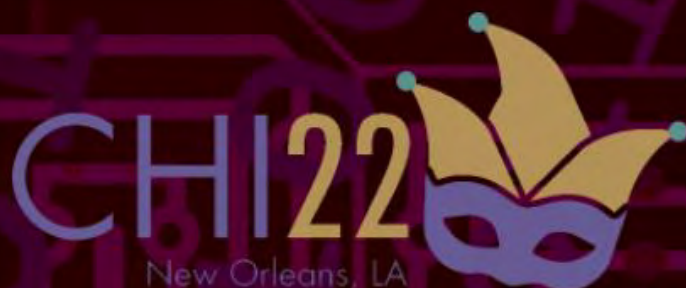


# AutomationXP22: Engaging with Automation

Understanding and Designing for Operation, Appropriation, and Behaviour Change

Workshop at CHI'22 - Hybrid - April 30th 2022



# Hybrid Workshop Format

## Before the workshop

- Each participant joins Zoom call: <http://tiny.cc/autexp22>
- Turn on camera
- Turn off mic and loudspeaker (on-site participants)

## During the workshop

- Use hand signal in Zoom or Zoom chat
- Turn on mic temporarily for asking questions, discussions, ...
- One slideset shared by remote organizers

## After the workshop

- Zoom session is closed, on-site participants can continue working

# Workshop Goal

**...exploration of the interplay of engagement and automation from a multi-disciplinary perspective...**

- Uncovering the dimensions of automation engagement
- Reflecting on major challenges of automation engagement
- Identifying promising future research topics in the field of automation experience
- Forming a multi-disciplinary network of automation experience researchers

# Subtopics

## Engage for Operation

- How can non-experts be engaged before and during their first encounter with an automated system to a level that they comprehend its capabilities and potential risks?
- How to design take over requests that entice operators for interventions and highlight potential consequences?
- How to support long-term engagement with automated systems?
- How can automated engagement be designed in a gender and diversity sensitive manner that responds to differing motivations, competency levels and realities and ensures accessibility for different types of users?

## Engage for Appropriation

- What are users' requirements regarding the adaptation of automated processes and how to address and design for them in different domains?
- What impact has the adaptability of automated processes on the user's automation experience?
- How can automated processes be tailored joyfully by non-expert users?
- How can users contribute their tacit knowledge to automated processes?

## Engage for Behavior Change

- How to define the right level of automation to reach users with interventions?
- How can engaging automation be designed in an ethically aware manner, enabling for a transparent behavioral goal definition and validation?
- How to prevent reactance with regard to behavioral recommendations issued by automated systems?
- What are the interaction design practices to ensure automation integrity in different types of projects and contexts?

# Organizers



**Matthias Baldauf**  
Eastern Switzerland  
University of Applied  
Sciences, Switzerland



**Peter Fröhlich**  
AIT Austrian Institute of  
Technology, Center for  
Technology Experience,  
Austria



**Virpi Roto**  
Aalto University, Finland



**Philippe Palanque**  
Université Paul Sabatier -  
Toulouse III, France



**Siân Lindley**  
Microsoft Research, UK



**Jon Rogers**  
Northumbria University, UK



**Wendy Ju**  
Cornell University, USA



**Manfred Tscheligi**  
University of Salzburg and  
AIT Austrian Institute of  
Technology, Austria

# PUC Theme Issue



Personal and Ubiquitous Computing

[Journal home](#) > [Journal updates](#) > Theme Issue on Engaging with Automation: unders...

## Theme Issue on Engaging with Automation: understanding and designing for operation, appropriation, and behavior change [CfP]

### Guest Editors

**Peter Fröhlich**, AIT Austrian Institute of Technology, Austria, [peter.froehlich@ait.ac.at](mailto:peter.froehlich@ait.ac.at)

**Matthias Baldauf**, Eastern Switzerland University of Applied Sciences, Switzerland, [matthias.baldauf@ost.ch](mailto:matthias.baldauf@ost.ch)

**Virpi Roto**, Aalto University, Finland, [virpi.roto@aalto.fi](mailto:virpi.roto@aalto.fi)

**Philippe Palanque**, Université Paul Sabatier - Toulouse III, France, [palanque@irit.fr](mailto:palanque@irit.fr)

**Manfred Tscheligi**, University of Salzburg & AIT Austrian Institute of Technology, Austria, [manfred.tscheligi@sbg.ac.at](mailto:manfred.tscheligi@sbg.ac.at)

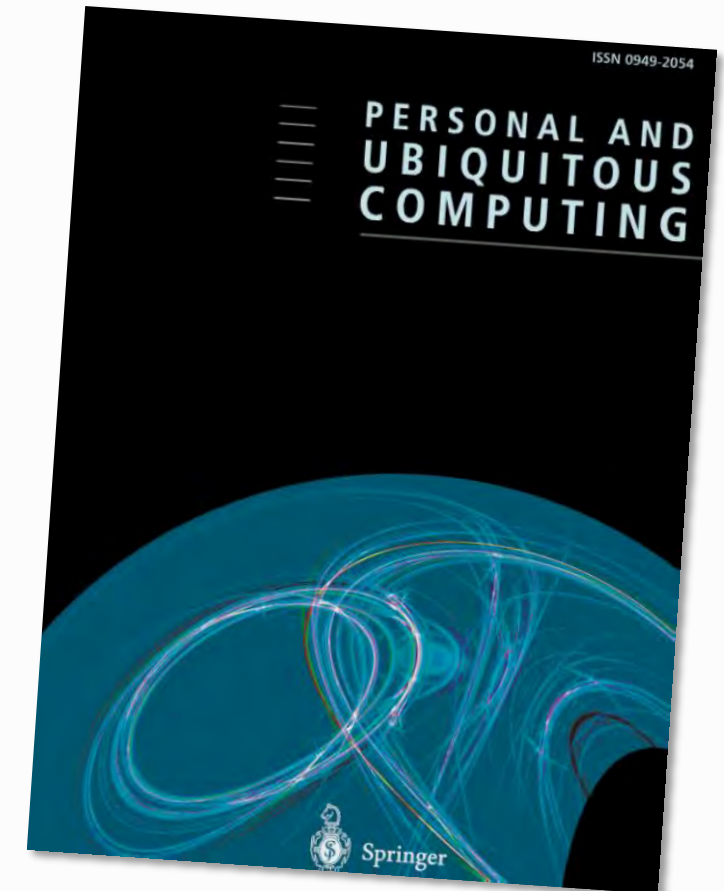
### Important Dates

Submissions due: September 30<sup>th</sup>, 2022

1st notification to authors: October 31<sup>st</sup>, 2022

2nd notification to authors: November 30<sup>th</sup>, 2022

Final versions: December 23<sup>rd</sup>, 2022



# AutomationXP22 in a Nutshell

23

participants



15

position papers



2

madness sessions



1

keynote



*CDT (New Orleans)*

9:00am-9:10am

**Welcome and Introduction**

9:10am-9:25am

**Participants Introduction**

9:25am-9:55am

**Paper Madness, Session I**

9:55am-10:05am

*Break*

10:05am-10:20am

**Keynote "Engaging with Automation"**

*Virpi Roto*

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# Participants

- Amiot, Clélie
- Asha, Ashratuz Zavin
- Baldauf, Matthias
- Bektas, Kenan
- Colley, Mark
- Fröhlich, Peter
- Gonzalez Jimenez, Shreepriya
- Jin, Lu
- Jones, Brennan
- Ju, Wendy
- Lee, Gihun
- Mattioli, Andrea
- Miller, Dave
- Müller, Sebastian
- Oechsner, Carl
- Palanque, Philippe
- Paternò, Fabio
- Pfleging, Bastian
- Roto, Virpi
- Strecker, Jannis
- Wiberg, Mikael
- Willamowski, Jutta
- Ziobro, Dawid



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# Engaging with Automation: Common Challenges

# User Experience (UX) meets Artificial Intelligence (AI) - Designing Engaging User Experiences Through *'Automation of Interaction'*

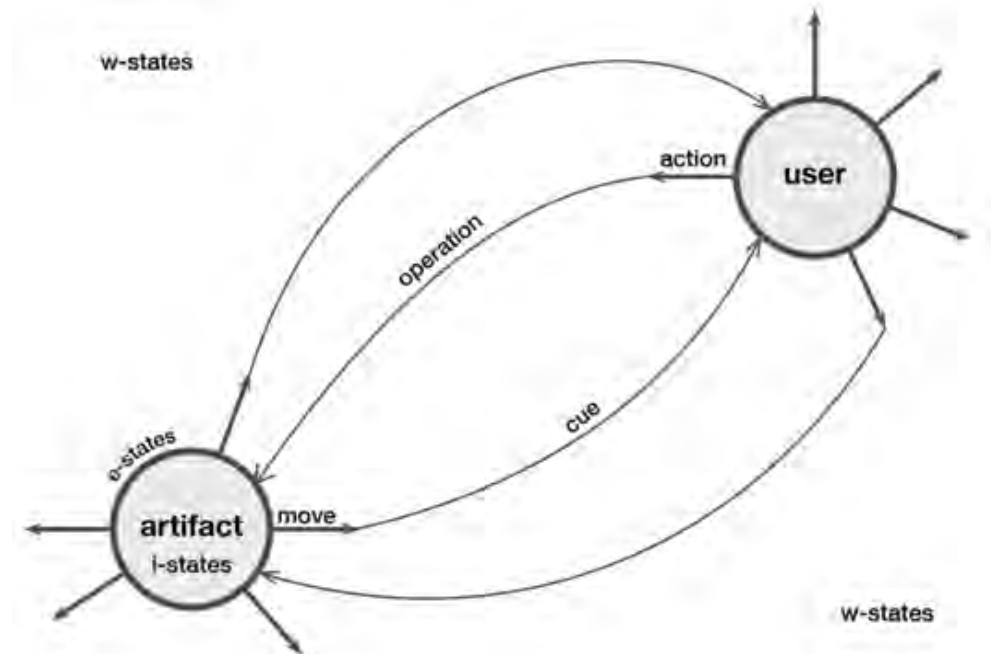
Mikael Wiberg<sup>1</sup> and Erik Stolterman Bergqvist<sup>2</sup>

<sup>1</sup> Umeå University, Department of Informatics, Umeå, Sweden

<sup>2</sup> Indiana University, Luddy School of Informatics, Computing, and Engineering, Bloomington, USA

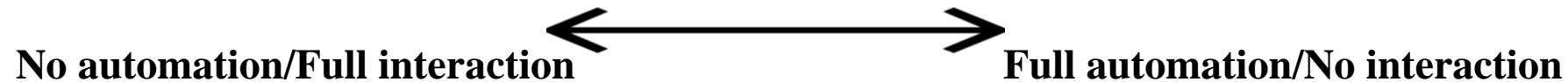
# Core challenge, Examples and Analysis

- **HCI at a crossroad?** On the one hand, it is still about designing for engaging user experiences (UX). Still, on the other hand, it seems to be increasingly about reducing interaction and automating human-machine interaction through AI.
- **Examining this seeming crossroad** – two classic examples, i.e., an autonomous car and a social media platform.
- Through an **interaction analysis** of these two examples, we show: 1) how interaction and automation are combined in the design, 2) how engaging interaction is dependent on a certain level of automation, and 3) how each example illustrates a different balance between interaction and automation.



# “Automation of interaction” – along a scale

- **Addressing this challenge – the EIA-scale** - We propose the *Engaging Interaction through Automation (EIA) – scale* as a conceptual construct that takes these aspects into account to understand and analyze ways of *combining interaction and automation* in interaction design.



- **We illustrate the use of the proposed EIA-scale**, discuss its theoretical implications, and suggest it as a useful tool – when *designing for engaging user experiences (UX) through automation*, with AI as an interaction design material.

# AutomationXP22: Engaging with Automation

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## Task-models based gameful design as a mean to increase Engagement with Automation



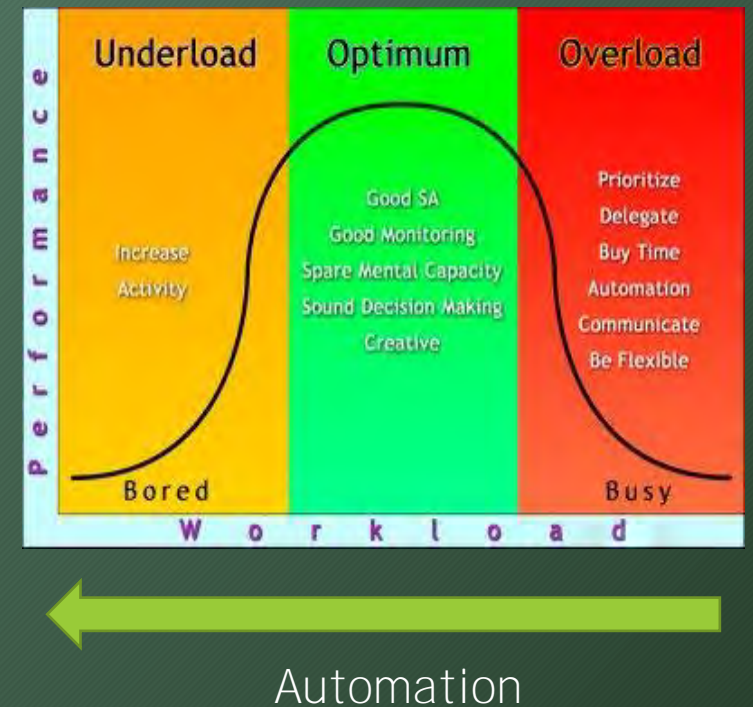
Célia Martinie & Philippe Palanque

palanque@irit.fr - <http://www.irit.fr/ICS/palanque>



# Engaging with Automation

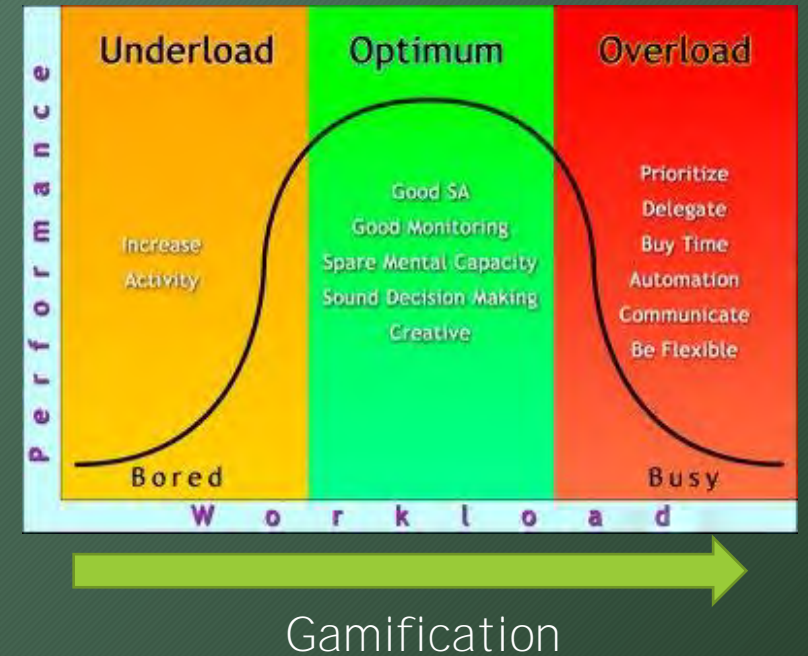
- Following Yerkes-Dodson Law more automation does not mean more engagement
- In fact, more automation might lead operators to underload and thus reduce engagement
- Additional issues such as de-skilling, loss of situation awareness ... particularly relevant if other tasks (e.g. entertainment) are becoming possible



R.M. Yerkes, J.D. Dodson. "The relation of strength of stimulus to rapidity of habit-formation".  
Journal of Comparative Neurology and Psychology 18: 459-482 (1908).

# Gamification - Gameful Design

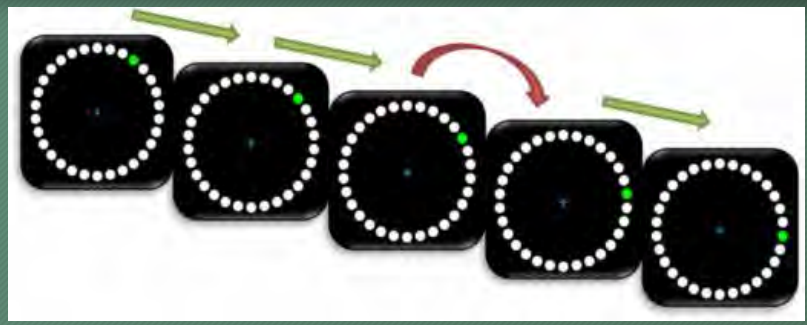
- Gamification and Gameful Design provide means to increase engagement (posts on **forums, lecture attendance, grades ...**)
- Gamification increases the quantity of activity
  - More information to process and to monitor
  - Specific gamified tasks to perform
  - Alternating work with gamification tasks (suspend and resume)
  - Keeping track of two concurrent flows of activity



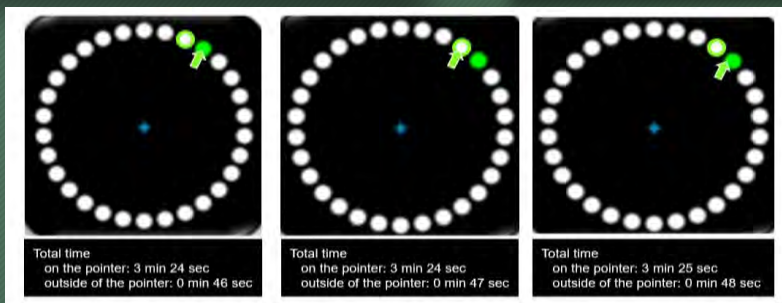
# Task-models to Assess the Workload Level



Original Mackworth Clock



Numeric Mackworth Clock

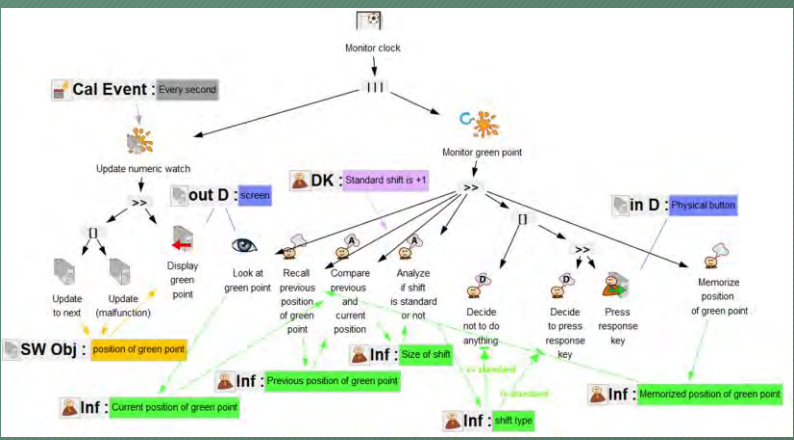


Gamified Mackworth Clock

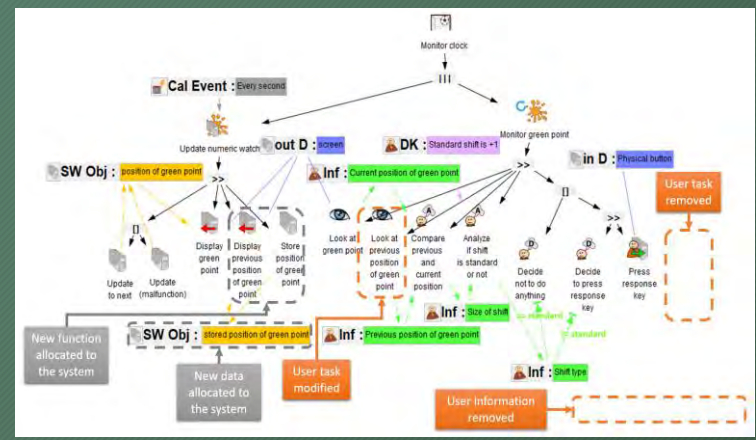
Total time on the pointer: 3 min 24 sec  
outside of the pointer: 0 min 46 sec

Total time on the pointer: 3 min 24 sec  
outside of the pointer: 0 min 47 sec

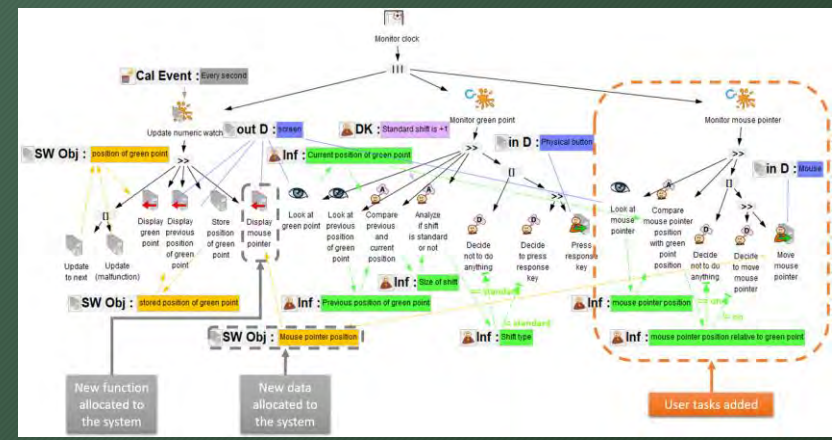
Total time on the pointer: 3 min 25 sec  
outside of the pointer: 0 min 48 sec



"Standard" Work



Work with automation



Work with automation & gamification

# Trustworthy automation for large-scale collaboration: a proposed exploratory study



Large-scale collaboration presents challenges:

- time and space distribution
- lack of interpersonal trust
- differences in vocabulary and expertise
- **high coordination costs**

Automation is a possible solution ...

- reduction in information flow delays
- fewer oversights in communicating critical updates
- standardization of work processes

... as long as human collaborators accept it

# Research perspectives

## Exploratory study of a collaborative task mediated by an automated agent:

- Which communication configuration provides the best support for users without over-soliciting them?
- Which level of automation initiative is the most appropriate for reliance and trust?
- Does higher trust in the automated agent results in better performance?

The screenshot displays a collaborative task interface. On the left, a chat window titled "Chat with COCCO" shows messages from a user and the agent COCCO. The agent provides information about a player's orange field module and offers a solution for a red grid module. The main area shows a 3x3 grid puzzle with colored squares (purple, yellow, orange, red, green, blue) and various interactive elements like checkboxes, dropdowns, and buttons. On the right, a "Mistake(s)" counter shows 1 mistake, and an "Instructions" panel lists rules for checkboxes, dropdowns, grids, fields, and buttons.

Chat with COCCO

player Koala's orange field module is 10

COCCO what is the solution for the red grid module ?

According to player Rabbit, the solution to red grid modules is the bottom left button

Message from player Panda to everyone : "who has a green grid at number 5 ?"

Time 07:41

0/4 players have finished  
3/16 modules solved

Mistake(s) 1

Instructions

**Checkboxes**  
- orange checkboxes: colors of the module n°11 of all players

**Dropdown**  
- red dropdown: name of the player with a red grid module at n°12  
- yellow dropdown: name of the player with a green checkboxes module at n°7

**Grid**  
- yellow grid: bottom center button  
- blue grid: top left button

**Field**  
- green field: number of the blue checkboxes module of player Rabbit

**Buttons**  
- purple buttons: center, right, left



**OST**

Eastern Switzerland  
University of Applied Sciences

# Designing Experts' Interactions with a Semi-Automated Document Tagging System

Sebastian Müller<sup>1</sup>, Beat Tödli<sup>1</sup>, Janine Vetsch<sup>2</sup>, Melanie Rickenmann<sup>1</sup>,  
Simon Haug<sup>2</sup>, Matthias Baldauf<sup>1</sup> and Peter Fröhlich<sup>3</sup>

<sup>1</sup> Eastern Switzerland University of Applied Sciences, IPM Institute for Information and Process Management,

<sup>2</sup> Eastern Switzerland University of Applied Sciences, IPW Institute of Applied Nursing Science

<sup>3</sup> AIT Austrian Institute of Technology

AutomationXP22: Engaging with Automation

April 30, 2022

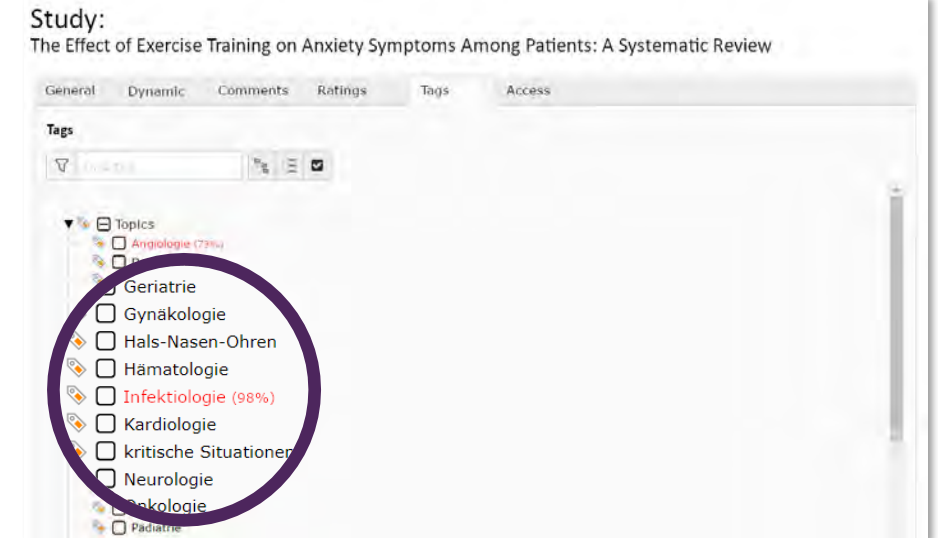
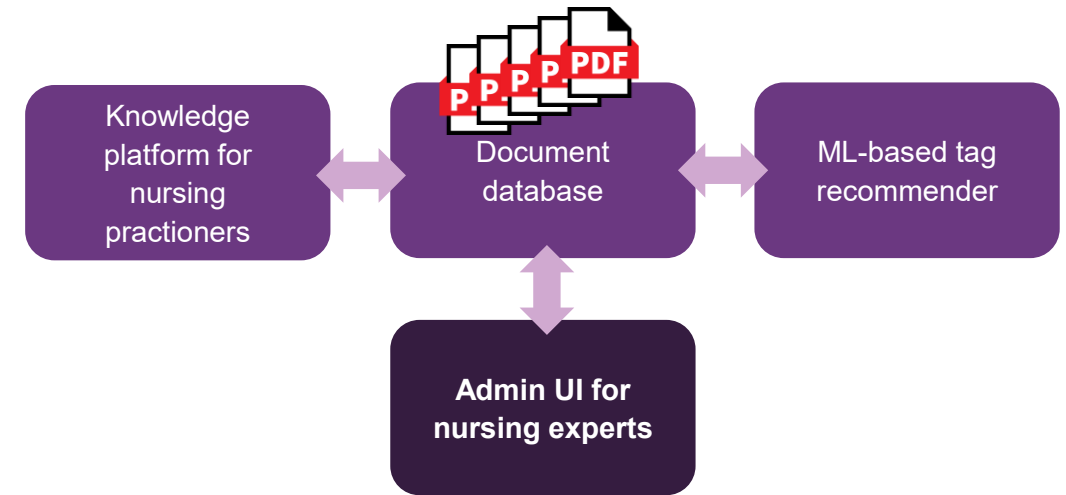




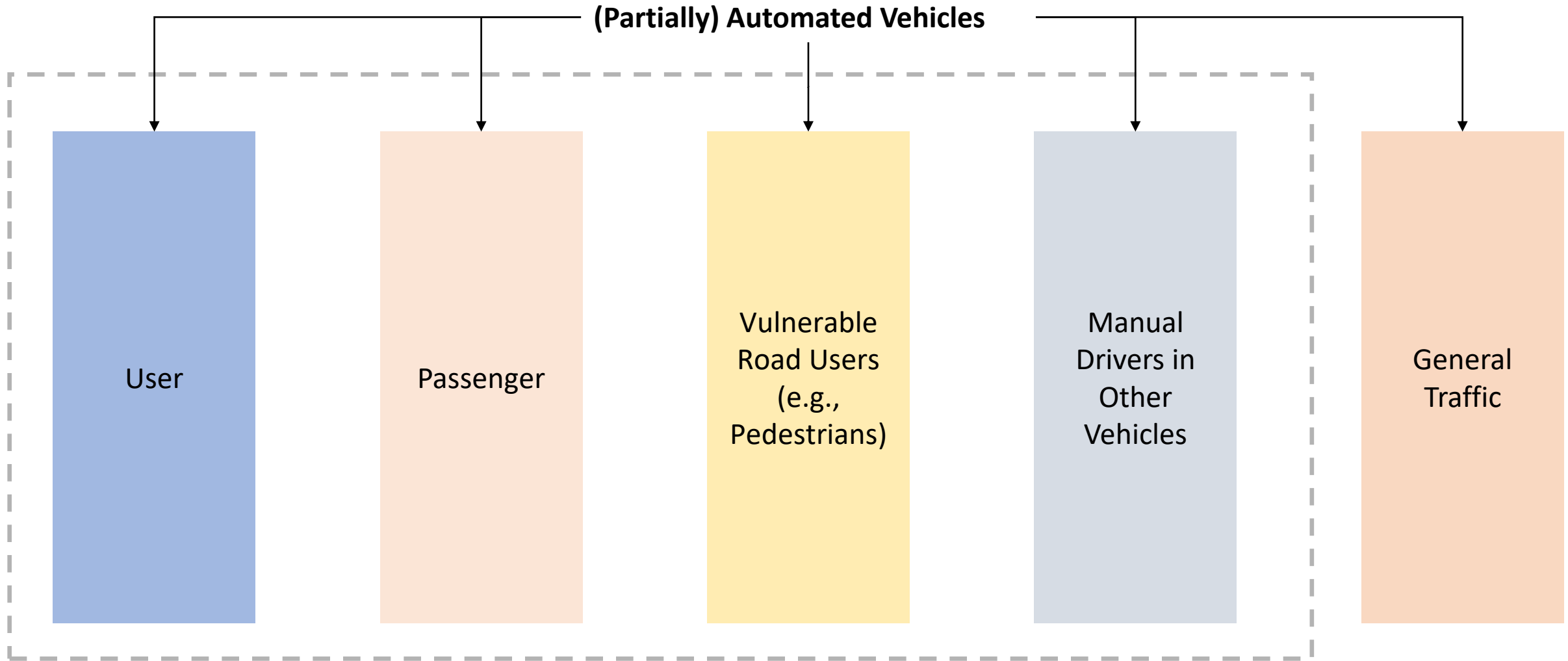
- Knowledge platform for **evidence-based nursing** with latest scientific findings
- Document annotation by experts is lengthy and expensive  
→ **Investigation of AI techniques of (semi-)automated categorization and recommendation of relevant scientific studies**

Prototype of a **domain-specific ML-based tag recommendation engine** returns set of tags with probabilities for a nursing-related publication

- UI challenges: **How to best support the experts' workflows by recommending tags without questioning their expertise or even overruling their decisions? How to foster trust in (prospective) fully automated recommendations?**  
→ Initial co-design workshop with nursing experts



# Automated Vehicle Operation





## Cooperation

*When is cooperation between an AV and a user possible and which level of engagement has to be maintained during the monotonous part of the journey?*

## Explainability

*How can we include and aid people with disabilities, for example, people with vision impairments?*

*What are long-term effects of using AVs and how will interaction change?*



## eHMIs

*How can the aspect of scalability, that is the communication of multiple AVs with multiple vulnerable road users, be solved?*

*How can we as researchers include and aid people with disabilities, [...]?*

*How can eHMIs be visually pleasing and effectively integrated into the general concepts of automobile manufacturers?*



Baseline

I'm stopping

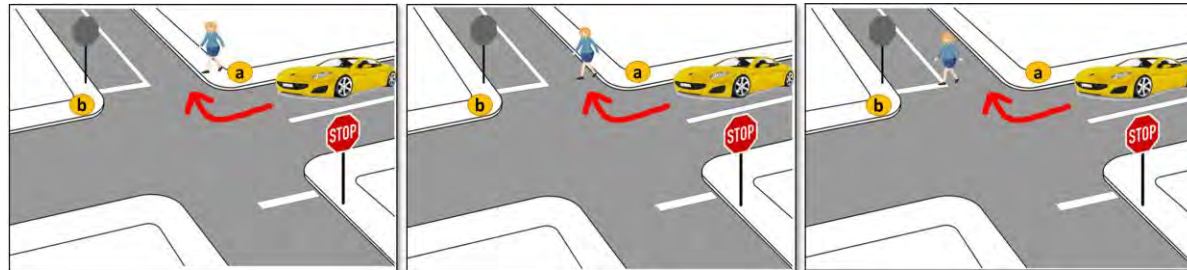
I'm not stopping

Warning message

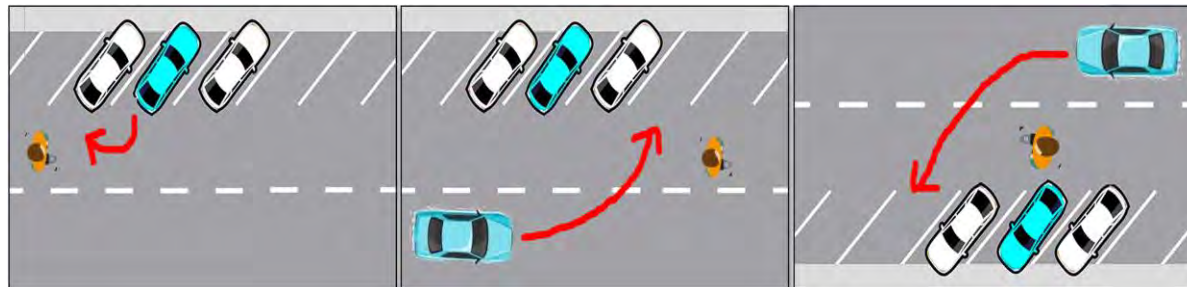
Timer

Towards Designing Audio Interactions with Autonomous Vehicles: A Hearing-Enhanced Pedestrian Story

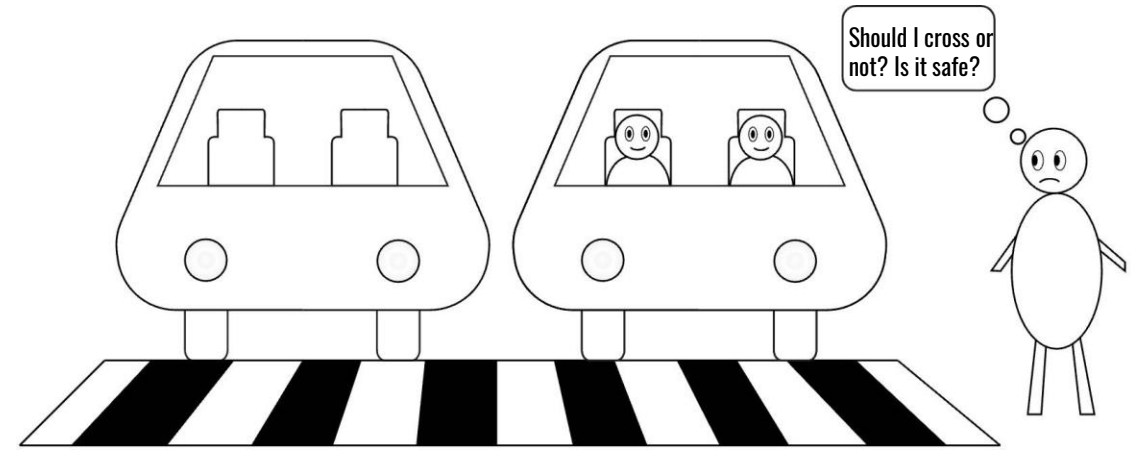
Presented by  
Ashratuz Zavin Asha



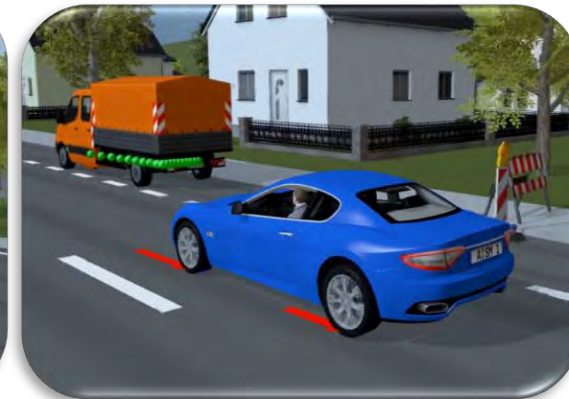
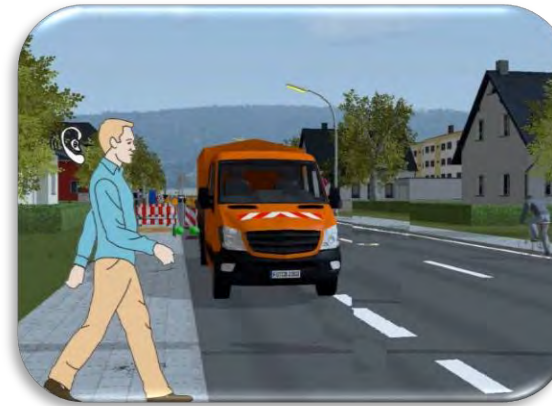
Pedestrian crossing scenario



Parking lot scenario



Future traffic – autonomous vehicles



- ❖ **Potential user:** pedestrian using a hearing aid
- ❖ **Interface:** direct audio cues (vehicle approaching, safe to cross, and warning)

# Simulated Extreme Experiential Training for Engaging with Automation

Dave B Miller

Department of Industrial Engineering and Management Systems  
University of Central Florida

Department of Mechanical Engineering  
Tufts University

# PROBLEMS



People don't understand the limits of automated systems, or their own limits



Mental models may be incomplete, inaccurate, ... or superstitious

# SOLUTIONS?

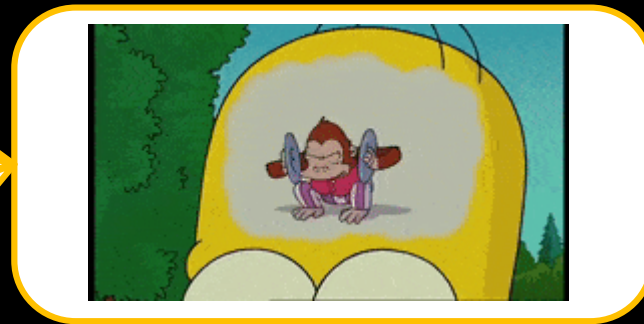


Experiential training can help form more thorough, accurate and usable mental models, compared to rote training

Prior Openness to Trust

Prior Experience

Explicit training



Self-Reported Trust

Behavioral Reliance

Description of Stem Model

# Investigating Hybrid Site Visits as a Methodology for Multi-Stakeholder Engagement in Contextual Requirements Analysis

- Challenges:
  - Investigate contextual stakeholder requirements for automated transport logistics systems
  - Cope with COVID-19 travel restrictions, enable all project participants to get a good impression
- Approach: Hybrid site visits
  - Site visit organisers prepare on-site visit and share remotely through online conferencing



Peter Fröhlich<sup>1</sup>, Jelena Rosic<sup>1</sup>, Matthias Neubauer<sup>2</sup>, Josué Manuel Rivera Velázquez<sup>3</sup>, Matthias Baldauf<sup>4</sup>, and Lisa Diamond<sup>1</sup>

<sup>1</sup>AIT Austrian Institute of Technology, Center for Technology Experience, Giefinggasse 4, 1120 Vienna, Austria

<sup>2</sup>University of Applied Sciences, Logistikum – Department of Logistics, Wehrgrabengasse 1-3, 4400 Steyr, Austria

<sup>3</sup>Cerema, Project team STI, 1 avenue du Colonel Roche, Toulouse 31400, France

<sup>4</sup>Eastern Switzerland University of Applied Sciences, IPM Institute for Information and Process Management, Rosenbergstrasse 59, 9001 St.Gallen, Switzerland



# Investigating Hybrid Site Visits as a Methodology for Multi-Stakeholder Engagement in Contextual Requirements Analysis

- Assessment of the method:
  - In-depth interviews and a follow-up survey with organizers and participants of the hybrid site visits
- Key learnings
  - Hybrid site visits seen as a useful workaround in times of travel restrictions.
  - But: Physical participation is the preferred mode of attendance for contextual inquiry.
  - The interaction between remote and on-site participants needs to be well facilitated, e.g. by own remote facilitator taking care of questions in the online chat.

Peter Fröhlich<sup>1</sup>, Jelena Rosic<sup>1</sup>, Matthias Neubauer<sup>2</sup>, Josué Manuel Rivera Velázquez<sup>3</sup>, Matthias Baldauf<sup>4</sup>, and Lisa Diamond<sup>1</sup>

<sup>1</sup>AIT Austrian Institute of Technology, Center for Technology Experience, Giefinggasse 4, 1120 Vienna, Austria

<sup>2</sup>University of Applied Sciences, Logistikum – Department of Logistics, Wehrgrabengasse 1-3, 4400 Steyr, Austria

<sup>3</sup>Cerema, Project team STI, 1 avenue du Colonel Roche, Toulouse 31400, France

<sup>4</sup>Eastern Switzerland University of Applied Sciences, IPM Institute for Information and Process Management, Rosenbergstrasse 59, 9001 St.Gallen, Switzerland





# AWARD

Scaling autonomous logistics



@award\_h2020



AWARD-H2020



[www.award-h2020.eu](http://www.award-h2020.eu)



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# **Automation at the Factory**



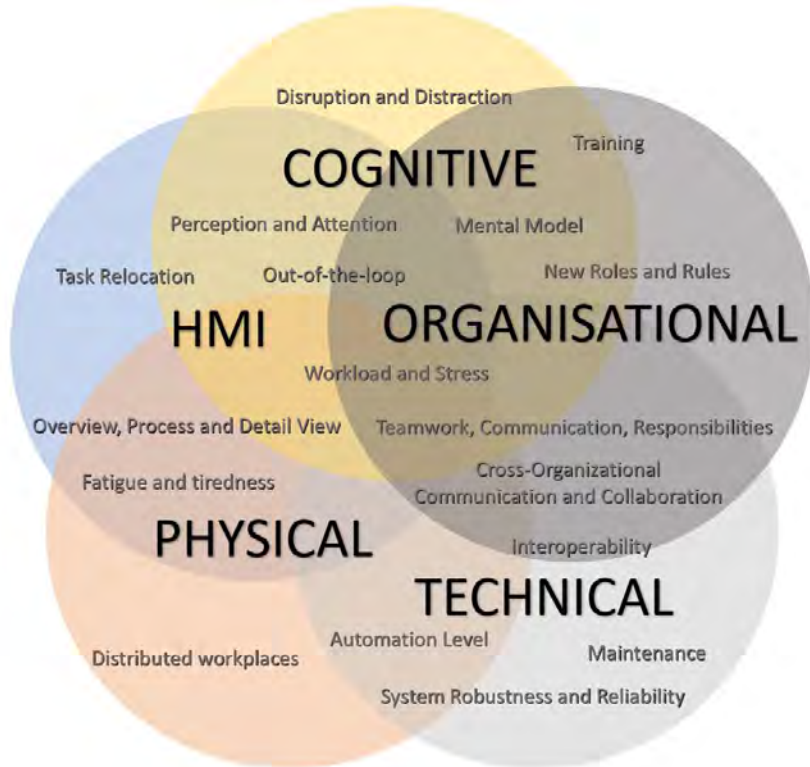
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## Understanding Human-Automation Engagement in the Industrial Context: Emerging Challenges and Ways Forward

Dawid Ziobro, Yemao Man, Joakim Åström– User Experience Team, Västerås, Corporate Research Center, ABB, Sweden



# Social-technical system



## Scope

- Investigate emerging challenges in the underground mining domain, for remote supervisory control of multiple different types of machine and processes.

## Case study

- 6 Operators (2 LHD, 2 Longhole drillrigg, 1 Rockbreaker, 1 Truck) , 1 Project manger, 1 Mine director
- Focus group study (7 participants, 2 Longhole drillriggs, 2LHD, 2 Rockbreaker, 1 Truck)

## Conclusions

- Traditional industrial approach to understand human-automation engagement has a deep technology root, e.g., what levels of automation is required, what new features are necessary, and how the operators should get trained to adapt to the advanced automation. Lack of holistic approach.
- Holistic multidisciplinary approach is required to address challenges across intersections of people, technology, and organization.

# Robots in Weight Carrying Scenarios: From Transportation to Co-navigation

Shreepriya Gonzalez-Jimenez, Jutta Willamowski and Tommaso Colombino

## Data Center



## Hypermarket



Heavyweight carrying using carts

Requires situational awareness and careful navigation

Standardized fine-grained procedures

More flexible and individualized procedures

Focus is on correcting, preventing, and avoiding errors

Overall less precise and more vague objective

Team of two collaborating and sharing responsibility

More individual agency and responsibility

## Generalized Workflow

Transportation to aisles

Stocking/Re-stocking  
Installation/Un-installation

Transportation to storage areas

# Introducing a Robotic Cart

## Challenges and Opportunities

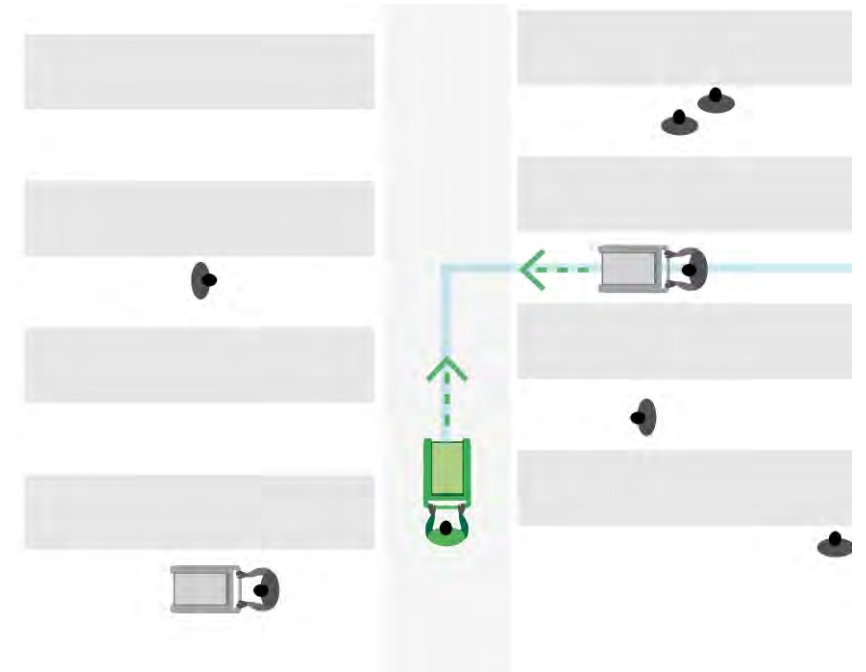
- Loss in **speed and flexibility**, may create **more work** rather than facilitating it
- Information about **obstacles** ahead and **larger spatial awareness** (other teams) and possibility to **embed task related information**

## Current Concept

- Autonomous until reaching a pre-defined or detected risky zone and then switch to shared or manual control for safer navigation

## Research questions

- What is the **added value of providing situational awareness** within the transportation and co-navigation scenario?
- How do users attribute **control and responsibility** between human and robot?



## Research Plan:

- 1 Online Survey** to understand information people would like to get for better spatial awareness
- 2 Define the tactile cues** that convey the information identified in the survey
- 3 User experiments** in a VR environment with differing levels of tactile feedback



University of St.Gallen

Institute of Computer Science



AutomationXP22:  
Engaging with Automation

# EToS-1: Eye Tracking on Shopfloors for User Engagement with Automation

Kenan Bektaş

University of St. Gallen, Switzerland

Jannis Strecker

University of St. Gallen, Switzerland

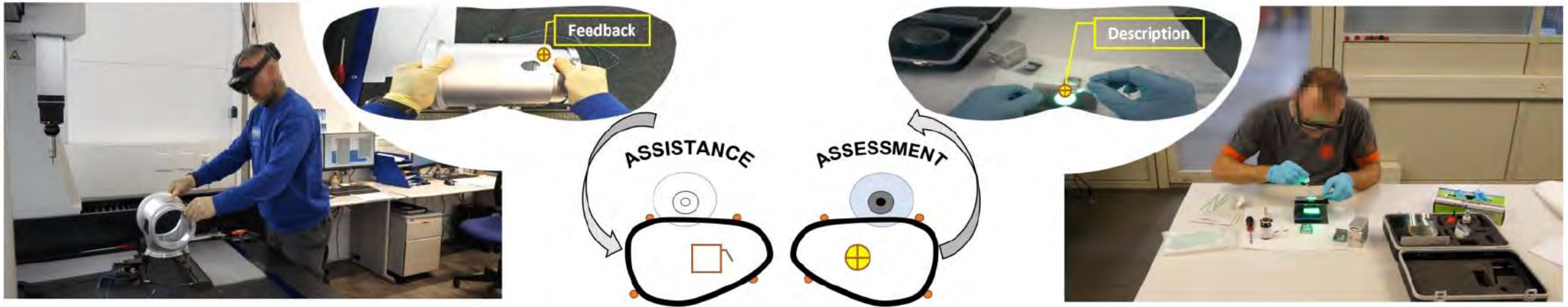
Simon Mayer

University of St. Gallen, Switzerland

Markus Stolze

Eastern Switzerland University of Applied Sciences









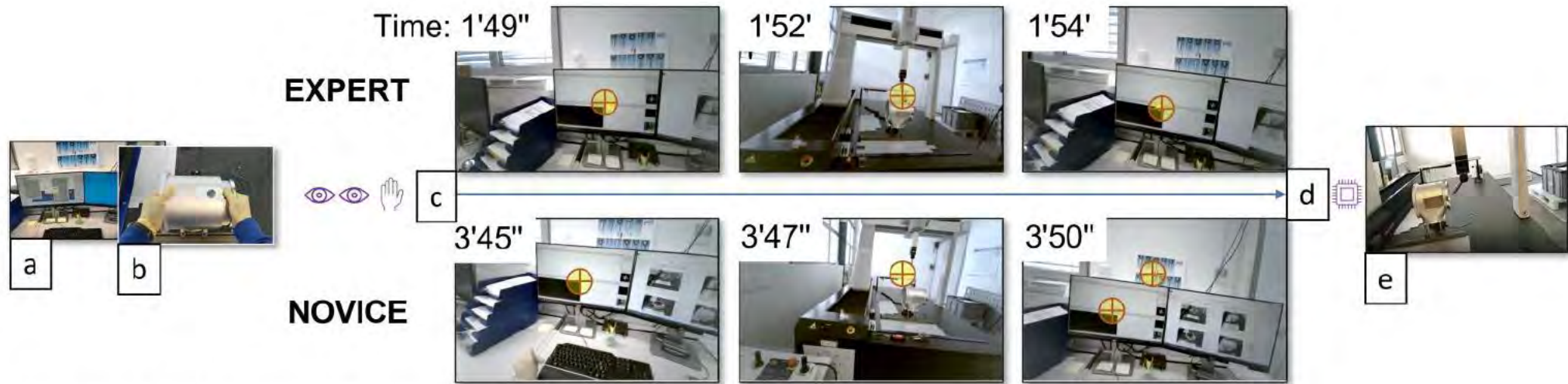
*Eye Tracking* can be used to assess user engagement.

If we understand users' level of engagement, we can provide assistance for engagement with automation using *Mixed Reality*.

### Mixed Reality (MR) Headsets

### Eye Tracking (ET) Devices

Wired	Mobile or Wireless		Wired
HTC VIVE Pro Eye, Varjo XR3	Microsoft HoloLens 2	Tobii Glasses 3, Pupil Core	Tobii Pro Fusion, EyeLink 1000 Plus
			



Use case: Semi-automated measurement of work pieces

## Lessons learned

- *differences* observable in *engagement and visual inspection behavior* of expert and novice (n=2)
- analysis of the eye tracking data from HoloLens 2 requires *more programming*
- in sedentary tasks relevant objects can remain *beyond the operator's field-of-view*
- future MR headsets need to be *more light-weight*
- *workers' perceptions* on using MR headsets need to be taken into account
- *wireless connectivity* can be an issue depending on the physical conditions of the shopfloor

## Next

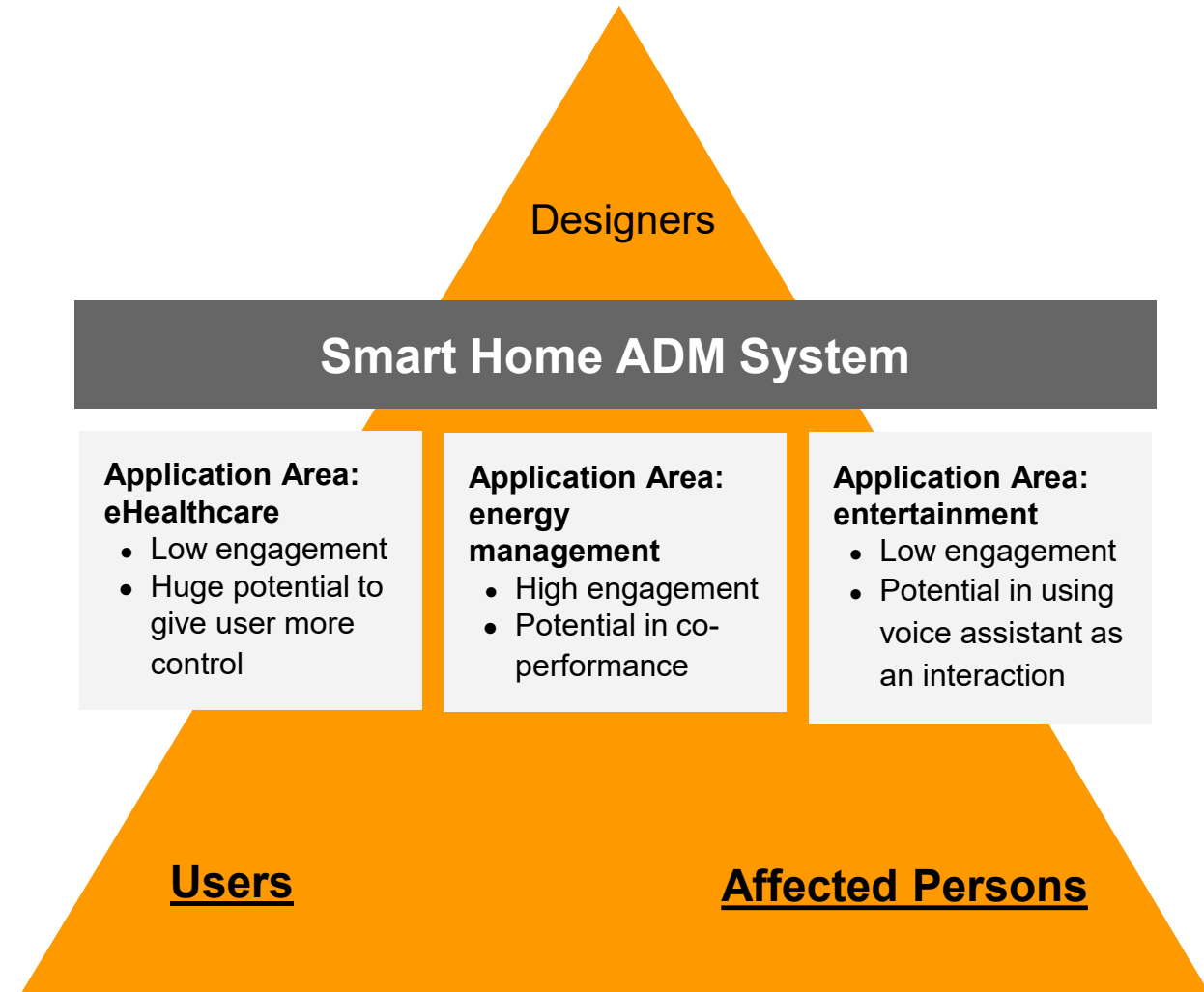
- developing prototypes for *attention-aware and context-aware assistance* through Mixed Reality headsets

# Automation at Home

# Automated decision making systems in smart home: A Study on User Engagement and Design

Lu Jin, Alexander Boden, Md Shajalal

How do users engage in automated decision making system (ADMs) in smart home ?



# Eg. Application Area: **Energy management**

## High level of user engagement

### For smart home:

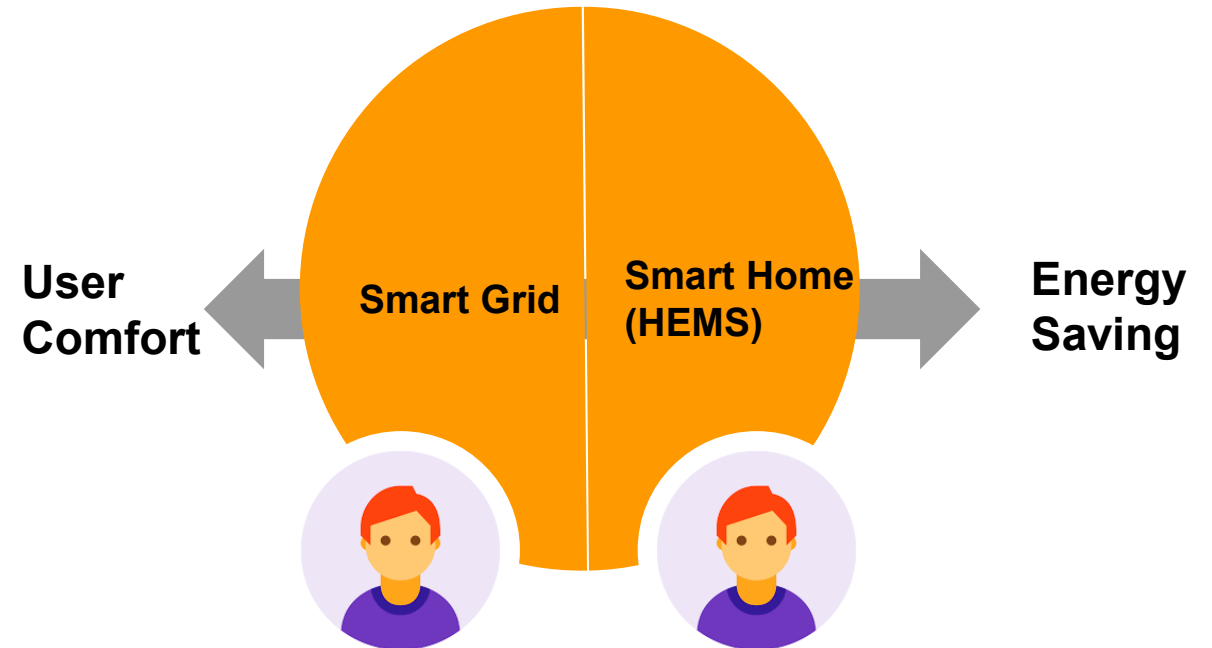
High level of user engagement, user can set up complex rules and time schedule for operation of the smart home.

### For smart grid:

Although more automation and less user engagement, the system provides several scenario for users to select, eg. comfort mode, energy saving mode...

### In the future

We want to investigate how can we make ADM system more transparent in decision making and more adaptable in supporting appropriation and empowerment of the users in such systems in different domains.



# An Approach to Making Smart Home Automations Perceivable

AutomationXP22: Engaging with Automation

Andrea Mattioli  
andrea.mattioli@isti.cnr.it

Fabio Paternò  
fabio.paterno@isti.cnr.it

## Context

- Automation: Internet of Things in Smart Home environment
- End-user development can exploit this welt of devices
- Implementation: Trigger-Action programming
- Based on conditional rules: when some change is detected in the environment → make something else happen



## Problems

- Visual editor: abstract representations
- Many possible combinations, selection and configuration is challenging
- Users need to know in advance technical details of the objects (*That light... Is the Philips or... ??*)
- Behaviour of the system is difficult to predict:
  - Timing aspects of TAP rules
  - Rule conflicts



## Possible solution

**Augmented reality** interaction paradigm used in the automation definition process to ameliorate the mentioned problems:

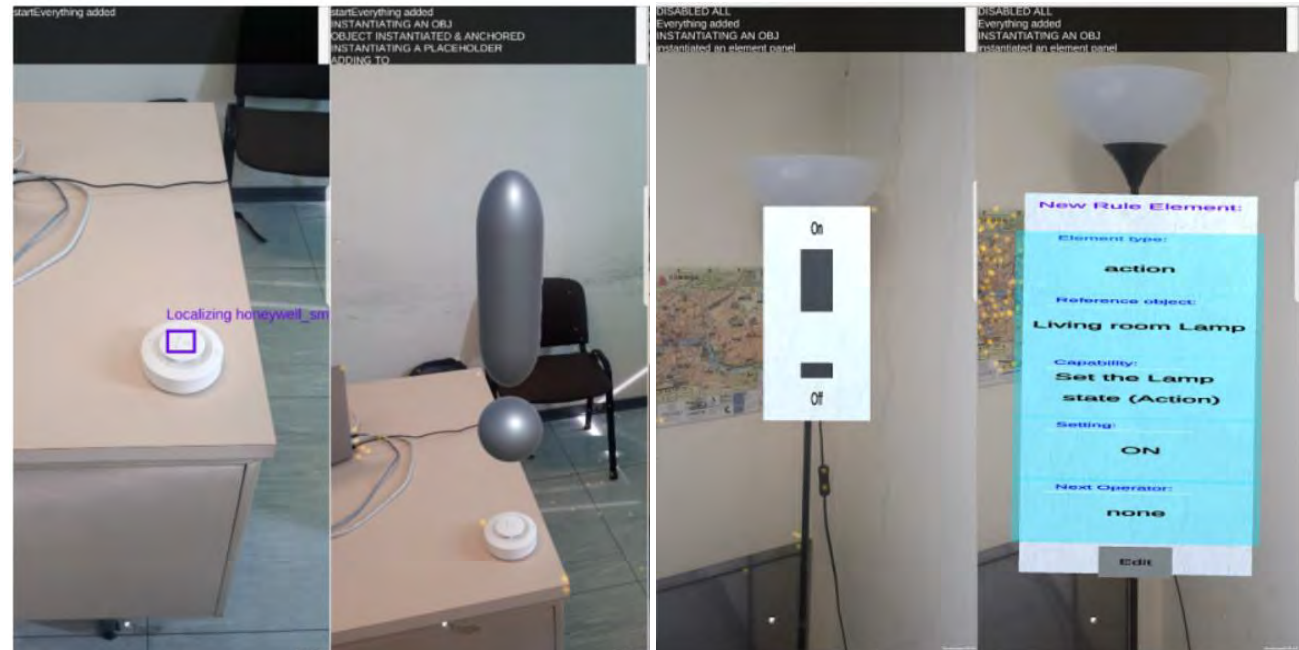
- Facilitating the mapping between the digital and real objects
- Narrowing the space of selection dynamically presented to users (hierarchical and abstract → plain and situated)
- Making more explicit TAP concepts

## Approach

- Unity + ARFoundation + YOLO object detection
- No need to detect each device during the use
- Expressive rules
- Explicit interactions between automations

## Further Developments

- Supporting automation transparency to improve user control
- Integrating recommendation support



# Challenges and Opportunities of Cooperative Robots as Cooking Appliances

Carl Oechsner<sup>1</sup>, Sven Mayer<sup>1</sup> and Andreas Butz<sup>1</sup>



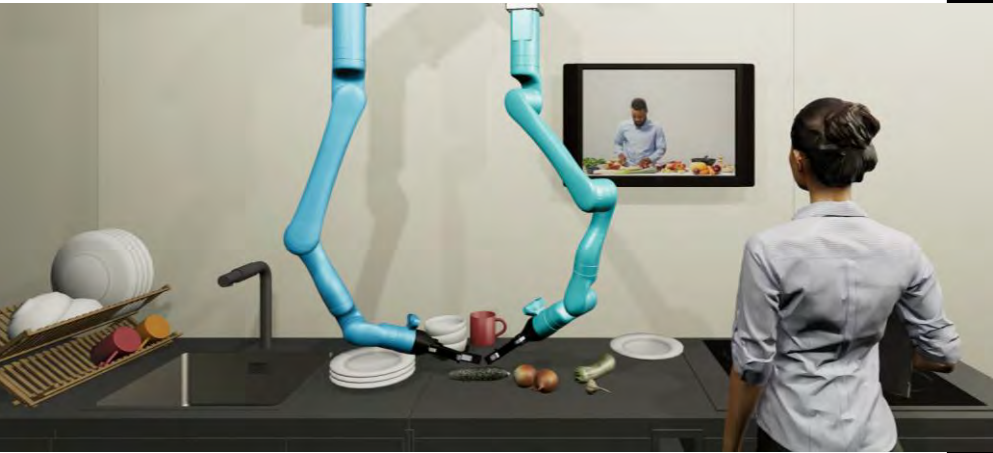
- Scalable Interaction Paradigms in Pervasive Computing Environments
- Build on anthropomorphism
- „Personality as UI“
- Robots as physical extension/manifestation

Testbed for domestic robotics (living kitchen)

- 2 robot arms
- Ceiling rail system
- Connected appliances
- Central control software
- Mixture of wizard-of-oz, automated (routines), intelligent (ML) control

# Challenges and Opportunities of Cooperative Robots as Cooking Appliances

Carl Oechsner<sup>1</sup>, Sven Mayer<sup>1</sup> and Andreas Butz<sup>1</sup>



## Scenarios

- „Robots as Media“
  - Record and playback food prep
  - Tutorials, Archives, ...
- Telepresence
  - Live Classes, Expert Support
  - Collaboration /w friends
  - Learning courses
  - Imitation Learning

Photo by [Alesia Kozik](#) at [Pexels](#)

**ATTENTION!**

**Important part of the workshop!**

# Group Photo of AutomationXP Heroes

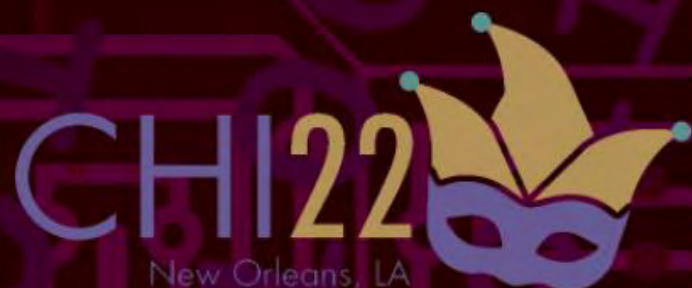


artist: <https://www.newgrounds.com/art/view/seraya78>

# AutomationXP22: Engaging with Automation

Understanding and Designing for Operation, Appropriation, and Behaviour Change

Workshop at CHI'22 - Hybrid - April 30th 2022



*CDT (New Orleans)*

9:00am-9:10am

**Welcome and Introduction**

9:10am-9:25am

**Participants Introduction**

9:25am-9:55am

**Paper Madness, Session I**

9:55am-10:05am

*Break*

10:05am-10:20am

**Keynote "Engaging with Automation"**

*Virpi Roto*

10:20am-10:50am

**Paper Madness, Session II**

10:50am-11:10am

*Break*

11:10am-11:25am

**Group Finding and Selection of Challenges**

11:25am-12:05pm

**Work on Selected Challenges**

12:05pm-12:20pm

*Break*

12:20pm-12:50pm

**Group Presentations**

12:50pm-1:00pm

**Wrap-Up and Closing**

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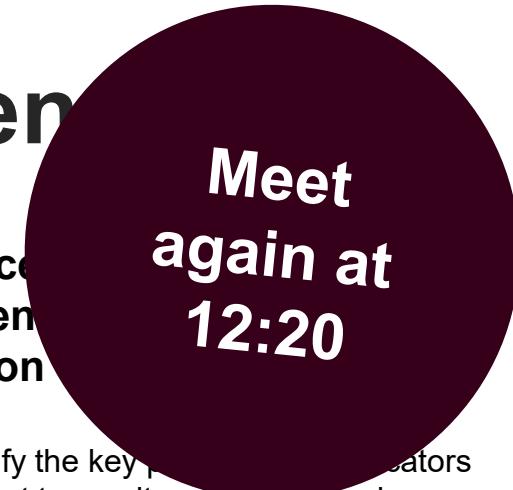
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# Group Finding and Selection of Challenges

- Topic identification
  - Challenges were defined by position paper authors
  - Clustered by workshop organisers (see next slide)
    - 1 online/remote group
    - 2 on-site groups
- Please check „your“ challenges cluster (see next slide)
- Within your cluster, tailor your topic(s) and discuss
- Use a tangible form of results documentation
  - Miro boards available
  - Photos of flipcharts
  - ...

# Group Finding and Selection of Challenges



Cluster	1. Conceptual aspects around automation and engagement	2. Trust and engagement in human-automation collaboration	3. Interface support for automation
<b>Challenges</b>	<ul style="list-style-type: none"><li>• What could a framework for engagement in automation look like? How could we measure engagement?</li><li>• What is the challenge of using chatbot to involve users into the automated decision-making system ( ADMs ) ?</li><li>• How to enable industries to utilize the benefits of social-technical thinking in their strive to evolve human-automation engagement?</li><li>• How to use our proposed EIA scale in interaction design processes, and also ways of identifying "best practice"/"leading design exemplars" along this scale to support automation of interaction, and automation experience.</li></ul>	<ul style="list-style-type: none"><li>• Understanding conflicts when multiple agents each with their own knowledge and metaknowledge--specifically how do we resolve conflicts when the answer is not "let the human win, or the robot win, or let the Wookie win?"</li><li>• How do we define proper task allocation between humans and robots, i.e., who should allocate the tasks among humans and robots and how?"</li><li>• What level of reliance we should aim for when designing automation.</li><li>• Integrating people with disabilities into automated systems development</li></ul>	<ul style="list-style-type: none"><li>• How to identify the key predictors of engagement to monitor when increasing automation? How to measure their evolution in different designs?</li><li>• How can we design inclusive interfaces by considering the unique needs and challenges of different vulnerable road users to bring accessibility and provide safe, reliable communication with autonomous vehicles.</li><li>• How augmented reality can be used to improve the user's understanding of a smart home automation system.</li><li>• Gaze-enabled Mixed Reality technologies can be used in a factory, home, or vehicle setup but they currently have limitations such as the form factor, connectivity, and user acceptance.</li></ul>
<b>Participants</b>	Lu, Andrea, Sebastian, Mikael, Dawid, Matthias, Peter, Virpi, Brennan (Online participants)	David, Shreepriya, Clélie, Mark, Carl, Jutta, Bastian	Ashratuz, Philippe, Kenan, Fabio, Jannis, Donovan

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# Group Presentation

- Please present the results of your discussion
- Comments by others
- Possible next steps

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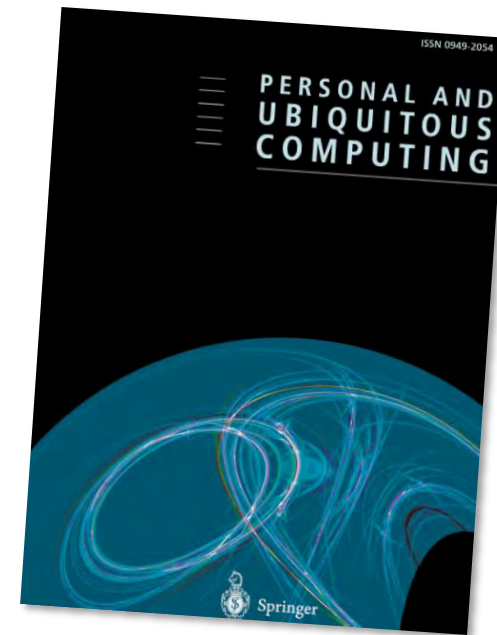


**Wrap-Up and Closing**

# Closing and Next Steps

- Website to be updated (photos, results, slides)
- Proceedings to be published at CEUR-WS
- E-mail list for further AutomationXP activities
- Submit to the PUC Theme Issue! 😊

**Thank you for  
participating!**





**AutomationXP22:  
Thank you for  
participating!**