

# Human Factors Lab

Digital Technologies for Human Centered Research



Website



Videos



# Digital Technologies For Human Centered Research

## Innovative Measurement Technologies

- Eye-Tracking in 3D Space & Time
- Virtualizer & Motion Capture System
- Digital Biosensing (EDA, ECG, EMG)
- Social Robot Interaction
- Mixed Reality (VR, AR)

## Digital Human Modelling and Assessment

- AI-enabled Cognitive Assessment
- Stress and Affective Computing
- Biomechanical & Cognitive Strain

## Intelligent Interaction

- Gaze-based Interfaces
- Information Ergonomics
- Multimodal Interaction



### Task

Real-time measurements on mental (cognitive) and behavioural functioning

### Benefits

Enabling of automated human state analysis in 2D & 3D environments

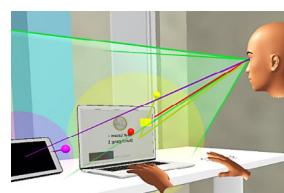
### Capabilities

Mapping of client attention in large, unrestricted environments

### Integration

Providing of mental performance and heatmaps about human factors

## Human Factors Lab



**Playful Decision Support & Training**

- Eye Gaze & Mental State Assessment
- Neuropsychological Profiling
- Serious Games & Dementia Training



**4D Attention & Behavior**

- Concentration
- Cognitive Load
- Task Switching



**Models & Simulation**

- Situation Awareness
- Executive Functions
- Stress Detection and Recognition



**Mixed Reality & Affective Computing**

- Experimental Test Bed for Attention Studies
- Cognitive Screening & Training
- Digital Care Intervention (Mindfulness, Rehabilitation)

# Customer Scenarios



## Active and Assisted Living & Digital Care

- Decision Support for Dementia Prevention and Intervention
- AI-Enabled Cognitive Assessment
- Social Robotics for Care
- Affective Computing



## Industry & Collaborative Robotics

- Gaze-based Intuitive Interface
- Cognitive and Biomechanical Load Modelling
- 3D Attention Heatmaps in Large Scale Studies



## Mobility – Cognitive Performance Assessment

- Driver Attention Mapping and Infrastructure
- Situation Awareness and Attention / Distraction Mapping
- First Responder Situation Awareness with Virtualizer

# Reference Projects



DI<sup>h</sup> Maria Fellner, MBA  
CEO digitAAL Life GmbH

» Die Entwicklung auf dem Markt der Lifestyle- und medizinischen Apps entwickelt sich fundamental in Richtung KI- und sensorgestützter Systeme. digitAAL Life setzt hier auf die hochinnovativen Entwicklungen des Human Factors Labors, insbesondere auf blickgestützten Decision Support.



Stv. Institutsvorständin  
Dr. Sandra Schüssler,  
MSc, BSc  
Medizinische Universität  
Graz, Institut für Pflege-  
wissenschaften

» Die Demenzpflege ist eine große soziale und technische Herausforderung unserer Zeit. Wissenschaftlich gesehen beruhen nicht-pharmakologische Interventionen auf Verhaltensmustern, die wir durch assistive Technologien, wie sie im Human Factors Labor entwickelt werden, unterstützen.“



Univ.-Prof. iR.  
DDr. K. Wolfgang Kallus  
Institut für Begleit-  
forschung und  
Psychologisches  
Qualitätsmanagement

» Human Factors und ihre psycho-  
logischen Grundlagen stellen zentrales  
inter-disziplinäres Wissen für die professionelle  
menschzentrierte Technologieentwicklung dar.  
Für Industrie 4.0 sind intelligente nicht-invasive  
Technologien, wie sie im Human Factors  
Labor entwickelt werden, für die Gestaltung  
der Arbeitsbedingungen und Optimierung  
der Leistungskomponenten von zentraler  
Bedeutung.



## multimodAAL

- BMK ICT & Dementia Training
- Diagnostics in Serious Games

[www.multimodaal.at](http://www.multimodaal.at)



## AMIGO

- BMK ICT & Dementia Training
- Social Robotics & Dementia Care

[www.benefit-amigo.at](http://www.benefit-amigo.at)



## SIXTHSENSE

- H2020 Security First Responder
- Psychophysiological Stress Analytics

[www.sixthsenseproject.eu](http://www.sixthsenseproject.eu)

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Credit: Bergmann, JOANNEUM RESEARCH