this study is completely voluntary, and choosing not to take part will not affect you in any way. You can also choose to withdraw your participation without giving a reason by contacting one of the research teams. Further details about withdrawing from the study are provided later on in this document.

What are the possible benefits of taking part in this study?

Partaking in this study will contribute towards a better understanding of the perception of realism in sound propagation in virtual environments.

What are the possible disadvantages, side effects or risks, of taking part in this study?

There are no identified disadvantages, side effects or risks associated with taking parts in this study.

Requirements

Basic knowledge of Digital Media Technology is required to complete the test. Participants should also have normal or corrected to normal vision and hearing. The difficulty level of the task is comparable to watching a video online and using a smart TV remote with a pointer.

Expenses and payments

There is no reimbursement or token to be received for the completion of the study.

Will my taking part be kept confidential?

The experiment will collect and store the following data from each of the tests involved. The data collection methodologies involve:
- Multi-choice and open questions administered through online forms (using Microsoft Forms).
- Timings for the completions of tasks within tests.
- Rankings of several audio excerpts that participants are required to evaluate.

No personal or sensitive information will be required by any of the tests. All information recorded is de-identified and anonymised. The afore-mentioned investigator will have access to the data collected. A series of statistical experiments will be performed on the responses to prove or disprove hypotheses targeting the goal of the study. The anonymised and de-identified data collected will be stored for a minimum of 5 years for future research and validation of drawn conclusions. The data will be stored on Birmingham City University servers. Results may be quoted in publications.

What will happen to the data collected about me?

Birmingham City University have to ensure that it is in the public interest when we use personally-identifiable information from people who have agreed to take part in research. This means that when you agree to take part in a research study, such as this, we will use your data in the ways needed to conduct and analyse the research study.

We will be using information from you in order to undertake this study and will act as the data controller for this study. We are committed to protecting the rights of individuals in line with data protection legislation.

No identifiable data will be collected from you as part of this study. This means that once your responses have been submitted to the research team, it will not be possible to withdraw this data as your individual responses cannot be identified. Email addresses or contact details for the purpose of setting up interviews will not be recorded and will be deleted upon the arrangement of the test.

Research data will be **anonymised** immediately after data collection and it will not be possible to withdraw your data after this point.

Data Sharing

Your rights to access, change or move your information are limited, as we need to manage your information in specific ways in order for the research to be reliable and accurate. Birmingham City University has in place policies and procedures to keep your data safe.

This data may also be used for future research, including impact activities following review and approval by an independent Research Ethics Committee and subject to your consent at the outset of this research project.

What will happen if I don't want to carry on being part of the study?

Participation is entirely voluntary, and a decision to withdraw participation from the study without giving a reason would not affect you in any way. Please note withdrawing participation is separate to withdrawing data that has already been collected during the study.

Please note that if you withdraw from the study, it will not be possible to withdraw your data after the completion of the test, after which point the data will have been anonymised **OR** it will not be possible to withdraw your data which have already been collected because they have been anonymised. To safeguard your rights, we will use no personally-identifiable information and keep the data secure in line with the University's Information and Data Compliance policies.

Who has reviewed the study?
This study has been reviewed and given favourable opinions by Birmingham City University.

Who should I contact if I want further information?

Mattia Colombo – mattia.colombo@bcu.ac.uk

Who should I contact if I wish to make a complaint?

Any complaint about the way you have been dealt with during the study or any possible harm you might have suffered will be addressed. Please address your complaint to the person below, who is a senior Birmingham City University official entirely independent of this study:

Ian Williams
Head of the Digital Media Technology Lab (DMT Lab)
School of Computing and Digital Technology
Birmingham City University
Birmingham
B4 7XG
Email: ian.williams@bcu.ac.uk

Thank you for taking the time to read this Participant Information Leaflet