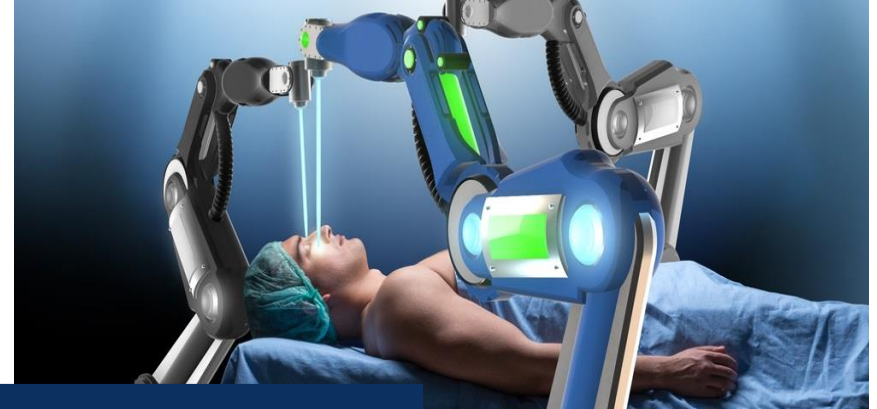


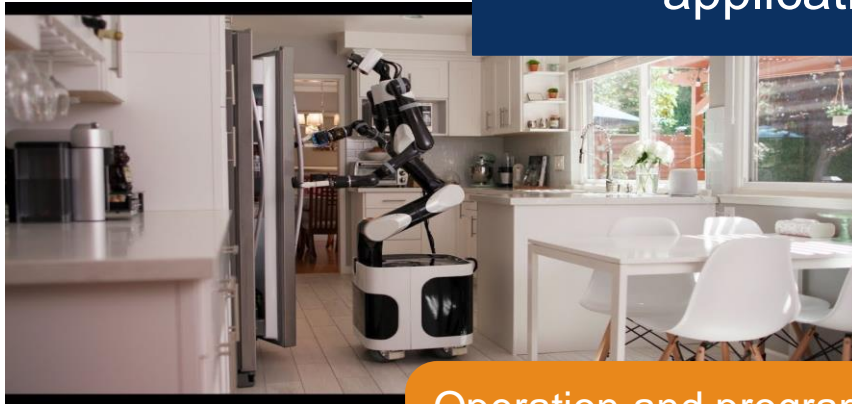
Project Group **VARobot**: **Virtual and Augmented Reality** **Assisted Robot Programming**

Enes Yigitbas, Ivan Jovanovikj

27.01.2020



Robots are used in various applications domains.

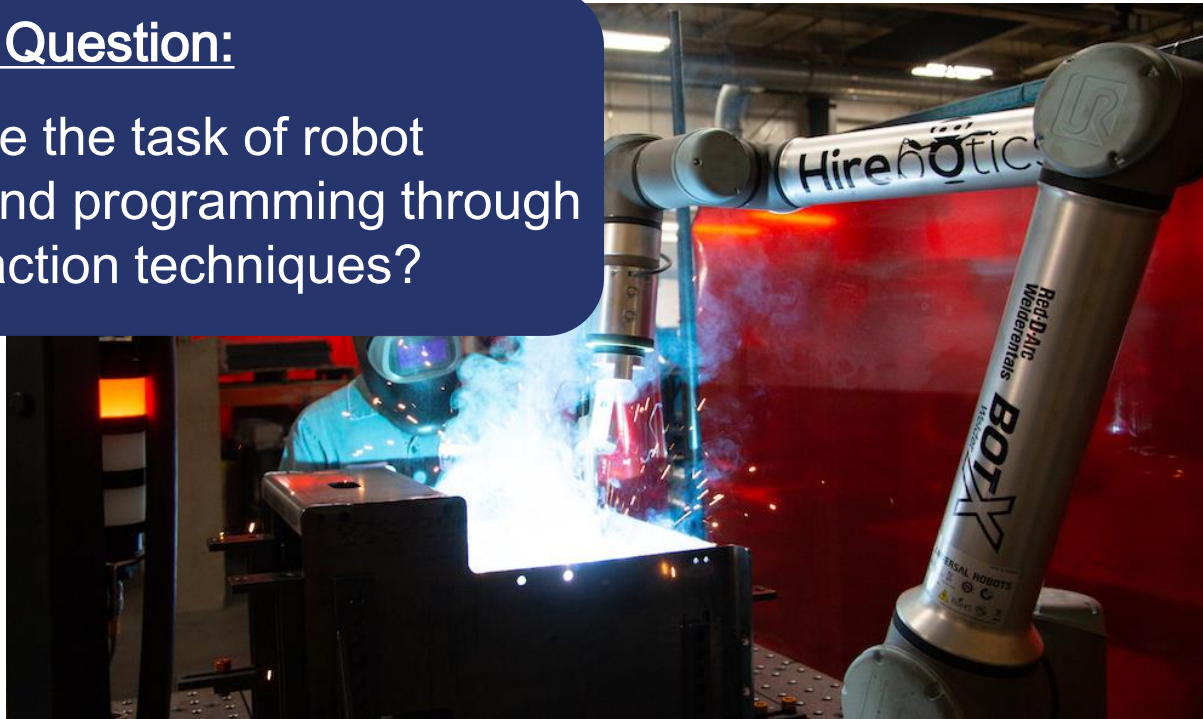


Operation and programming of robots is a challenging task which requires profound domain as well as programming knowledge!

„ [...] **manually programming** a robotic arc welding system for the manufacture of a large vehicle hull takes more than **eight months**, while the **cycle time of the welding process** itself is only **sixteen hours**. In this case, **the programming time is approximately 360 times the execution time**. As a result, small to median sized enterprises (SMEs) are not able to benefit from robotic automation due to this programming time overhead.“ [Pan et al., 2010]

Research Question:

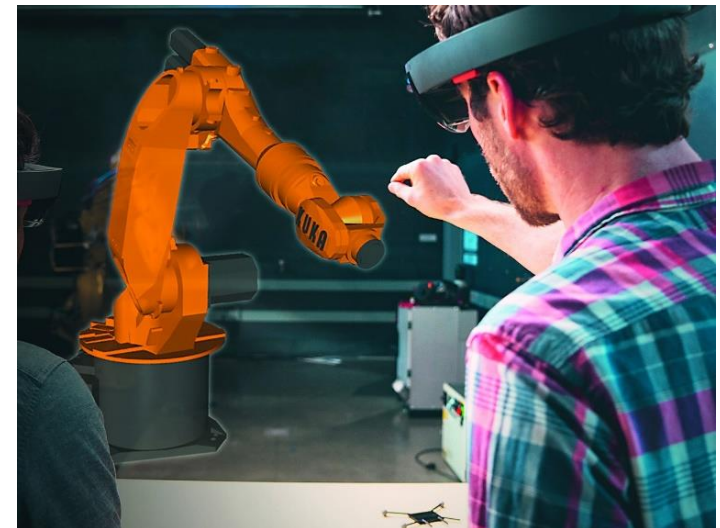
How to ease the task of robot operation and programming through novel interaction techniques?



Virtual Reality (VR) is electronic simulations of environments experienced via head mounted eye goggles and wired clothing enabling the end user to interact in realistic three-dimensional situations.
[Coates, 1992]

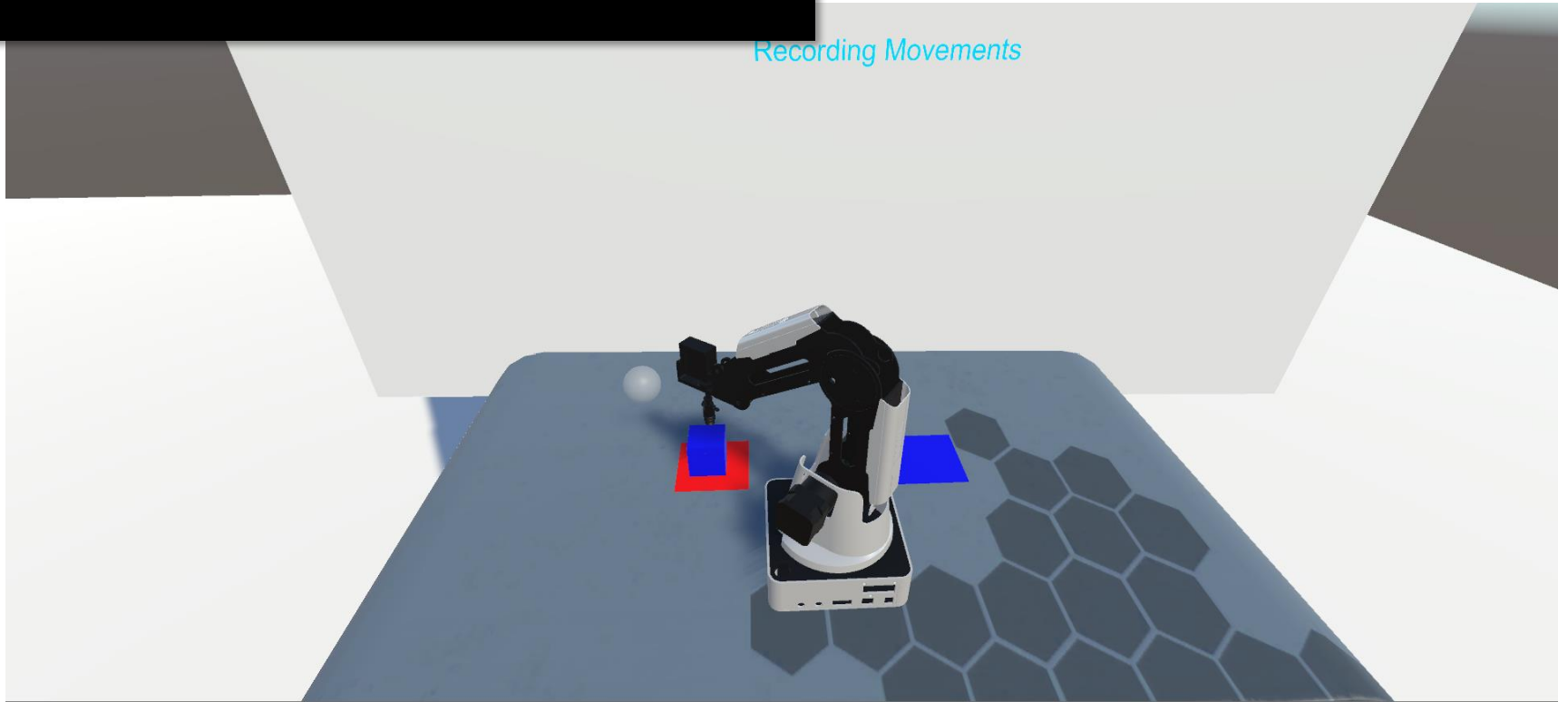


Augmented Reality (AR) relies on the concept of overlaying digital data onto the physical world, typically in form of graphical augmentations in real-time.
[Azuma, 1997]

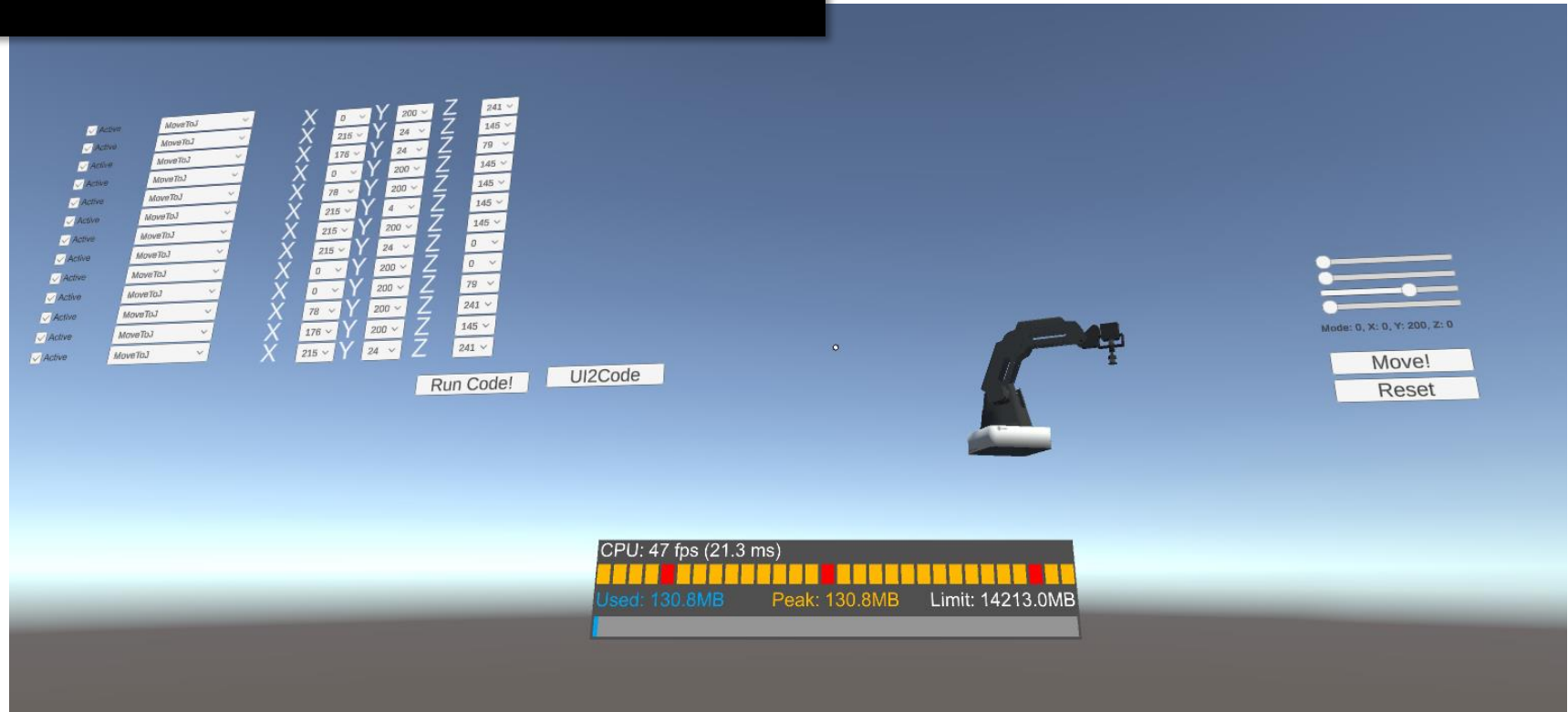


VR Robot Programming Environment

Recording Movements

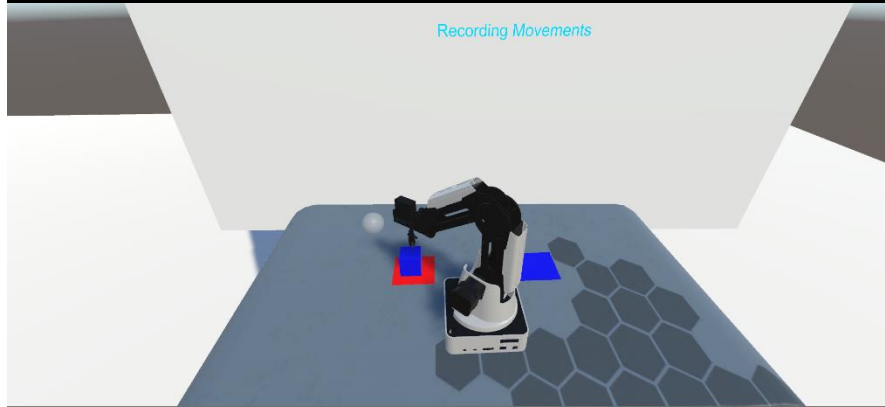


AR Robot Programming Environment



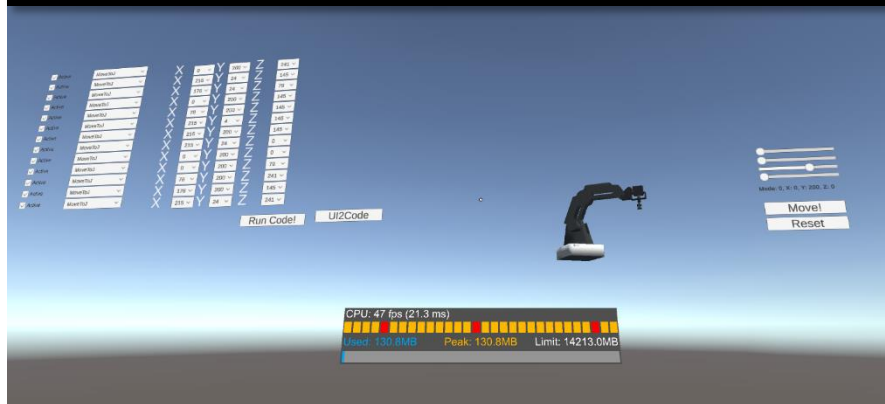
Goal: VR/AR Assisted Robot Programming Environment

VR Robot Programming Environment



Collaborative AR/VR Robot Programming Environment across Different Devices

AR Robot Programming Environment



Used tools, frameworks, etc.



Prerequisites:

- Sound programming skills in an object-oriented language, e.g. Java, C#
- Basic knowledge about the concepts of Model-Driven Software Development
- Motivation to work in an agile team, self-organize yourself, and be creative
- Formal requirements to participate in a project group

Optional, but helpful:

- 3D Programming, experience with Unity Engine
- Robot Programming, experience with ROS

- We want to get to know you in advance!
- Describe yourself according to the following criteria...
 - Programming experience (languages, projects, ...)
 - Experience with robot, 3D programming?
 - Working experience (university, industry)
 - Lectures, seminars or other courses in the area of Software Engineering that you completed successfully
 - Working artifacts (AR/VR Demo-Apps, Assets, 3D Models etc.)
 - ... and last but not least: What do you expect from this project group? Why do you want to participate in this particular PG?
 - Submission in the first registration period (**until 20.02.2020**) via email to enes@mail.upb.de



- Ask questions after the presentations
- Contact us via email:
 - Enes Yigitbas enes@mail.upb.de
 - Ivan Jovanovikj ivanj@mail.upb.de

- Visit our web page:

<https://cs.uni-paderborn.de/dbis/lehre/veranstaltungen/project-group-varobot/information>

Thank you for your attention!

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attention.**

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