

ESR Presentations

ESR 15. Tamara Mujirishvili

- About me:
From Tbilisi, Georgia

BA in Psychology (2011-2015)

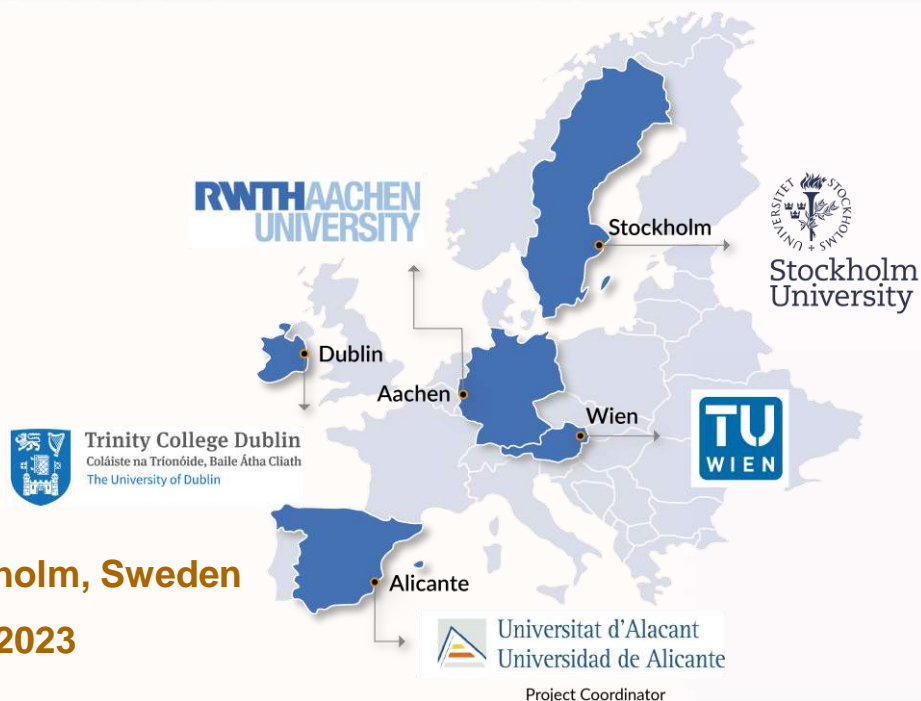


MA in Neuroscience (2018-2020)





Privacy-Aware and Acceptable Video-Based Technologies and Services for Active and Assisted Living



Stockholm, Sweden

20/04/2023

Research project

Perceptions of personal safety and privacy in frail elderly, disabled people and their caregivers in the context of video-based lifelogging technologies

Universidad de Alicante, Spain

Tamara Mujirishvili



This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 861091.



Universitat d'Alacant
Universidad de Alicante

Project Coordinator



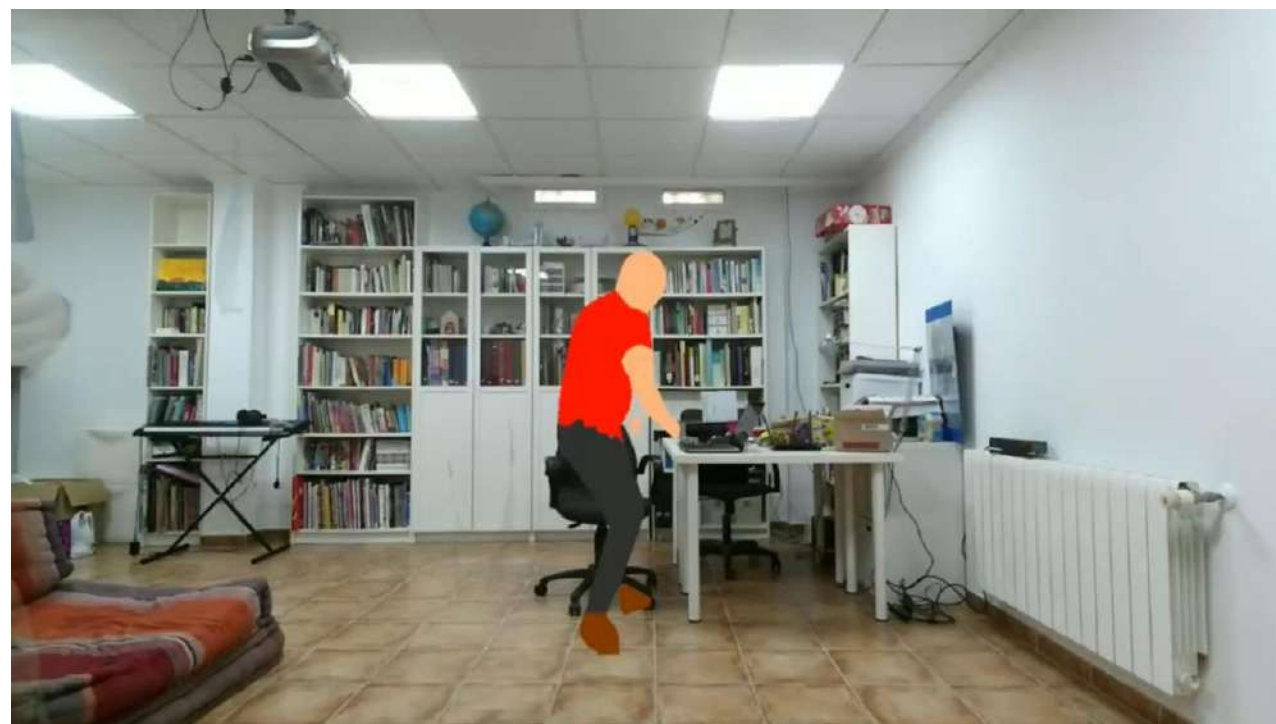
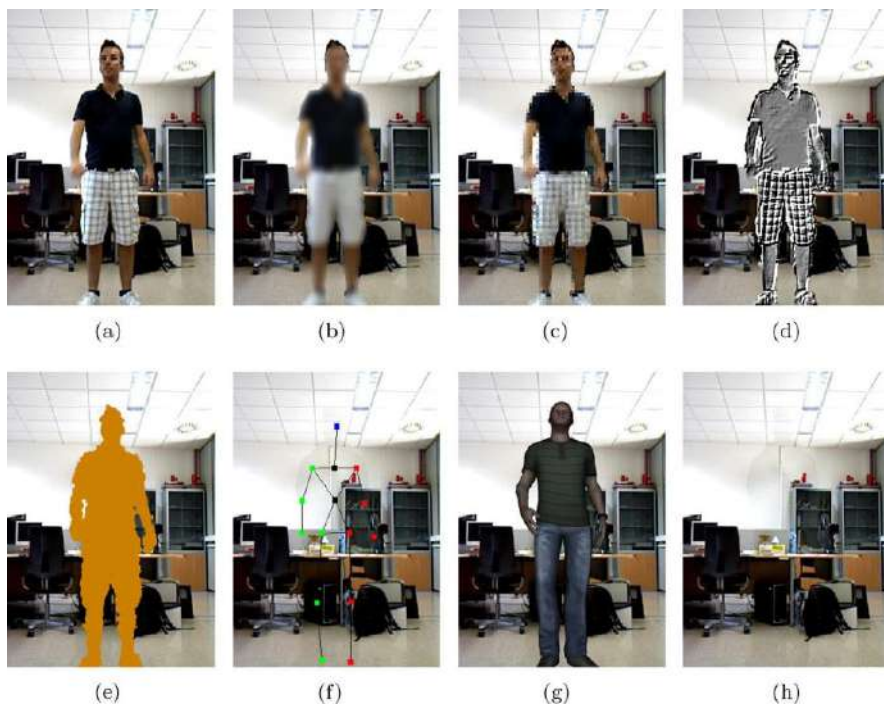
Stockholm University



Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin



Video based monitoring system with privacy filters



Climent-Pérez, P., & Florez-Revuelta, F. (2021). Protection of visual privacy in videos acquired with RGB cameras for active and assisted living applications. *Multimedia Tools and Applications*, 80(15), 23649-23664.

Project aim



The aim of this project is to analyse the acceptance of video-based AAL technologies, located in public and private spaces, by their potential users. Including as a potential user, both the older adults and persons with disabilities and with needs of aid, and their caregivers, formal or informal. Different types of cameras, locations, and type of information will be considered as well as benefits (for example, medical safety) and related barriers (for example, the threat to their privacy).

- **Expected results** - A map of benefits and barriers associated with the use of video monitoring technologies for frail elderly people and persons with disabilities.
- **Secondments**
 - Secondment 1:** RWTH Aachen (Supervisor: Prof M. Ziefle), Training and research on benefits and barriers of technologies
 - Secondment 2:** AIAS Bologna (Supervisor: Dr L. Desideri), Data collection
 - Secondment 3:** Cáritas Diocesana Coimbra (Supervisor: C. Dantas), Data collection


A Combination of qualitative and quantitative research and a living lab approach:

- A scoping review ☒

Qualitative methodological framework:

- Exploratory interviews sessions (what is privacy for older adults) ☒
- Interview sessions with a diversity of potential stakeholders ☒
- Living lab 
- Persona-scenario use cases 

Quantitative methodological framework:

- Quantitative study developed on the bases of the qualitative study results 

A Combination of qualitative and quantitative research and a living lab approach:

- A scoping review ☒

ESR1 - Caterina Maidhof



Research project

"Perceptions of personal privacy in different users regarding health monitoring technologies"

About the project

This project seeks to identify differently perceived dimensions and degrees of personal privacy by potential users of a broad range of health monitoring technologies (e.g., video-based, audio-based, sensor-based). Perceptions of privacy are analysed technology-specifically, while as well considering user group-specific needs and requirements in diverse contexts. Potential users of such technology can be

JMIR Preprints

Mujirishvili et al

Acceptance and Privacy Perceptions Toward Video-based Active and Assisted Living Technologies: Scoping Review

Tamar Mujirishvili¹; Caterina Maidhof²; Francisco Flórez-Revuelta³; Martina Ziefle²; Miguel Richart-Martínez¹; Julio Cabrero-García¹

¹University of Alicante, Faculty of Health Sciences Alicante ES

²RWTH Aachen University, Chair of Communication Science, Human-Computer Interaction Center Aachen DE

³University of Alicante, Department of Computer Technology Alicante ES

Corresponding Author:

Julio Cabrero-García

University of Alicante, Faculty of Health Sciences

Carrer San Vicente del Raspeig

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Abstract


Background: Aging society posits new socio-economic challenges, to which a potential solution is Active and Assisted Living (AAL) technologies. Visual-based sensing systems are technologically among the most advantageous ones in providing health and social care, however, they come at the risk of violating rights to privacy. With the immersion of video-based technologies, privacy-preserving smart solutions are being developed, however, the user-acceptance research about these developments is not yet being systematized.

Objective: With this scoping review, we aim to gain an overview of existing studies examining older adults and/or their caregivers' viewpoints on technology acceptance and privacy perceptions specifically toward video-based Active Assisted

A Combination of qualitative and quantitative research and a living lab approach:

- A scoping review ☒

Qualitative methodological framework:

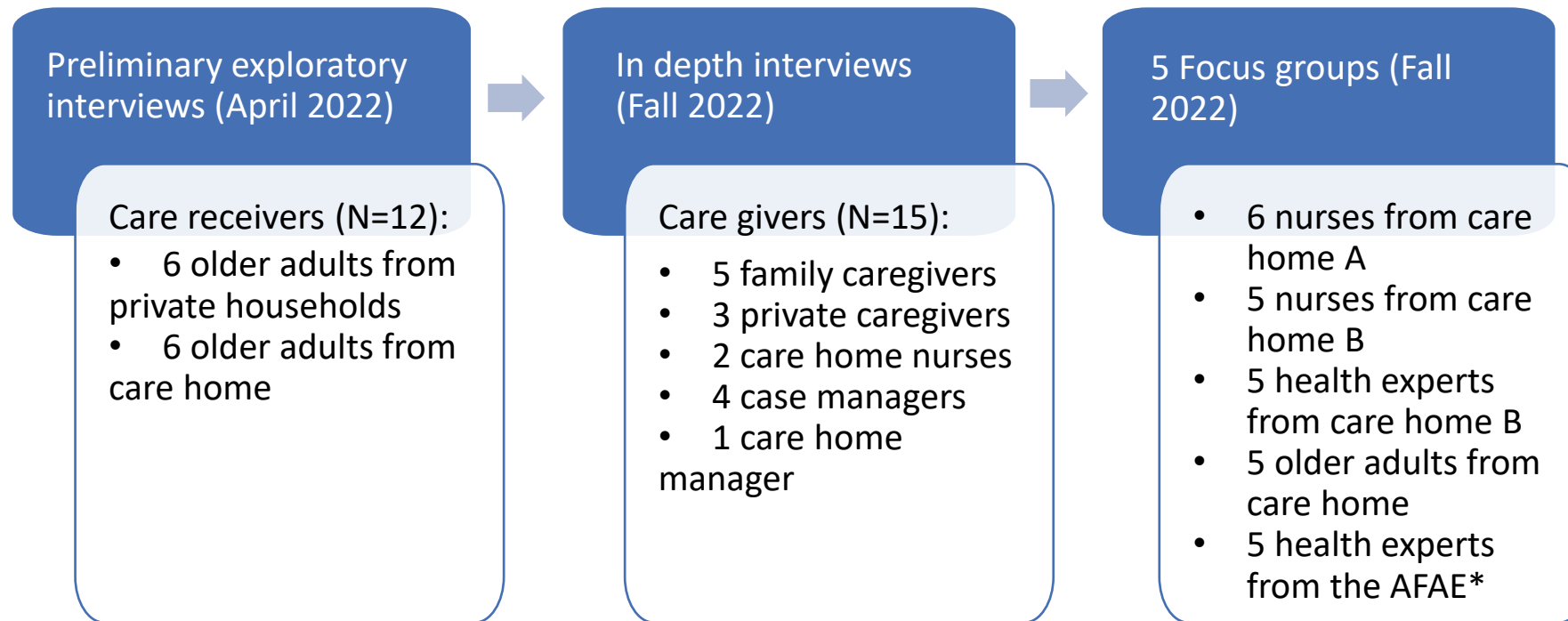
- Exploratory interviews sessions (what is privacy for older adults) ☒
- Interview sessions with a diversity of potential stakeholders ☒
- Persona-scenario use cases ☒
- Living lab 

Quantitative methodological framework:

- Quantitative study developed on the bases of the qualitative study results 

Qualitative methodological framework:

Interview and focus group sessions exploring the topics of privacy and acceptance of the video based active and assisted living systems.



* Asociación de Familiares de Personas con Alzheimer de Elche

Qualitative methodological framework:

Interview and focus group sessions exploring the topics of privacy and acceptance of the video based active and assisted living systems.

Preliminary exploratory interviews (April 2022)

Care receivers (N=12):

- 6 older adults from private households
- 6 older adults from care home



HOME

2022 World Congress of Gerontechnology
October 22-26, 2022. Daegu, Korea

Theme: Gerontechnology in the Era of Artificial Intelligence

Perceptions of older adults about the concept of privacy and in terms of video-based AAL technologies

T. Mujirishvili, M. R. Martinez, J. C. Garcia, F. F. Revuelta

Full text [PDF](#)

Abstract

Privacy is a basic human need and it spans all areas of human activity. For that, the concept of privacy is notoriously known as very difficult to define. Even more so, the technological era has given a whole new meaning to privacy. Modern technological solutions, such as Active Assisted Living technologies, provide great benefits in healthcare and at the same time posit a risk of violating privacy. The Privacy by Design paradigm in technology allows data protection through inherent technology design (Schaar, 2010). Different visual privacy preservation filters are being developed for video-based AAL technologies (Climent-Pérez & Florez-Revuelta, 2021; Ravi et al., 2021). On the other side of these technological advancements, is the user perspective. The study aims to understand what privacy means for older adults and what implications it has in relation to active assisted living technology. We are specifically interested in knowing how older adults define privacy as a concept, in relation to their lives, and in relation to AAL technology. What are their attitudes toward AAL technology and Video-based AAL technology (VAAL) specifically and how does it affect their privacy.

Qualitative methodological framework:

Interview and focus group sessions exploring the topics of privacy and acceptance of the video based active and assisted living systems.





Preliminary exploratory interviews (April 2022)

Care receivers (N=12):

- 6 older adults from private households
- 6 older adults from care home



What is privacy? Perceptions of older adults in the south of Spain about the concept of privacy and in terms of video-based AAL technologies

Tamara Mujirishvili¹^a, Miguel Richart-Martínez,¹^b, Julio Cabrero-García¹^c and Francisco Flórez-Revuelta²^d

¹ Department of Nursing, University of Alicante, Ctra. San Vicente del Raspeig, S/N 03690 San Vicente del Raspeig, Spain

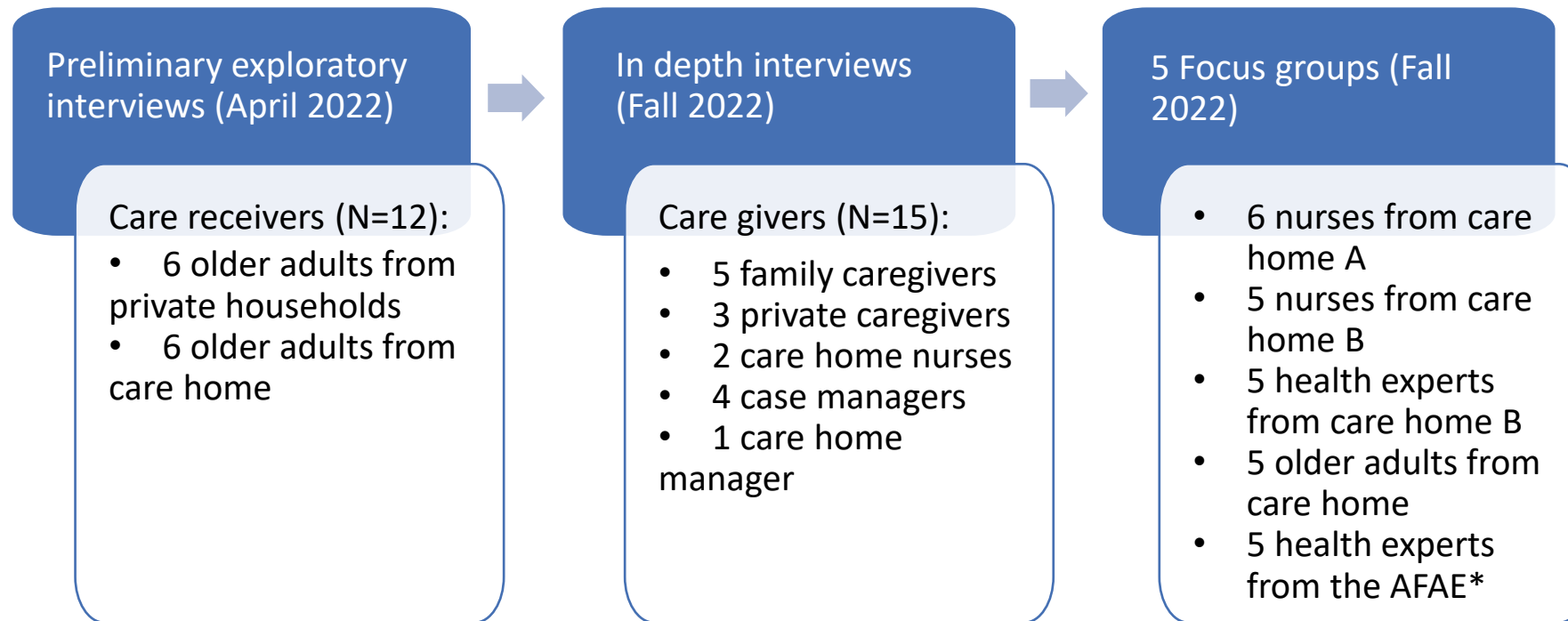
² Department of Computer Technology, University of Alicante, Ctra. San Vicente del Raspeig, S/N 03690 San Vicente del Raspeig, Spain
tamar@ua.es, m.richart@ua.es, julio.cabrero@ua.es, francisco.florez@gcloud.ua.es

Keywords: Privacy, Active Assisted Living Technologies, Camera-based Technologies, Life-logging, User-acceptance, Older Adults, Video-monitoring, Qualitative Study, Exploratory Interviews.

Abstract: Privacy is a very complex concept that concerns all areas of human activity. Even more so, it has acquired whole new importance and has become a hot-button topic in the era of ubiquitous computing. The emer-

Qualitative methodological framework:

Interview and focus group sessions exploring the topics of privacy and acceptance of the video based active and assisted living systems.




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A Combination of qualitative and quantitative research and a living lab approach:

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- Living lab 

Quantitative methodological framework:

- Quantitative study developed on the bases of the qualitative study results 

- Persona-scenario use cases ☒



Blueprint on Digital Transformation of Health and Care for the Ageing Society

Silvia



Age: **83**
Country: **Spain**
Area: **Urban**
Need: **Complex needs**
Connectivity: **None**

Daily living

- Troubles in maintaining personal hygiene.
- Challenges with obtaining quality sleep and utilizing the waking hours effectively during insomniac episodes.
- Difficulties playing bingo with her peers at the care home due to impaired vision and hearing.

Bio

Silvia lives in a care home in Spain for the past five years. She has a history of falls, particularly in the bathroom during night-time which has a significant amount of fear in her and her son, Alejandro. To mitigate this risk, the care home decided to make her part of the new initiative to incorporate video monitoring technology into Silvia's room, which will send alarm signals, along with an image of any potential falls, to the care home personnel. Silvia feels pretty comfortable with the idea of the monitoring technology installed in her room however, she is cautious about the privacy concerns posed by the bathroom. She is not trusting who might have access to the images taken in the bathroom, nor is convinced about the privacy-guaranteeing filters she is promised with. Despite the added safety his son Alejandro also remains concerned about the potential privacy issues posed by the technology. She requires a technology solution that offers privacy protection and reassurance.

Internet usage

Mobile device skills

Affinity to new tech

Digital health literacy

Assistance (ICT use)

What's important to Silvia

- Physical safety.
- Maintaining independence and privacy.
- A technology solution that will offer privacy protection and reassurance, ensuring that images taken in the bathroom are only accessible by authorized personnel.


Events, issues & concerns

- Fear of falls.
- Distrust in offered privacy features of the technological solution.
- Concern about appearing unusual among other residents at the care home.

A Combination of qualitative and quantitative research and a living lab approach:

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- Quantitative study developed on the bases of the qualitative study results 

- Living lab 




- Older adults
- Healthcare professionals
- Technology designers closely working with older adults




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RESEARCH PROGRESS




CONFIDENTIAL - Do not disclose this information to any third party without the prior written consent of the Disclosing Party



User studies with interviews

Persona design

Silvia



Age: **83**
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Need: **Complex needs**
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- Distrust in offered privacy features of the technological solution.
- Concern about appearing unusual among other residents at the care home.



User testing with technology in the Living Lab



Position paper on ethical, legal and social challenges linked to audio- and video-based AAL solutions

Alin Ake-Kob; Slavisa Aleksic; Zoltán Alexin; Aurelija Blaževičienė; Anto Čartolovni;
Liane Colonna; Carina Dantas; Anton Fedosov; Eduard Fosch-Villaronga;
Francisco Flórez-Revuelta; Zhicheng He; Aleksandar Jevremović; Andrzej Klimczuk; Maksymilian
Kuźmicz; Lambros Lambrinos; Christoph Lutz; Anamaria Malešević;
Renata Mekovec; Cristina Miguel; Tamar Mujirishvili; Zada Pajalic; Rodrigo Perez Vega; Barbara
Pierscionek; Siddharth Ravi; Pika Sarf; Agusti Solanas; Aurelia Tamò-Larrieux¹

AALPLIS **Active and Assisted Living Literacy Scale**

Developing and refining scale content, scale dimensions and the items of each dimension by interviewing the stakeholders of AAL technology:

- Potential users of 60 and plus of age
- Caregivers
- Council members

OPLIS Online Privacy Literacy Scale

Philipp K. Masur

Doris Teutsch

Sabine Trepte

good
brother



Can we agree on what privacy means? Philosophical, legal, and social context

Abstract. An accurate definition can make all the difference. When it comes to working in an interdisciplinary context, understanding what other researchers mean is invaluable. Privacy is a complex feature. There are numerous ways to describe, conceptualize, and explain privacy, and it is rather difficult to find a definitive answer to the question as to what it truly is. On the one hand, privacy is a state of affairs, a quality of a situation, and, in some instances, a benefit for those who have it. On the other hand, it is a legal obligation in some contexts and a preferential asset in others. This paper presents a composite definition of privacy spanning three scientific disciplines: Philosophy, Law, and Social Science. We will present privacy from each of these perspectives, summarise important work of the respective field, and integrate our insights into an agreement on what privacy means to form a practical tool with which we can address privacy related issues.

Keywords: Privacy · Privacy Definition · Informational Privacy · Personal Data · Theoretical Paper · Philosophy · Law · Social Sciences

ESR3 – Alexander Hick



Research project

"Acceptance of artificial intelligence in health-related contexts"

About the project

The project focusses on the support of people who suffer from chronic diseases and their medical staff by means of intelligent technology functions user group barriers, i

ESR5 - Maksymilian Kuźmicz



Research project

"Video-based AAL technologies and balancing of interests"




About the project

An aspect that is necessary to take into account, when introducing new technologies into society, is that there are bound to be multiple interests at stake, which potentially come into conflict with each other, particularly from a legal perspective. For example, under the General Data Protection Regulation (GDPR), an individual is able to gain access to the logic behind automated decisions that affect him or her, yet only to the extent that it does

Pervasive Computing Technologies for Healthcare

15th EAI International Conference, Pervasive Health 2021
Virtual Event, December 6–8, 2021
Proceedings

RITA: A Privacy-Aware Toileting Assistance Designed for People with Dementia

Irene Ballester¹ , Tamar Mujirishvili² , and Martin Kampel¹ 

¹ Computer Vision Lab, TU Wien, Vienna, Austria
{irene.ballester,martin.kampel}@tuwien.ac.at

² Department of Nursing, University of Alicante, Alicante, Spain
tamar@ua.es

Abstract. Dementia is one of the leading causes of disability and dependence among older people, currently affecting more than 55 million people and estimated to increase to 139 million by 2050. A growing number

ESR12 - Irene Ballester Campos



Research project

"AI for dementia care"

About the project

Although the progress and severity of dementia varies depending on the underlying cause (e.g. Alzheimer's disease) there are common symptoms between the manifestations. These symptoms include personality changes, which manifests itself in becoming subdued or withdrawn. By using machine learning in long-term emotional analysis, it should be possible to recognize patterns and thus determine personality changes. In order to assign the person's mood correctly, it is necessary that the algorithms treat the emotions



AAATE 2023

Assistive Technology: Shaping a sustainable and inclusive world

[Home](#)[About AAATE 2023](#)[Contribute](#)[Participate](#)

Paris, August 30-September 1st, 2023

The 17th International Conference of the Association for the Advancement of Assistive Technology in Europe (AAATE) will take place in Paris, at the Conference Centre located

[Campus Condorcet](#).

From user testing to usability testing, user experience in video-based AAL technologies

Tamara MUJIRISHVILI ^{a,1}, Francisco FLÓREZ-REVUELTA ^b

^a *Department of Nursing, University of Alicante, Ctra. San Vicente del Raspeig, S/N 03690 San Vicente del Raspeig, Spain*

^b *Department of Computer Technology, University of Alicante, Ctra. San Vicente del Raspeig, S/N 03690 San Vicente del Raspeig, Spain*

Introduction

The world's population is aging, and this demographic shift is creating a growing demand for active and assisted living (AAL) technologies that could support older adults maintain their independence, health, and quality of life [1]. One such technology is video monitoring systems, which can provide a sense of security and peace of mind for both older adults and their caregivers [6]. However, privacy concerns are a significant barrier



Privacy-Aware and Acceptable Video-Based Technologies
and Services for Active and Assisted Living

Thank you!

Contact information

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 861091.



Universitat d'Alacant
Universidad de Alicante

Project Coordinator



Stockholm
University



Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin



Extra slides

Project aim

The aim of this project is to analyse the acceptance of video-based AAL (VAAL) technologies, located in public and private spaces, by their potential users. Including as a potential user, both the frail elderly patients and people with disabilities and with needs of aid, and their caregivers, formal or informal. Different types of cameras, locations, and type of information will be considered as well as benefits (for example, medical safety) and related barriers (for example, the threat to their privacy).

- What are the main benefits and barriers associated with the use of video monitoring technologies for frail elderly people and people with disabilities?
- What variables play role in the acceptance of video-based monitoring technologies?
- What are the determinants of VAAL acceptance in different contexts (cultural, social, public, private)?
- What are main privacy concerns related to those technologies and what role does it play in the acceptance of VAAL?
- What are the trade-off of privacy versus safety, in older adults and people with disabilities?

Maria



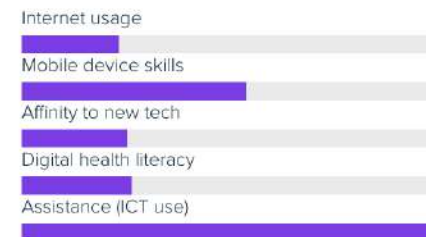
Age: **67**
Country: **Spain**
Area: **Urban**
Need: **Complex needs**
Connectivity: **Smartphone, Mobile device, Digital TV.**

Daily living

- Problems in managing her household (cleaning, cooking, doing groceries).
- Wishing to integrate a cognitive training program for dementia into her daily living.

Bio

Maria lives in an urban area of Spain with his husband Eduardo. Maria has been experiencing cognitive impairment and the early signs of dementia, including difficulties caring for herself and memory loss. She is struggling with forgetting her daily plans and activities, resulting in a decline in her quality of life. Meanwhile, Eduardo leads an active life and is involved in various sports and social activities. Concerned about his wife's health and increasing dependence on him, they are considering adopting a wearable egocentric camera integrated with vital sign monitoring, GPS, and an emergency alarm system. This could help Maria recall her daily routines and provide both of them with a sense of security through its ability to send medical alarms if necessary. Maintaining independence and daily routine are of utmost importance to Maria as well as Eduardo. While they recognize the benefits of this initiative, they are also aware of the privacy concerns that it may raise, especially given their frequent hosting of friends at their homes.



What's important to Maria

- Maintaining independence and not burdening his husband.
- Upholding daily routine activities.
- Keeping the social ties.

Events, issues & concerns

- Feelings of frustration for forgetting things.
- The potential cost of the ICTs.
- Privacy threats associated with the monitoring system.
- Concerns regarding the reactions of her friends towards the implementation of ICTs in her living environment.

Sergio



Age: 78
Country: **Spain**
Area: **Rural**
Need: **Complex needs**
Connectivity: **Smartphone, Mobile device, Digital TV.**

Daily living

- Wishing to pursue his passion for gardening despite the increasing fragility with age.
- Concerned about the progression of his care requirements.

Bio

Sergio lives alone in a rural area of Spain. He is an avid gardener but has faced several incidents of leaving household appliances on, including a fire, and has concerns about potential damages. Additionally, he has heard of burglaries in his neighborhood and given his increasing fragility with age, he feels insecure living alone. However, he does not want to burden his children. He is considering implementing a monitoring camera to increase his security and peace of mind, however, he faces several challenges that impede his adoption of the monitoring technology. Firstly, he is cautious about the usage and access of the information captured and how the information collected may be used, and by whom. Secondly, Sergio worries about the potential impact on his relationship with the cleaning assistant who visits him once a week. He fears that the camera may be perceived as a means of surveillance and that this may convey a lack of trust in the assistant. Lastly, Sergio fears that he lacks the technical proficiency necessary for effectively managing the monitoring system. Lastly, Sergio fears he lacks the technical proficiency necessary for effectively managing the monitoring system.

Internet usage

Mobile device skills

Affinity to new tech

Digital health literacy

Assistance (ICT use)

What's important to Sergio

- Physical safety.
- Not burdening his children.
- Maintaining trusting relationships with people in his life.
- Being of value and having a purpose.

Events, issues & concerns

- Distrust in new technology.
- Fear of not having sufficient skills for the use of the technology.
- Concerns about the cost of the technology.

Ana



Age: **53**
 Country: **Spain**
 Area: **Urban**
 Need: **Generally well / good wellbeing**
 Connectivity: **Broadband, smartphone, mobile device, tablet digital TV.**

Daily living

- Working committedly for the well-being and safety of her residents.
- Ana endeavors to reconcile the demands of her job with her family responsibilities, including her duties as a caregiver to her parents.

Bio

Ana is a manager of a care home for the elderly in a small town in Spain. She is a dedicated professional who is passionate about providing high-quality care for the residents of her home. With over 20 years of experience in the field, she has a deep understanding of the needs and concerns of the elderly. Recently, Ana has been considering the installation of monitoring cameras throughout the care home to ensure the safety and well-being of the residents. Some of the reasons for making this decision are detection of emergency incidents such as falls, improved quality of care, especially for those with mobility issues. Despite the benefits, Ana is also aware of the challenges and worries that come with this decision. She acknowledges that some residents and their families may have concerns about privacy and how the information captured by the cameras will be used. Moreover, installing and maintaining a monitoring camera system can be complex. Ana is aware that some of her staff may be resistant to the idea of monitoring cameras in the care home and she wants to ensure that they are fully onboard with this initiative. Despite these challenges, she is confident that the benefits of installing monitoring cameras will outweigh any challenges that may arise.

Internet usage

Mobile device skills

Affinity to new tech

Digital health literacy

Assistance (ICT use)

What's important to Ana

- High-quality care and well-being of the residents.
- Ensure a delicate balance between providing top-notch care to the residents and maintaining positive relationships with the staff and families.

Events, issues & concerns

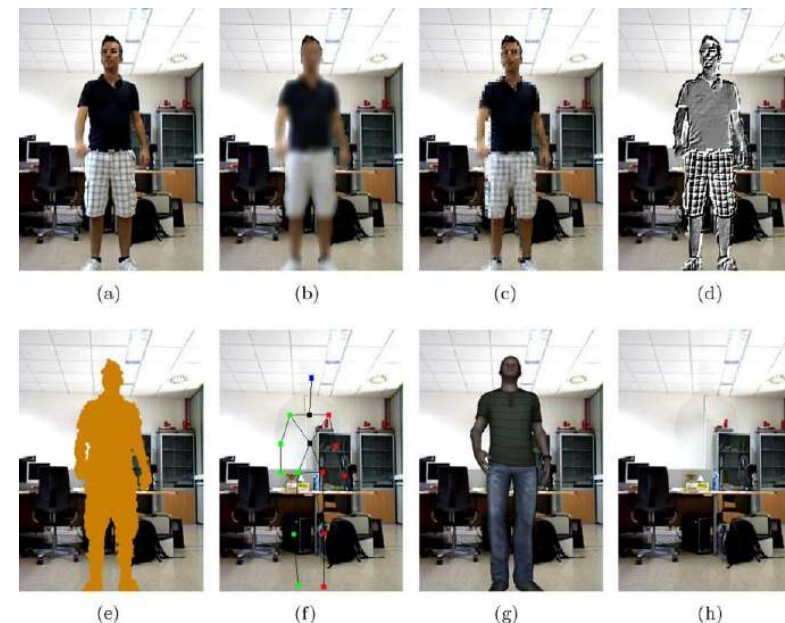
- The challenge of balancing emergency detection through monitoring system and guaranteeing the privacy of the residents.
- Worry about the ability of the care home to handle the technical aspects of the monitoring system.
- Concerns about the potential staff resistance towards the monitoring technology.

➤ Interest in privacy paradox - this discrepancy between privacy attitudes and privacy-related behaviour [1] -> Experiments to identify privacy paradox.

➤ Interviews with different stakeholders using developed scenarios and privacy filters:

- End users – older adults, persons with disability
- Informal caregivers
- Formal caregivers
- Care Facility managers
- Healthcare professionals

➤ Quantitative survey using different privacy filters.



[2]

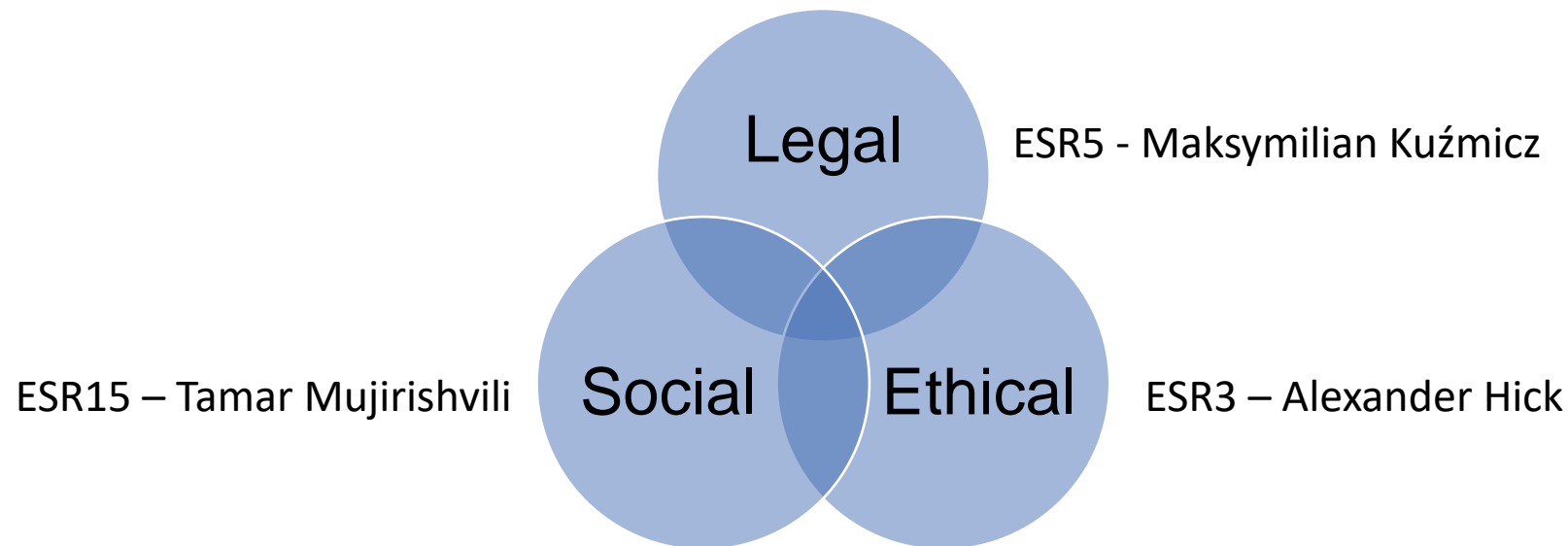
1. Kokolakis S. Privacy attitudes and privacy behaviour: A review of current research on the privacy paradox phenomenon. *Computers and Security* 2017;**64**:122–34.
2. Climent-Pérez, P., & Florez-Revuelta, F. (2021). Protection of visual privacy in videos acquired with RGB cameras for active and assisted living applications. *Multimedia Tools and Applications*, 80(15), 23649-23664.

Acceptance and privacy perceptions toward Video-based Active and Assisted Living (VAAL) technologies – A scoping review.

Inclusion and exclusion criteria

	Include	Exclude
Population	Humans; Current and potential users of VAAL: Older adults (50+) or disabled people (of any age); Their caregivers, family members, nurses, medical staff and bystanders (of any age)	
Interest of the study	Video-based (RGB, depth, thermal, radar-based) monitoring technologies (including all the other technologies as long as they use video cameras)	Video based technologies used solely for the video-conferencing / video-communications / interactive-video
Context	Concerning privacy perception and acceptance attitudes towards camera-based monitoring technologies; Active Assisted Living / Ambient Assisted Living	Technology used purely for medical purposes in medical hospital and not primarily AAL
Physical setting of the study	Private home, care home, nursing home, living lab or an online survey concerning these settings	Purely medical setting
Study type	Empirical study: qualitative or quantitative	Theoretical study / review
Year of publication	∞ – 2021 August 23	
Language	English, Spanish, German, French, Portuguese, Italian, Russian, Georgian.	

Develop Persona Profiles based on moral dilemmas:



Design a questionnaire based on the moral dilemmas and Persona Profiles to measure benefits and barriers of technologies which then will be used in different countries for data collection.

Timeline

Year One

M1 – M5

- In-depth reading of the existing literature in the field of ambient assisted living technologies.
- Preparation and drafting the literature review

M6 –M8

- Finalizing the literature review
- Preparing and giving lectures to Bachelor and Master level studently, mostly in research methodology

M9 – M12

- Structuring and categorizing questionnaires and interview guides for the data collection
- Preparing materials for the study and data collection and preparing for the data collection
- Doing the first, qualitative part of the data collection
- Preparing and giving lectures to Bachelor and Master level studently, mostly in research methodology

Year Two

M13 – M17

- Start the recruitment of the participants for the first part of the data collection: identifying benefits of video-based lifelogging technologies in objective ways, measured by AAI service designers and in subjective ways, perceived by the potential users
- First part of data collection ends
- Data Analysis of the collected data

M18-M20

- Secondment 1: Training and research on benefits and barriers of technologies RWTH Aachen University (Supervisor: Prof M Ziefle)

M21-M24

- Data collection continues for identifying the barriers for the use of video-based lifelogging technology
- Recruiting participants for the quantitative & qualitative part of the research
- Data analysis of the collected data

Year Three

M25 – M31

- Data collection and data analysis continues
- Starts and progresses the final write up, discussing the relations of current findings to the existing literature

M32

- Secondment 2: Data collection, Cáritas Diocesana Coimbra (Supervisor: C Dantas)

M33 - M34

- Secondment 3: Data collection, AIAS Bologna (Supervisor: Dr L. Desideri)

M35 – M36

- Finish the write-up, preparing for the Doctoral thesis defence.