# ATTENTIVE MACHINES

## Gazor: A gaze aware Industrial IoT-based Instructor

JOHANNES KEPLER UNIVERSITÄT LINZ

Institute for Pervasive Computing

### Background

**Typical Industrial Apprenticeship Model** observation learn from the expert cooperation let the novice work along monitoring observe the novice Subset of Collins' 6 Stage Model in Allan Collins. 2005. Cognitive apprenticeship.

#### **Observational Learning**

attention noticing something worthwile retention remembering in order to imitate reproduction being able to imitate motivation willingness to perform

Internal Processes defined by in Albert Bandura and Richard H. Walters. 1977. Social learning theory.

#### Addressed Challenges

digital transformation of this process

- creating a non-expert systems
- provide an affordable solution





Attention Capturing through Eye Tracking



Capturing Retention Processes



Enabling and Supporting Retention and Reproduction

### Hardware Prototype and System Design



PiCam is attached to RPi with Flatband Connection



IoT Communicat on Network



tandalone hardware and sof ware modul ndalone sof ware modul connect on to central message queue connect on to a local message queue of another module





Actual Hardware Prototype



Schematic Layout of the Raspberry PI Based Platform

### Software Prototype





System Design shows Component Interplay of Hardware and Software



mapping of Digital pixel angle to coordinates enables later easy positioning of the laser unit with a calibration process. If a scene is digitally mapped users can define interaction points using the video panel in the Gazor Control Unit.

The Gazor control unit is used to define interaction/gaze points for a workflow. If a point is looked at, the system moves the laser to the next position in the sequence, in addition an instruction video will be displayed in a peripheral display.

Using an infrared light laser makes it possible to detect if the user is gazing at a point without him noticing. This enables the system to gradually remove support (not showing the visible laser point) while being fully functional.



This work was supported by the Attentive Machines project (FFG, Contract No. 849976).



Contact

Michael Haslgrübler, Michaela Murauer, Alois Ferscha Institute for Pervasive Computing Johannes Kepler University, Linz, Austria Johannes Kepler University, Linz, Austria {haslgruebler,murauer,ferscha}@pervasive.jku.at



