

CAADRIA WORKSHOP DAY 02

Collaborative Assembly Tasks using AR-enabled HRC system and Group Discussion (20minutes)



WORKSHOP AGENDA

CAADRIA 2024 – Day 02

[Workshop Objectives]

- Explore different methods to interact with digital data, including communicating with robotic system through AR interface.
- Explore how AR technology can be used to facilitate the bi-directional communication between human designers and robotic system.



Image: How to communicate with robotic arm using Microsoft Hololens 2. Source: Loy, 2024.

END OF THE DAY

CAADRIA Workshop – Day 02

Image: AR-enabled HRI system. Source: Loy, 2024.

WORKSHOP SCHEDULE

CAADRIA 2024 – Day 02

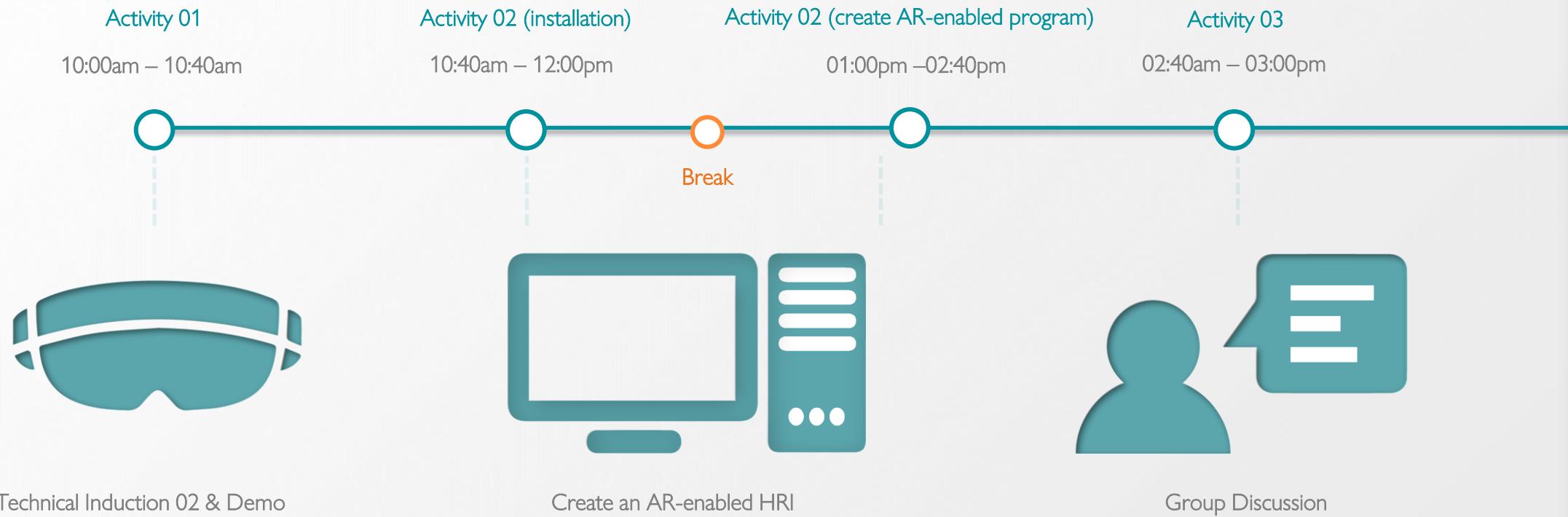


Image: Time Schedule for CAADRIA 2024 – Workshop Day 2. Source: Author 2023.

TECHINCAL INDUCTION

Using Microsoft Hololens 2 / AR Devices (10 minutes)

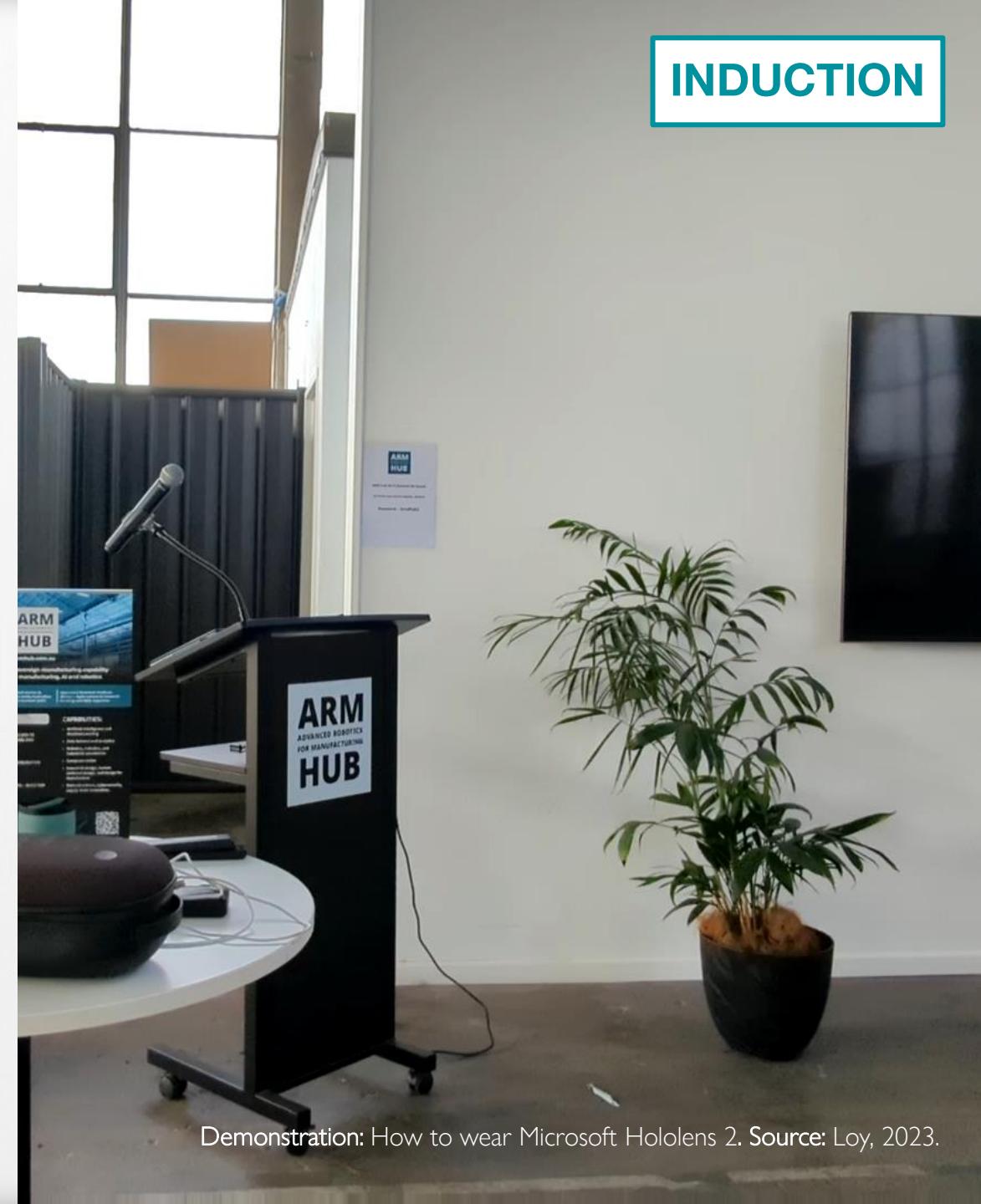


Image: User interact with UR10 via AR interface. Source: Dr. Muge Belek Fialho Teixeira 2023.

AR INDUCTION

How to wear Microsoft Hololens 2

- Loosen the headband: Turn the adjustment knob located at the back of the device to loosen the headband.
- Align with your eyes: Position the center of the device directly in front of your eyes for optimal viewing.
- Adjust the headband: Gently tighten the headband by turning the adjustment knob until the device feels secure and comfortable on your head.
- Ensure cable clearance: Check that the charging cable is not obstructing your movement or causing discomfort.
- Compatibility with glasses: Microsoft HoloLens 2 can be worn with glasses, except for multifocal glasses.



Demonstration: How to wear Microsoft Hololens 2. Source: Loy, 2023.

AR INDUCTION

Motion Sickness

Some research participants might experience **motion sickness** while using Microsoft Hololens 2.

- Each participant is only allowed to use HL2 for **10 minutes** for each session.
- **Take a deep breath.**
- Remember to **have plenty of fluids** throughout the research activity.



Image: Experiencing motion sickness. Source: Midjourney, 2023.

DEMO

Exploring how AR could be used to communicate with digital data (30minutes)

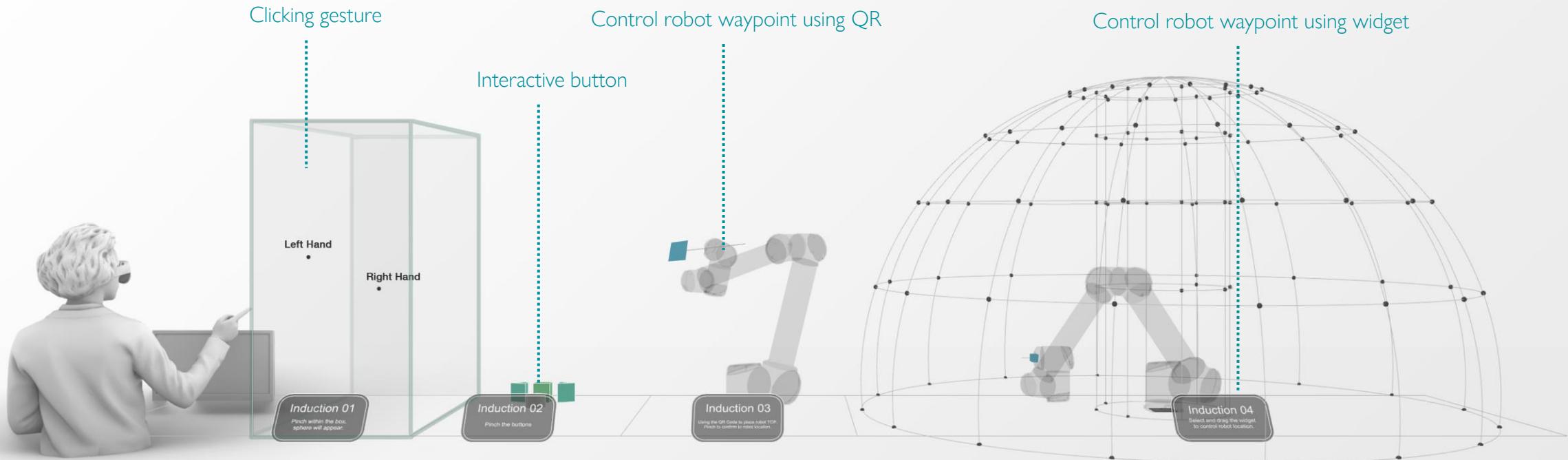


Image: AR Demo for CAADRIA Workshop. Source: Loy, 2024.

AR-enabled HRI

How to create AR-enabled Human-Robot Interaction (HRI) (1 hour 20 minute)



Fologram (Add-on)
Website: <https://fologram.com/>



Robot (Add-on)
Website: <https://github.com/visose/Robots?tab=readme-ov-file>

AR-enabled HRI

[Installation] Where to install Fogram (website: <https://fogram.com/>)



DOWNLOAD FOLGRAM

Fogram for Rhino and Grasshopper

Connect Rhino and Grasshopper to mobile and HoloLens devices running Fogram. Includes Grasshopper components for streaming and interacting with models, working with gestures and markers, modelling and controlling data flow.

Free to download and install for Rhino 6 or above.

Windows

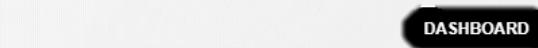
Download for Windows:

Rhino 6 **Rhino 7** Rhino 8

Mac

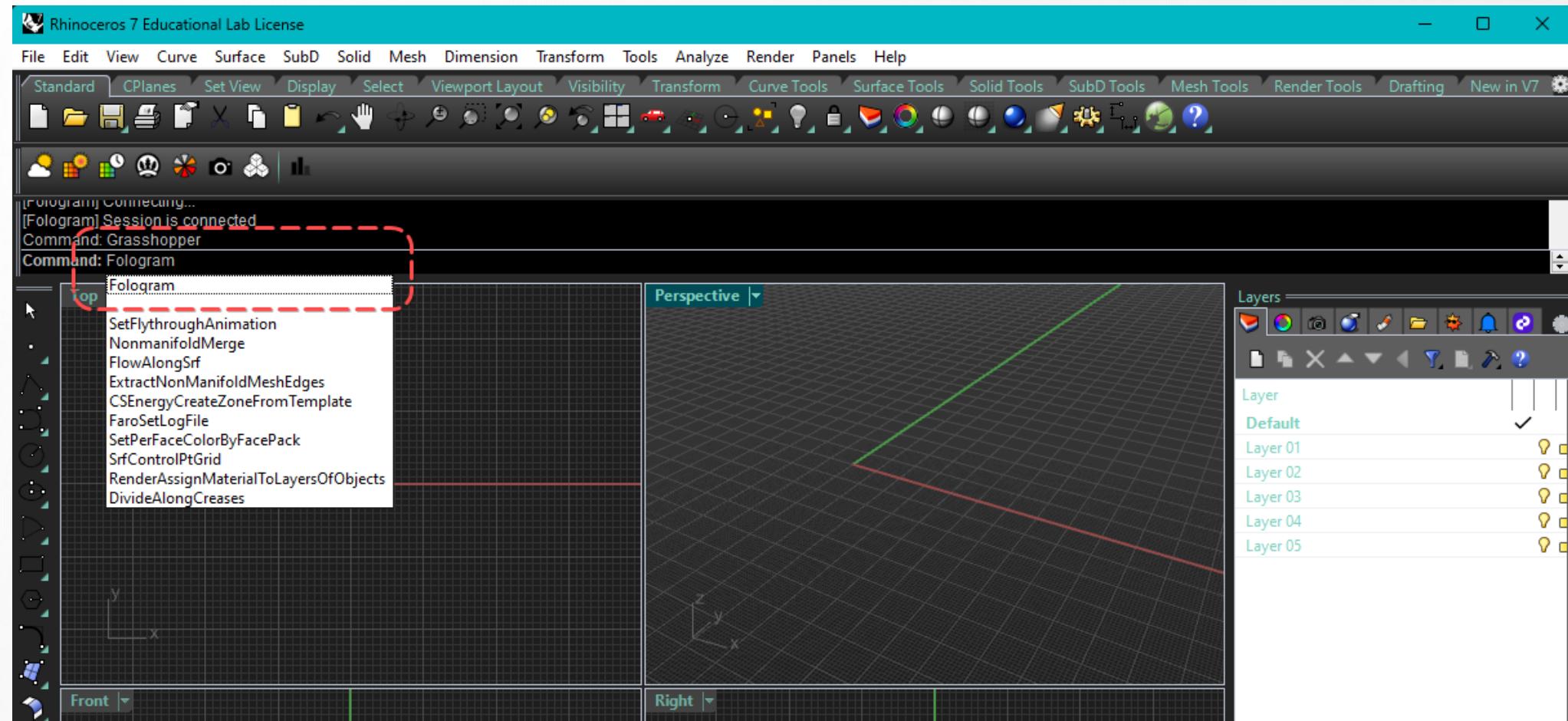
Download for Mac:

Rhino 6 Rhino 7 Rhino 8

A large red rectangular box highlights the "Rhino 7" button under the Windows download section.

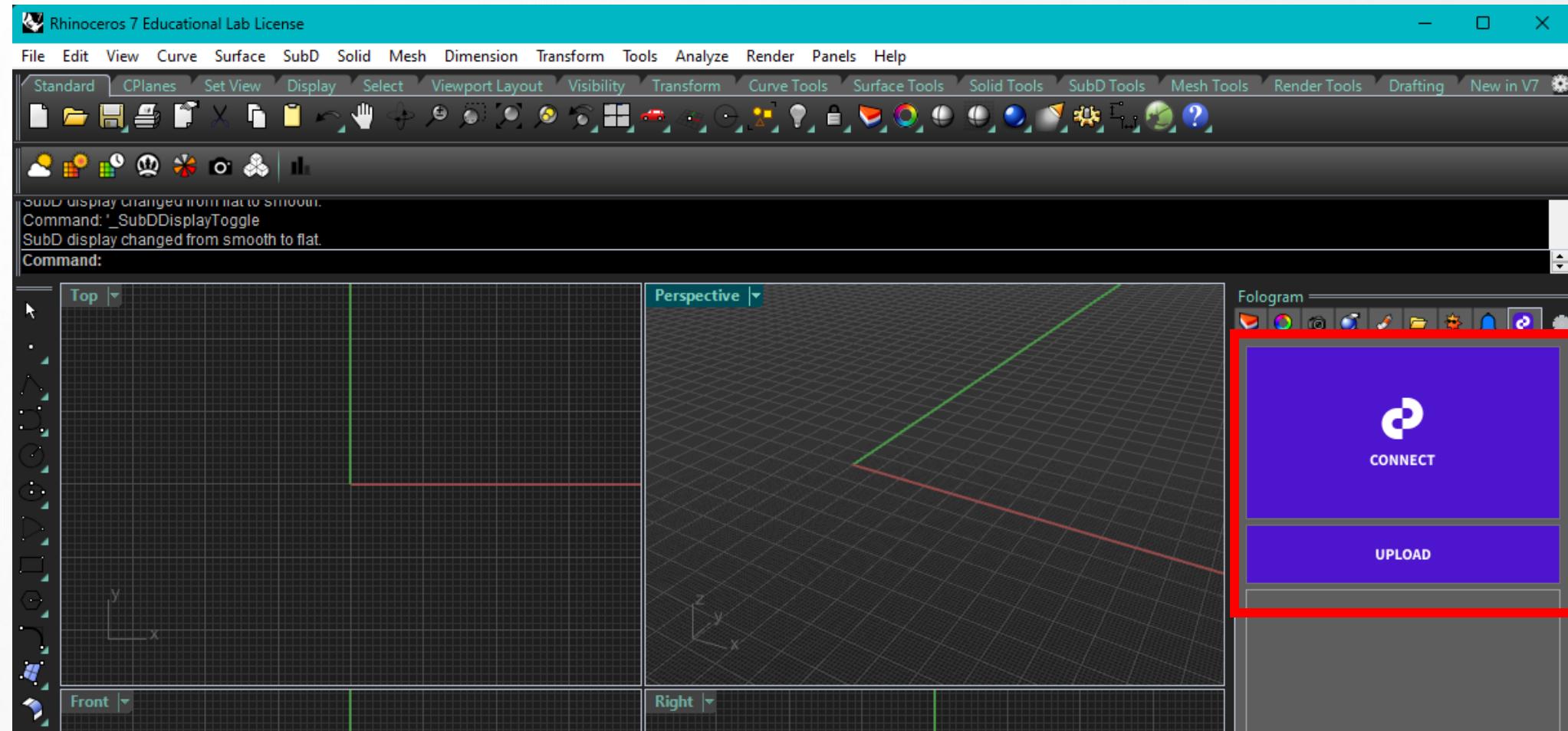
AR-enabled HRI

[Installation] Check if fogram is properly installed



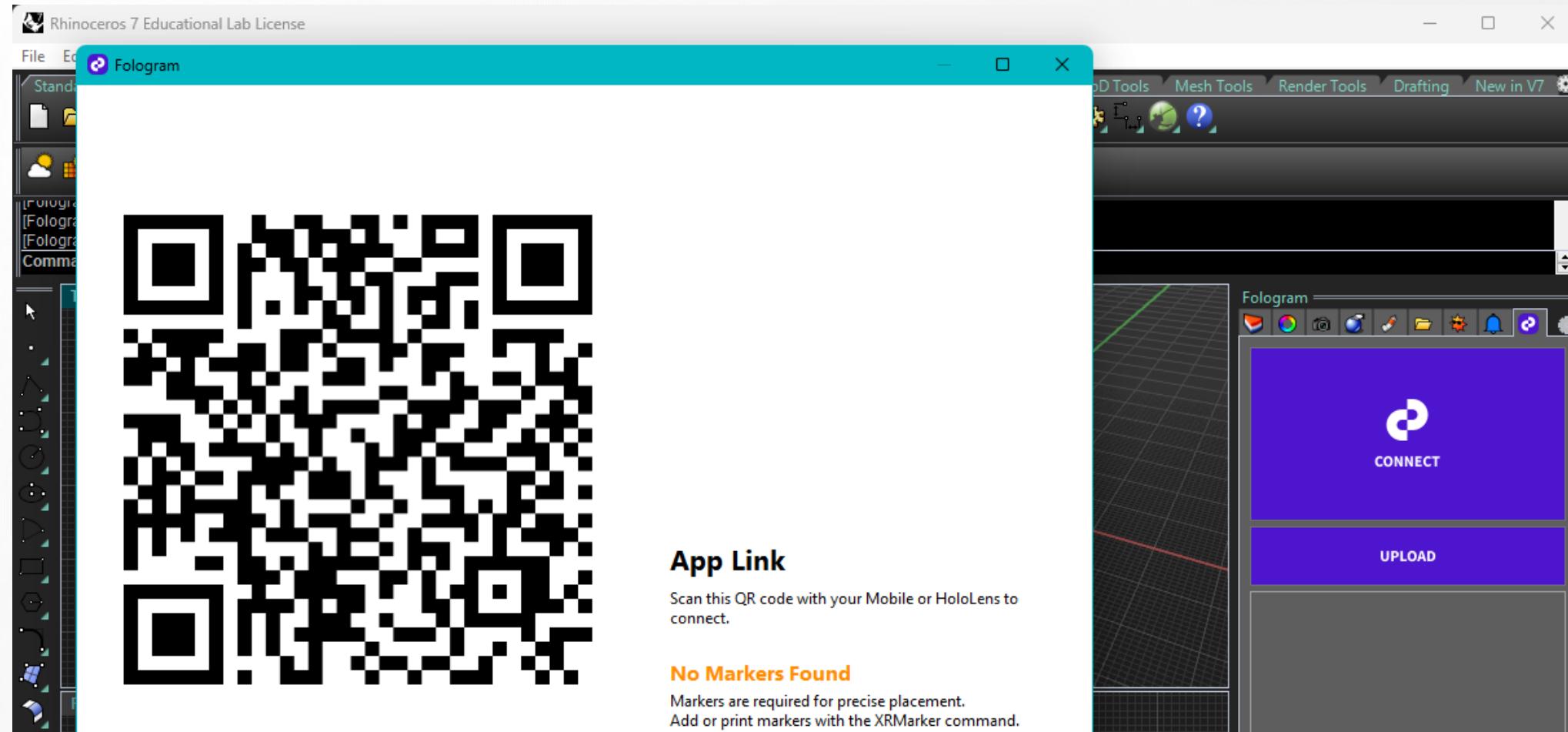
AR-enabled HRI

[Installation] Check if fogram is properly installed



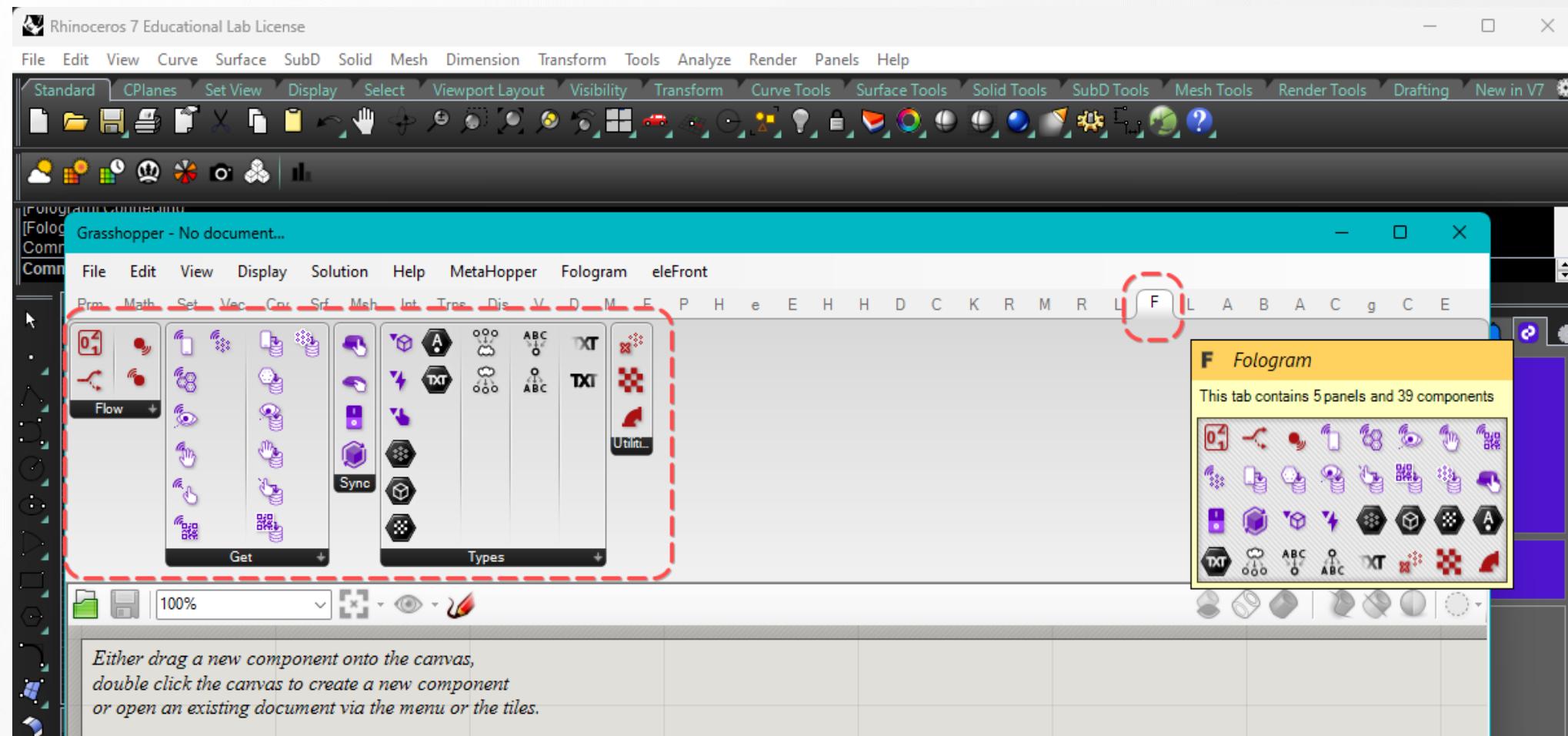
AR-enabled HRI

[Installation] How to connect to AR devices (Mobile or Hololens 2)



AR-enabled HRI

[Installation] Check if fologram is properly installed



WORKSHOP SERVER

[Installation] Internet server



Make sure using the same internet server.

Wifi : TP-Link_31E5

Password : 81819515

Internet Protocol (IP) : 192.168.137.102



BREAK & WILL BE BACK

60 minutes (make sure you have *stay hydrated*)

ACTIVITY 02

How to create AR-enabled HRI – 50 minutes

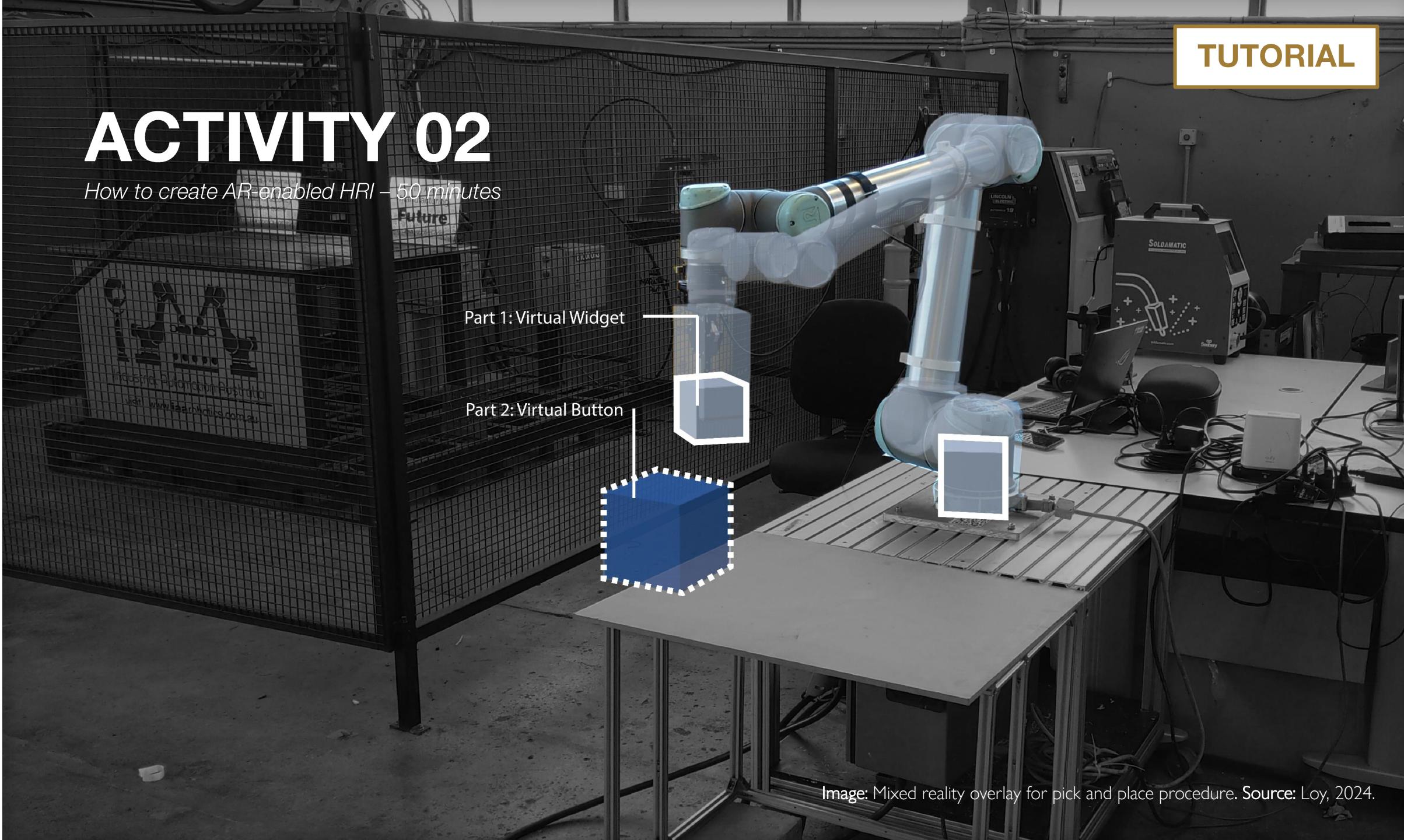


Image: Mixed reality overlay for pick and place procedure. Source: Loy, 2024.

GITHUB REPO

How to create AR-enabled HRI – 50 minutes

https://github.com/LoyWeiWin/AR-HRC_CAADRIA2024_Workshop.github.io

ACTIVITY 03

Group Discussion – 15 minutes

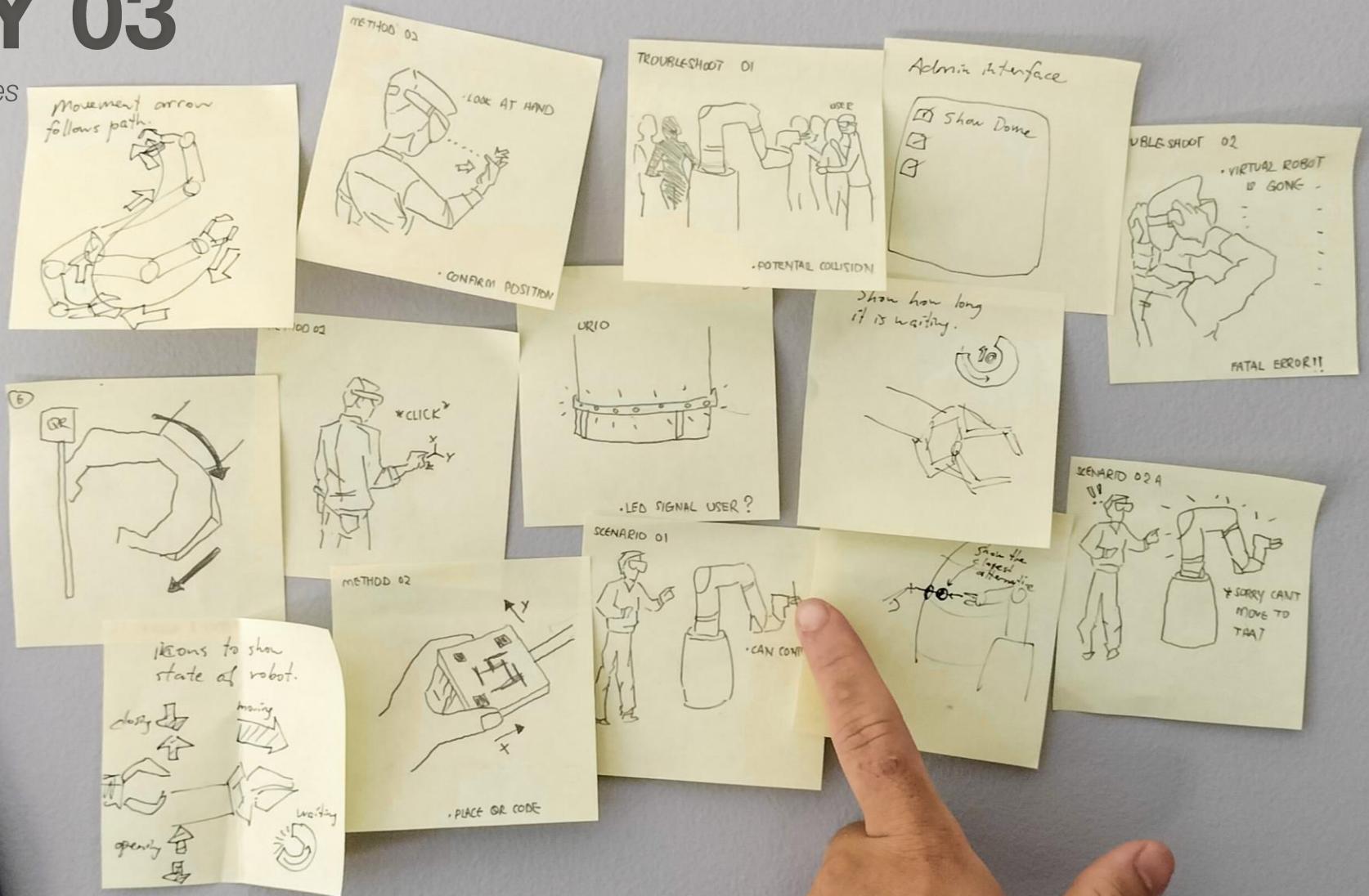


Image: Group discussion with Post-it Notes. Source: Loy, 2023.

ACTIVITY 03

Group Discussion – 15 minutes

“How these AR interactions / interface could be expanded to support you in interacting with the robotic system for collaborative assembly tasks?”



“Feel free to sketch other mode of interaction on the Post-it note.”

– Workshop Facilitator



THANK YOU

Any question? Thank you so much for participating and feel free to reach out if there is an opportunity for collaboration

PREVIEW FOR TOMORROW

