

Consent Form

Free University of Bozen-Bolzano



Researcher(s):

Prof. Angelika Peer, Full Professor

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Zahid Razzaq, PhD student

Tharewal Sumegh Shrikant, Researcher

Edoardo Bianchi, PhD student

Study Title: *Multimodal Dataset of Assembly Tasks*

1. WHAT IS THIS DOCUMENT?

This document is a consent form providing information about the study; please take your time to consider and ask questions. If you choose to participate, you will be asked to sign it, confirming your understanding, and you will receive a copy for your records.

2. WHY ARE WE DOING THIS RESEARCH STUDY?

We are conducting this research study to improve Human-Robot Collaboration (HRC) systems in the industrial domain. HRC involves humans and robots working together, and for these systems to be effective, robots must be able to predict human intentions and actions. Recognizing human intentions and actions in an industrial setting is challenging, and we aim to address this challenge by developing algorithms that take advantage of multimodal datasets involving sensor information originating from different types of sensors. Due to the scarcity of public datasets in the industrial domain, in this study we aim at recording a multimodal dataset that covers assembly tasks for training and testing our algorithms.

3. WHO CAN PARTICIPATE IN THIS RESEARCH STUDY?

Participants in this study must be adults aged 18-45, capable of performing procedural activities of assembling toys.

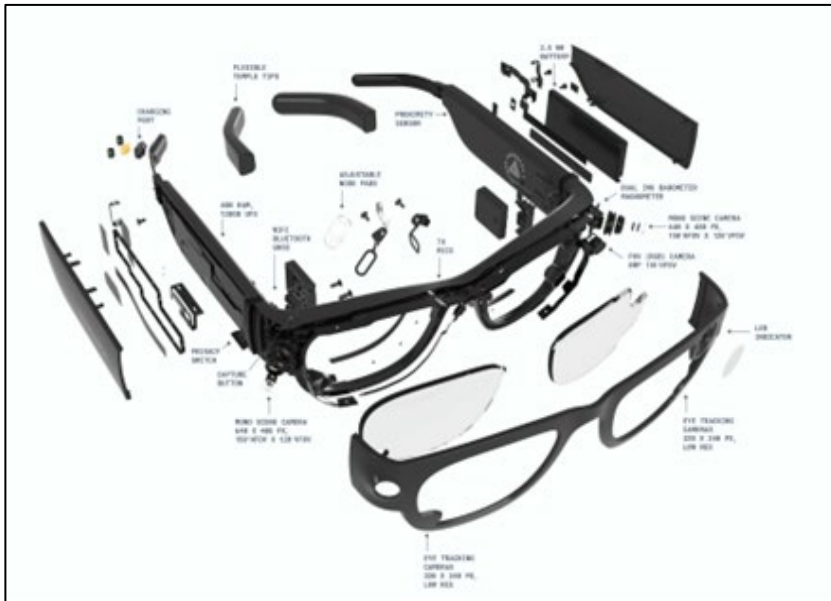
4. WHERE WILL THIS RESEARCH STUDY TAKE PLACE AND HOW MANY PEOPLE WILL PARTICIPATE?

The study will take place at the Human-Centered Technologies and Machine Intelligence Lab (HCT) as well as the SMACT Live Demo both located at NOI TechPark, Via Alessandro Volta, 13, 39100 Bolzano BZ.

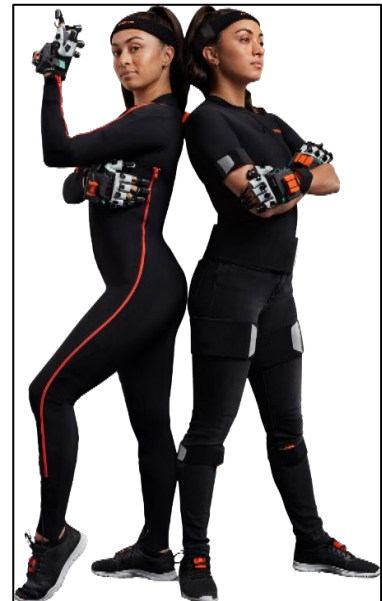
We anticipate 20-30 participants.

5. WHAT TASKS WILL I BE REQUIRED TO PERFORM AND HOW MUCH TIME WILL IT TAKE?

You will be asked to assemble a series of toys, see Figure 3, while being recorded by wearables (Project Aria Meta glasses, an XSENS body suit, and XSENS gloves, see Figure 1 below) and non-wearable devices (RGB cameras, see Figure 2).



Meta Glasses



XSENS suit and gloves

Figure 1: Wearable devices



Motion tracking camera

Figure 2: Non-wearable devices

The Meta glasses have a size and weight of typical glasses and are equipped with a rich set of sensors: a scene camera to capture the scene in front of view; 2 RGB cameras to capture your body movements and actions; 2 eye tracking cameras for tracking your ocular movements; IMUs to track your head movements; microphones to capture sounds originating from the manufacturing activities; and other environmental sensors (e.g., magnetometer, barometer and thermometer).



Figure 3: Toys to be assembled/disassembled.

The XSENS suit and gloves will be used to capture whole body motion data from body and fingers when performing the assembly tasks. The XSENS suit, equipped with 17 wireless IMU sensors is hereby used to record body movements, whereby the XSENS gloves, featuring one IMU across each finger, allow tracking finger movements.

Finally, RGB cameras recording videos from a third-person perspective will be used as an additional modality next to the wearable sensors as detailed above.

Before starting with the experiment, you will be asked to read and sign a consent form. Then, you will be given some time to get familiar with the hardware, specifically the wearables (Meta Glasses, XSENS suit and XSENS gloves) and not wearable devices (RGB cameras) as well as the assembly tasks. You are encouraged to ask any questions about the hardware and experimental activities during this period. Then, the recordings from the individual devices will be started and you will be asked to assemble up to 6 toys within two hours of time. Once recordings for an assembly are completed, the recording from devices will be stopped and the next toy will be presented. The presented procedure will be repeated for all assembly tasks. Upon completion of all of them, you will be asked to take off again the wearable devices. The whole experiment will take approximately two hours.

All data collected will be anonymized post-experiment to safeguard your identity. To this end, in video recordings your face will be blurred and combined with the rest of the data. The anonymized data will be made publicly available as part of the Assembly101 archive, a public repository where recordings originating from assembly tasks are collected allowing the research community to develop and test new algorithms for action recognition and prediction.

6. WILL PARTICIPATING IN THIS RESEARCH STUDY PROVIDE ANY BENEFITS FOR ME??

While you may not directly benefit from this research, your participation significantly contributes to advancing knowledge in multimodal action, plan and intention recognition and prediction in human-robot collaboration systems.

7. WHAT ARE MY RISKS OF BEING IN THIS RESEARCH STUDY?

All actions to be performed for assembling the selected toys are safe. However, you can stop the experiment at any time if you feel uncomfortable to continue. Please also note that your face will be blurred in video recordings to protect your identity in published datasets.

8. HOW WILL MY PERSONAL INFORMATION BE PROTECTED?

All the captured data will be anonymized immediately after the recording session. All links between your identity and the collected data will be destroyed. This way, there will be no possibility to connect the data in the public datasets to you. The signed consent documents will be stored securely following university rules.

9. WILL I RECEIVE ANY COMPENSATION FOR PARTICIPATING IN THIS STUDY?

You will not receive any payment.

10. WHO SHOULD I CONTACT IF I HAVE QUESTIONS?

If you have any questions before, after, or during the experiment, feel free to contact Zahid Razzaq (zahid.razzaq@student.unibz.it; +39 344 4740037) or Prof. Angelika Peer (angelika.peer@unibz.it; +39 0471 017069). During the experiment, feel free to ask questions at any time.

11. WHAT IF I CHANGE MY MIND AFTER SAYING YES?

If during the experiment you decide that you no longer wish to participate in this study, you can notify the researchers, and the experiment will be stopped immediately, withdrawing the data collected so far. Nonetheless, your data cannot be withdrawn once the data has been anonymized. All direct identifiers from your data will be destroyed after the session.

Thank you for considering participation in this study. Feel free to contact the researchers mentioned in question 10 for additional information or clarification.

Consent Form

Signature Page

Please complete this form after reading the entire document.

Title of the study: *Multimodal Dataset of Assembly Tasks*

Thank you for considering participation in this study.

If you have any questions about this document or the information provided, please ask the researcher before deciding whether you wish to participate.

- 1. I acknowledge that I have read this consent form and have been given the opportunity to discuss the information and my involvement in the project with the researcher(s).*
- 2. I understand that, if during the session I decide that I no longer wish to participate in this study, I can notify the researchers, and the data will be withdrawn immediately.*
- 3. I understand that my data cannot be withdrawn after the session due to the data anonymity.*

Participant's statement:

I, _____, hereby agree that the research project titled " *Multimodal Action Dataset* " has been thoroughly explained to me, and I voluntarily consent to participate in this study. I fully understand the nature and scope of the research project.

Signature:

Date:

Researcher's statement:

I, _____, confirm that I have comprehensively explained the nature and requirements of the proposed research to the participant. To the best of my knowledge, the participant has read and understands the details of this project as outlined in this document. A copy of this document has been provided to the participant for their reference.

Signature:

Date: