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1. Introduction

Our world is changing. The demographic discrepancy between the older and younger generations is growing at an increasing rate (MPIDR, 2023). This change could lead to significant shortcomings in medical care and general support for those in need. Due to the increasing number of older people and the decreasing number of people with the relevant skills to care for them, our societies might face a catastrophic state of our healthcare system. To counteract this situation, we might turn to technological support. This support could come in the form of innovative technologies that support and eventually replace some parts of the healthcare system.

The technological development in terms of medical technology using artificial intelligence (AI) has seen a steep increase in recent years (Nader et al., 2022). Alongside the launch of useful AI-tools, such as ChatGPT, the term AI itself has been used to describe an entire field of research and innovation (OpenAI, 2023; Bochniarz et al., 2022). This increase in interest has led to new questions about the usability and acceptance of AI-based medical technology and offered a new perspective on the intention to use and implement AI in a variety of healthcare contexts (AI Watch, 2020). It is estimated that by the year 2050 around 2.1 billion elderly people will be living worldwide (United Nations, 2015). Currently, there exists a plethora of new technologies helping the healthcare system and implemented particularly in assisted living i.e., delivery of medical care and services. Many of these technologies are based on some form of AI (Catania, 2021). When it comes to choosing the right technological support for one's care needs, AI can play an important role. Over the last decades, new innovations and tools have promised a tremendous improvement over the traditional "one-size-fits-all" health-care principle (AI Watch, 2020). One angle is a collection of technologies known as Ambient Assisted Living (AAL) (Sun et al., 2009). These tools may be installed in the living environment of a person in need to provide a tailored support and seamless implementation thereof. Among other parts, AAL-technologies often make use of cameras to monitor a particular room and alarm healthcare personnel or family members in case of an emergency. This is often done by using AI to analyse the received data. In this report we present the current state of AI-based medical technologies, summarise the most relevant literature in this context and develop an AI-

Acceptance cartography which visualises the areas of most promising benefits of this technological innovation.

2. Definitions and Purposes of Artificial Intelligence and Ambient Assisted Living Technologies

Ambient Assisted Living (AAL) refers to the concept of integrating various technologies and services to enhance the quality of life and well-being of individuals, particularly of older adults and people with disabilities and/or chronic illnesses, in their living environments (Jovanovic, 2022; Blackman et al., 2016; Rashidi & Mihailidis, 2013). AAL technologies aim to provide personalized assistance and support, promoting independent living, safety, and social participation (Reeder et al., 2013). These medical technologies are designed to support people in need of medical care in their own homes. AAL Sensors can measure physiological parameters and actuators can interact with the person in need (Blackman et al., 2016). For example, these technologies could be used to monitor a person‘s gait or walking patterns in order to predict their potential for falling. To recognise these patterns most of these systems rely on some form of AI. AI is an umbrella term for technologies that can learn. It summarises various computer algorithms e.g., machine learning models, deep learning, or convolutional neural networks (Patterson, 1990). Some of these models and algorithms are implemented in everyday technology e.g., smartphones, cameras, cars, but also in medical technology such as AAL systems (Jovanovic et al., 2022). AAL sensors can measure physiological parameters and actuators can interact with the person in need (Blackman et al., 2016). As opposed to traditional technology i.e., technology that is not based on AI, AI-based AAL technology in general is often highly complex (Lecue, 2020). Its complexity can lead to a false understanding of the abilities of AI (Hick & Ziefle, 2022) or mistrust and problems in usability (Zhang et al., 2020; Holzinger et al., 2019; Shin, 2021). Research showed that people who distrust a technology, for example because of low usability, utility, or high risk, are less inclined to use it (Choung et al., 2022; Schomakers et al., 2021; Otten & Ziefle, 2022). This creates problems for technology developers but also for policy makers who try to implement new technologies as support for healthcare workers (Cesta et al., 2018).

2.1 Artificial Intelligence in AAL Technologies

In the realm of cutting-edge technology, artificial intelligence (AI) is term that has been making waves in recent years (Cath, 2018). AI is a multidisciplinary field that combines computer science, mathematics, and cognitive science to create intelligent machines capable of performing tasks that typically require human intelligence. It is a remarkable scientific endeavour that seeks to replicate and enhance human cognitive abilities, such as learning, reasoning, problem-solving, perception, and language understanding, within the realm of computer systems. AI is not a novel concept. Its roots can be traced back to the 1950s, where early pioneers envisioned the creation of intelligent machines (McCarthy, 2009). However, it is in the last few decades that significant advancements in computing power, data availability, and algorithmic sophistication have propelled AI into the forefront of technological innovation. Today, AI has permeated various aspects of our lives, from virtual assistants like Siri and Alexa to autonomous vehicles, recommendation systems, fraud detection algorithms, and advanced medical diagnostics, among many others (OpenAI, 2023; Sipior, 2020). At its core, AI can be broadly classified into two main categories: narrow AI and general AI. Narrow AI, also known as weak AI, refers to systems designed to perform specific tasks with exceptional proficiency (Patterson, 1990). These systems are built to excel in specific domains, such as image recognition, natural language processing, or game playing. On the other hand, general AI, also known as strong AI or artificial general intelligence (AGI), aims to develop machines that possess the intellectual capabilities and versatility to understand, learn, and apply knowledge across a wide range of tasks—essentially mirroring human-level intelligence (Liao, 2020). The field of AI encompasses several fundamental subfields, each with its own specialized techniques and methodologies. Machine learning, a subset of AI, focuses on the development of algorithms that allow computers to learn patterns and make predictions or decisions based on data, without explicit programming. Deep learning, a subfield of machine learning, utilizes artificial neural networks with multiple layers to process and understand complex patterns in large datasets (Copeland, 1993). Other key areas within AI include natural language processing, computer vision, robotics, expert systems, and knowledge representation. While AI presents immense opportunities and has the potential to revolutionize numerous industries, it also raises important ethical and societal considerations

(Vallor, 2019; Liao, 2020). Issues surrounding privacy, bias, job displacement, transparency, and accountability must be carefully addressed to ensure AI is developed and deployed responsibly and ethically (Asaro, 2009). Striking a balance between technological progress and safeguarding human interests remains a critical challenge for researchers, policymakers, and society as a whole. As AI continues to evolve at a rapid pace, it holds the promise of transforming industries, amplifying human capabilities, and solving complex problems. Whether it is enabling personalized healthcare, revolutionizing transportation, optimizing energy consumption, or enhancing customer experiences, AI has the potential to reshape the way we live, work, and interact with the world around us (Gabriel, 2020) . As we embark on this technological journey, it is crucial to foster a collaborative and inclusive approach that harnesses the benefits of AI while addressing its associated challenges, ensuring a future where humans and machines coexist harmoniously and thrive together.

2.2 Video-based AAL Technologies and their use contexts

In the domain of AAL technologies, the integration of video-based AAL systems represents a notable advancement, harnessing the capabilities of AI-driven video monitoring and analysis to improve the safety, security, and overall well-being of individuals, particularly of older and frail people or those with disabilities. This technology implements strategically positioned camera-based sensors within living spaces or care facilities, capturing visual data that is subsequently analysed using cutting-edge computer vision AI-algorithms (Climent-Perez, 2020). Real-time analysis or data storage for later analysis by caregivers or healthcare professionals is facilitated, with the analytical process involving an array of techniques, including object recognition, activity recognition, facial recognition, and anomaly detection (Climent-Pérez et al., 2020; Hashemifard et al., 2023). The selection of camera type is contingent on the specific monitoring requirements, with options ranging from RGB-based for environmental recording, to depth and infrared or thermal sensors for enhanced data (Mucha & Kampel, 2022; Hashemifard et al., 2023; Rashidi & Miahilidis, 2013). Each of these options can provide varying degrees of privacy preservation, data granularity, and adaptability in discerning relevant information (Ravi et al., 2021; Mucha & Kampel, 2022; Padilla-Lopez, 2014). Notably, video-based AAL technologies can be seamlessly integrated with other modalities, including motion sensors and wearable devices, resulting in comprehensive monitoring systems. Overall, the type of camera should be chosen based on the desired information.

However, it is imperative to acknowledge that, within the purview of AAL, cameras remain the least embraced sensor modality. This reluctance primarily emanates from taking issue with problematic or unresolved privacy and data security (Arning & Ziefle, 2015; Himmel & Ziefle; 2016; van Heek et al., 2018; Maidhof et al., 2023). Concerns encompass continuous surveillance, perceived intrusiveness, and the potential for an intrusion of the personal space (Demiris et al., 2004; Kirchbuchner et al., 2015; Peek et al., 2014; Yusif et al., 2016; Arning & Ziefle, 2015). Consequently, it is important for stakeholders to establish robust privacy policies and safeguards to ensure the secure storage of video-captured data, restricting access to authorized personnel, and mandating usage strictly for intended purposes which includes representing the user's perspective of these technologies.

3. Acceptance of AAL Technologies

User acceptance an important key to a successful adoption of new technologies. Technology is defined as the overall agreement with something and an active intention to adapt one's behaviour towards this entity; the most widely used acceptance model for technology is the TAM (Technology acceptance model; Davis, 1989). This model is based on two important theories. First, there is the theory of reasoned action (Ajzen & Fishbein, 1980). It attempts to explain the relationship between attitudes and behavioural intentions to predict human behaviour. Second, there is the theory of planned behaviour (Ajzen & Fishbein, 1980) which is an extension of the former, explaining an individual's behaviour as the result of an intention which is also influenced by attitudes, perceived control, and subjective norms. The TAM utilises those theories to construct a model that measures the respective influences of these factors to explain technology acceptance. Most notably it uses the perceived usefulness of a particular technology and its perceived ease of use. As an additional factor it measures the behavioural intention to use a certain technology (Davis, 1989; Venkatesh & Davis, 2000). The second most widely used technology acceptance model is the *Unified Theory of Acceptance and Use of Technology* (UTAUT) and has its root from the TAM. The UTAUT primarily focusses on four key influencing factors to explain user intentions to accept a particular technology, namely performance expectancy, effort expectancy, social influence, and facilitating conditions.

Regarding AI-based AA L technology, it is important to consider these subjective experiences and attitudes which may also differ by contexts. In these contexts, the specific user requirements might differ and vary substantially between individuals. This could help policy makers, researchers, or other stakeholders to gain an overview over problems and an aid in the development of possible solutions. In the context of AI, a common framework for its evaluation is the trade-off between risk and utility (Brauner et al., 2023). What factors influence the acceptance evaluation of (video-based) AAL technologies depend on the user and the technology but also on the specific use context in which the technology is applied (Povey & Mills, 2016). Several factor make up the overall acceptance with which technologies, such as video-based AAL systems are evaluated against, i.e. perceived usefulness and ease of use (Peek et al., 2016). Generally, users are more likely to accept (video-based) AAL technology if they perceive it as valuable and beneficial in improving their quality of life, safety, or well-being (Rashidi, & Mihailidis, 2013; Otten et al., 2023). These are perceived benefits which are weighed against perceived barriers, such as data management, usability, and trust issues (Schomakers et al., 2021; Venkatesh et al., 2003). Given that there are many applications of video-based AAL technologies and situational circumstances and needs of the user, evaluations of both the benefits and barriers are highly individual and may change over time. Previous research has shown repeatedly that perceived benefits positively influence acceptance evaluations while perceived barriers negatively predict acceptance evaluations (Jaschinski et al., 2021; Offermann-van Heek et al., 2019). Therefore, user acceptance increases when (video-based) AAL technology is perceived as user-friendly, intuitive, and easy to operate, even for those with limited technical skills. As a results of these facets of acceptance, personalisation of (video-based) AAL systems as well as privacy and data protection are important in managing and ideally, increasing the benefits and decreasing the barriers of (video-based) AAL (Holden & Karsh, 2009). However, acceptance of AAL technologies is not binary decision in the sense “accept” or “reject”, but rather dynamic, multifaceted and characterised by complex trade-off procedures. Along with evaluations of benefits and barriers, acceptance evaluations are shaped by decision making patterns that differ based on various characteristics. Thus, conjoint analyses have been conducted to capture these trade-offs. Generally speaking, these types of analyses aim to capture decision making processes focusing on relative importance of individual factors. They were initially developed by Luce and Tukey (1964) for the design and evaluation of new products in a market but are increasingly used in the field of technology acceptance as well (Arning, 2017; Offermann-van Heek et al., 2020). In a conjoint procedure, real and complex decision-making processes are simulated. This means that the participants do not evaluate individual aspects of a certain technology, but all relevant factors which possibly contribute to the decision whether to accept or reject such a technology are evaluated together and in dependence on each other. In the context of AAL technologies, research has shown that acceptance evaluations are subject to decision patterns based on different situations and predictors of acceptance. Offermann-van Heek & Ziefle (2019) investigated the relative importance of these acceptance considerations based on safety, data access, data handling, and care relief attributes. The goal of their study was to holistically investigate laypeople's decisions between a selection of relevant perceived benefits and barriers of using AAL technology while taking the perspective of a caring relative. Here, data access was to be the most relevant parameter relative to others, i.e., safety, data handling, and care relief. In addition and based on these underlying decision patterns, user profiles could be identified. They differed based on whether they were care-experienced or a "care novice" whereby these groups could be further divided into age, education, occupation, and status of care experience (active or passive). Another study using a conjoint design found that within the attributes fall risk (e.g., high), reliability (e.g., 99% reliability of fall detection), data recipients (e.g., relatives), type of access (e.g., live data), type of data (e.g., activity data), reliability was the most important relative factor for the acceptance decision of an AAL system, whereby people with chronic conditions also made different choice patterns than people who did not have chronic conditions (Schomakers & Ziefle, 2023). Ultimately, these findings show the intricacy of capturing acceptance and how this makes context and individuality all the more important when investigating and developing AAL technologies. While acceptance itself is a complex process of decisions, there are multiple factors that are relevant in predicting the likelihood of a person accepting a given AAL technology as well.

There are also other user characteristics and personality factors that influence acceptance evaluations. Particularly age and gender serve as carrier variables, meaning that acceptance evaluations are modulated by whether users are female or male, as well as older or younger. Research has not conclusively explained to relationship between age and acceptance evaluations. Some studies showed that older adults tend to have lower acceptance ratings of AAL technologies whereas other studies found the opposite (Biermann et al., 2018; Halbach et al., 2018; Himmel & Ziefle, 2016; Steinke et al., 2014; Steinke et al., 2012). Moreover, men are more inclined to accept them as opposed to women (Schomakers et al., 2018). In addition, technical affinity and openness to try out and use new technologies in general, directly translates to the acceptance of AAL technologies, with higher affinity and openness predicting higher acceptance scores (Halbach et al., 2018). Studies have shown that also other individual characteristics beside technical affinity, such as a general (dis)trusting attitude, innovation and risk readiness are also important for the understanding of AAL acceptance (Behrenbruch et al., 2013; Barr, 2023). Lastly, not only individual attributes are relevant but also contextual factors, such as living situation and area, care dependence and health status. Whether people live alone, together with someone, or in close proximity of relatives seem to have an impact on the acceptance of AAL technologies, with people living alone reporting the highest acceptance evaluations (Jaschinski et al., 2021). Moreover, the presence of chronic illness and/or being dependent on care also influences acceptance whereby people have been shown to be more likely if the medical necessity was given and whether people had experience in caring for someone else (Offermann & Ziefle, 2019; Van Heek et al., 2017a; Van Heek et al., 2017b; Van Heek et al., 2018). The considerations of users personalities, and user characteristics are therefore imperative if the goal is to develop technologies that will be readily accepted.

4. Trust in AAL Technologies

In addition to weighing benefits and barriers as well as acceptance parameters against each other, trust is another critical factor in the evaluation of technology. Drawing from various research fields, trust is an interdisciplinary concept by nature as it always pertains to an interaction between two parties (McKnight et al., 2011). Trust (in automation) has been studied extensively, yet no precise conclusions can be drawn about the general concept (Ghazizadeh et al., 2012). It is most often considered an attitude which is related to the reliance on someone or -thing (Lee & See, 2004). Because of that, it has behavioural implication beyond the cognitive evaluation of the trustee. There are multiple influences that make-or-break trust, including characteristics of the trustee, personal perceptions of the trustor as well as context variables (Ondiege & Wanjira, 2014). Overall, trust in automation is related to user, technology, and context factors while the interplay of these results in the overall evaluation of trust being present or not. Specifically in the context of (video-based)AAL technology, users need to trust that the technology will operate reliably, maintain their privacy, and deliver the intended benefits (McKnight et al., 2011). In that sense, reliability can include the accuracy of the technology's monitoring, sensing, and response capabilities that users use to realistically estimate and trust (Otten & Ziefle, 2022). Here, both under- as well as overreliance on the technology can have dramatic effects, as seen in maritime and aviation accidents in the past (Parasuraman & Riley, 1997). Moreover, transparency of how the technology works and which people can operate it can play into a user's overall feeling of trust (Vervier et al., 2019; Vervier et al., 2018; Otten et al., 2023). This includes how data is collected and used which is closely linked to privacy protection, data ownership and control. Research has further shown that transparency, including financial aspects of the technology (i.e., whether it is paid for or not and who profits) are also integral to user's trust perceptions (Otten et al., 2023b). These key issues, e.g., data control, transparency of information, communication flow, professionalism around the technology, technical competence, and health benefits, are strongly related to the trust evaluations of video-based AAL technologies.

Trust, but also acceptance, are both variables that are predicted by other influences as well. Particularly age and gender serve as carrier variables, meaning that trust and acceptance evaluations are modulated by whether users are female or male, as well as older or younger. Research is split on the effect of age; some studies showed that older adults tend to have lower acceptance ratings of AAL technologies whereas other studies found the opposite (Biermann et al., 2018; Halbach et al., 2018; Himmel & Ziefle, 2016; Steinke et al., 2014; Steinke et al., 2012). Moreover, men are more inclined to accept them as opposed to women (Schomakers et al., 2018). In addition, technical affinity and openness to try out and use new technologies in general, positively translates to trust in and acceptance of AAL technologies (Halbach et al., 2018). Studies have shown that also other individual characteristics beside technical affinity, such as a general (dis)trusting attitude, innovation and risk readiness are also important for trust in AAL and the acceptance of it (Biermann et al., 2023; Behrenbruch et al., 2013; Barr, 2023). Lastly, not only individual attributes are relevant but also contextual factors, such as living situation and area, care dependence and health status. Whether people live alone, together with someone, or in close proximity of relatives seem to have an impact on the evaluation of trust in AAL technologies, with people living alone reporting the highest acceptance evaluations (Jaschinski et al., 2021; Otten & Ziefle, 2022). Moreover, the presence of chronic illness and/or being dependent on care also influences acceptance whereby people have been shown to be more likely if the medical necessity was given and whether people had experience in caring for someone else (Offermann & Ziefle, 2019; Van Heek et al., 2017a; Van Heek et al., 2017b; Van Heek et al., 2018). The considerations of users personalities, and user characteristics are therefore imperative if the goal is to develop technologies that will be readily accepted and trusted.

5. Privacy Perceptions in AAL Technologies

Within the domain of video-based Ambient Assisted Living (AAL), privacy emerges as a central concern, emphasizing the need for its protection to avoid potential breaches. Various studies among users reveal a range of privacy-related concerns, including feelings of constant surveillance, fear regarding unauthorized access and misuse of personal data, concerns about the sensitivity of gathered information, invasion of personal space, and the perceived intrusive nature of the technology itself. These factors collectively hinder the widespread adoption of video-based AAL technologies, (Demiris et al., 2009; Garg et al., 2014; Lorenzen-Huber et al., 2011; Peek et al., 2014).

However, it is essential to recognize that privacy is a multidimensional concept with diverse definitions across different disciplines. In legal and economic contexts, privacy is often conceptualized based on its inherent value, whether as a fundamental human right or as an economic commodity (Burgoon, 1982; Smith et al., 2011).

In studies within the realm of social sciences focusing on the acceptance of video-based Ambient Assisted Living (AAL), privacy definitions primarily revolve around cognate-based approaches. This entails categorizing privacy as either a behavioral pattern or an inherent predisposition of individuals to act in certain ways (Smith et al., 2011). Consequently, privacy is perceived as either a psychological state (Alpert, 2003; Westin, 1967) or an assertion of one's control over personal information (Goodwin, 1991; Milne, 2000; Westin, 1967). Within these cognate-based perspectives, two distinct lines of inquiry emerge: one explaining the mechanisms through which privacy is achieved, and the other delving into the reasons behind the necessity and pursuit of privacy. The latter perspective posits that privacy serves fundamental human needs such as introspection, autonomy, relaxation, trust-building, and creativity. These aspects significantly contribute to personal well-being, positive human functioning, and the effective management of social interactions (Altman, 1975, 1976; Pedersen, 1979, 1997, 1999). Continuous failure to address these needs and escalating privacy concerns may lead to serious mental health issues such as depression or anxiety (Altman, 1975, 1976; Uysal et al., 2010).

Ideally, privacy is controlled through a boundary regulation process to reach an ideal amount of privacy, as proposed in the conceptual analysis of privacy by Altman (1976). Indeed, to reach to an optimum amount of privacy individuals attempt to shift the current achieved privacy towards the desired amount of privacy through various behavioral mechanisms such as verbal and paraverbal expressions, nonverbal movement of the body, cultural norms and customs as well as environmental behaviors (Altman, 1976). This adjustment happens according to the circumstances at hand including personal and situational factors. The latter can be, but is not restricted to, personal factors like interpersonal skills or personality and situational factors such as physical environment including location and given barriers.

Particularly within digital environments, the process of regulating boundaries becomes more complex, often resulting in feelings of losing control over personal information. Consequently, individuals tend to prioritize protection against privacy breaches over meeting their actual privacy needs (Lombardi et al., 2016). Technologies such as video-based AAL, facilitating pervasive surveillance, large-scale data storage, and rapid global information dissemination pose significant threats to privacy (Lombardi et al, 2016; Nissenbaum, 2010). In the context of video-based AAL, for instance, the comfort level with being monitored via camera varies based on the activity being performed, with activities involving sensitive or personal matters being particularly discomforting to be visually monitored (Caine et al, 2012). Situational factors, including environmental constraints, significantly impact privacy perceptions, with studies suggesting that acceptance of medical monitoring with cameras decreases in more private spaces (Arning & Ziefle, 2015).

Interestingly, older, frail, and ill participants tend to accept visual systems more readily than healthy individuals, often due to reduced concerns about dignity and privacy loss (Himmel & Ziefle, 2016). Factors such as the need for care, degree of disability, and perceptions of safety and security can positively influence acceptance of AAL technology (Offermann-van Heek & Ziefle, 2019; Schomakers & Ziefle, 2022; Londei et al., 2009).

Despite privacy concerns, technological features often mitigate these apprehensions, such as the ability to select monitoring time slots and automatic processing of video material with image blurring (Lapierre et al., 2018). Efforts in computer vision comprising AI aim to address older adults' concerns and fulfill privacy needs during monitoring of intimate activities, utilizing techniques like de-identification and privacy-by-design frameworks (Ribaric et al, 2016; Gurrin et al., 2014). In video-based AAL, computer vision efforts focus on preserving bodily privacy and, to a lesser extent, identity protection through methods like visual obfuscation (Ravi et al, 2021; Clarke, 2006).

User evaluations of different visualization modes indicate preferences for less intrusive options and generally welcome automatic processes supporting privacy preservation (Wilkowska et al., 2021). Hence, there is great potential in computer vision efforts and AI to make video-based AAL more acceptable and in line with privacy preferences. However, there remains a hesitant behavioral intention among users to adopt these making the significance of privacy and its preservation in video-based AAL undeniable.

Therefore, for the ongoing technological developments it is essential to align them with user preferences and perceptions.

6. Recommendations for Best Practice

Based on the previously outlined theoretical underpinnings regarding AI and technology acceptance as well as trust and including the major influencing aspects of privacy on video-based AAL perception, this sections provides a visualization of acceptance perceptions, thus a kind of acceptance cartography. This can be used to graphically demonstrate complex concepts and illustrate influences that play a role, in this case into the acceptance and trust of users.

In doing so, several conditions of acceptance and trust have to be considered. As is evident from the previous sections, the two concepts are highly dynamic and equally complex.

- Achieving a positive evaluation is not simply a means of asking people what they think. Context, e.g., the recorded activities (and where they are recorded and who is allowed to use the data), biographical events that have shaped an individual's perception for either technology or care- and health-related assistance for better or for worse, or situational circumstances of users are extremely diverse.
- Individual attributes, such as technical affinity, innovation readiness, trust in healthcare professionals and dispositionally in the healthcare system, health status, and care experience are also a major factor contributing to the evaluation of acceptance and trust in (video-based) AAL technologies.
- Lastly, technological aspects of the system itself, e.g., algorithms analysing data, functionality and reliability, data access, privacy protection, etc., are the third determining factor.

Resulting from that, best-case scenarios and worst-case scenarios highlighting the user's perspective of vAAL technologies can be constructed. In between there are conditions that would have to be met but are not a given in some use cases and which shape the evaluation in favour or against vAAL technologies. Below, a graphic illustration as well as highlights pertaining to each of these scenarios are highlighted in Table 1.

Table 1. Overview of relevant adoption criteria

Worst Case Scenario	Best Case Scenario
No human contact	Possibility of device testing periods to gather experience before having to commit
Frequent false alarms and malfunctioning technology	Reliable technology
Constant surveillance without control	Provision of control over technology and personal regulation of privacy (e.g., the option to turn technology on-off is largely requested)
No customizable set-up	Flexible technological functions (e.g., visualization options, data access allowances) across the entire home in line with privacy by design and privacy by context frameworks
Sense of being dependent on technology	Technology is a real relief allowing for a largely independent life at the own home
Confusion about data elaboration and use	Transparency about information regarding data and algorithms.
	Financial transparency and plans to implement technology
No direct correspondence with a technician	Easy to use and understandable technology
Obtrusive design	

Closely related to the descriptions of the adoption criteria of the best- and worst-case scenarios of visual and AI based technologies In AAL environments (Table 1), Figure 1 visualizes the conditional requirements for the users adoption. The figure is designed in a traffic light coloring with red fields signalling negatively evaluated facets and green fields signalling positively evaluated facets. Yellow represents the cases where acceptance are context-dependent and conditional on the individual situation.

Naturally, the graph breaks down the complexity because it does not show the interdependencies and the conditions in which, for example, a positive adoption criterion is weighted more heavily and therefore outshines a negative one. The changes over time are also not visible, so it could be that familiarization with a technology changes acceptance. However, the fundamentally more negative and the positively assessed facets become clear. In daily practice these changes in the acceptance conditions can then be negotiated with the users during use.

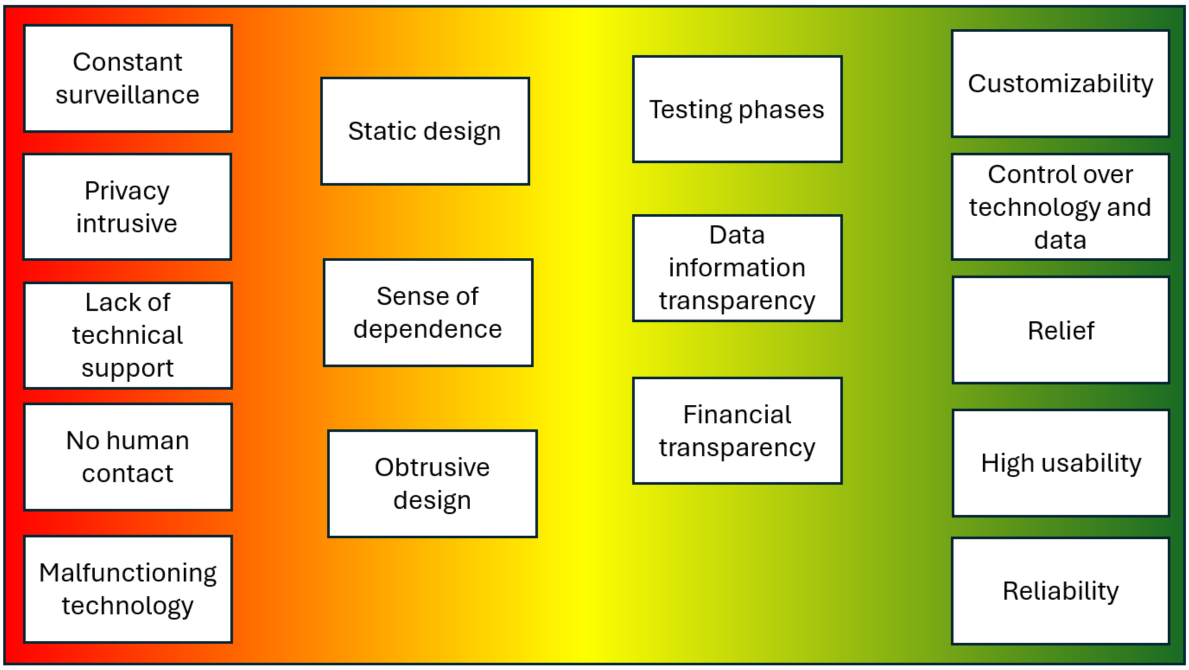

Figure 1. Cartography of relevant adoption criteria

7. References

Alpert, S. A. Protecting Medical Privacy: Challenges in the Age of Genetic Information. J. Soc. Issues. **2003**, 59(2), 301–322

Altman, I. Privacy: A Conceptual Analysis. In Man-Environment Interactions: Evaluations and Applications: Part 2; Carson, D.H, Ed.; Environmental Design Research Association: Washington, DC, USA, 1974; pp. 3–28

Ajzen I, Fishbein M. Understanding Attitudes and Predicting Social Behavior. 1st ed. Englewood Cliffs, NJ: Prentice-Hall (1980).

Arning, K., & Ziefle, M. (2015). “Get that camera out of my house!” Conjoint measurement of preferences for video-based healthcare monitoring systems in private and public places. In Inclusive Smart Cities and e-Health: 13th International Conference on Smart Homes and Health Telematics, ICOST 2015, Geneva, Switzerland, June 10-12, 2015, Proceedings 13 (pp. 152-164). Springer International Publishing.

Asaro, P. M. (2009). Information and regulation in robots, perception and consciousness: Ashby's embodied minds. International journal of general systems, 38(2), 111-128.

Augusto, J., Huch, M., Kameas, A., Maitland, J., & Mccullagh, P. (2012). Handbook of Ambient Assisted Living: Technology for Healthcare, Rehabilitation and Well-Being. Informatics, 94, 112-116.

Barr, H. M. (2023). Differences in Effectiveness of Intrinsic and Extrinsic Motivation-Based Incentives in Promoting Use, Acceptance, and Adoption of Automated Systems. https://doi.org/10.13140/RG.2.2.16494.48965

Bastardo, R., Martins, A. I., Pavão, J., Silva, A. G., & Rocha, N. P. (2021). Methodological Quality of User-Centered Usability Evaluation of Ambient Assisted Living Solutions: A Systematic Literature Review. International Journal of Environmental Research and Public Health, 18(21). https://doi.org/10.3390/ijerph182111507

Behrenbruch, K., Söllner, M., Leimeister, J. M., & Schmidt, L. (2013). Understanding Diversity – The Impact of Personality on Technology Acceptance. In P. Kotzé, G. Marsden, G. Lindgaard, J. Wesson, & M. Winckler (Eds.), Human-Computer Interaction – INTERACT 2013 (Vol. 8120, pp. 306–313). Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-40498-6_23

Biermann, H., Brauner, P., and Ziefle, M. (2020). How context and design shape human-robot trust and attributions. Paladyn, Journal of Behavioral Robotics, 12(1):74–86.

Biermann, H., Offermann-van Heek, J., Himmel, S., & Ziefle, M. (2018). Ambient assisted living as support for aging in place: quantitative users' acceptance study on ultrasonic whistles. JMIR aging, 1(2), e11825.

Biermann, H., Otten, S., Ziefle, M. (2023). Understanding Trust in Automation: A Consideration of Human Factors Context. In: Tareq Ahram and Christianne Falcão (eds) Usability and User Experience. AHFE (2023) International Conference. AHFE Open Access, vol 110. AHFE International, USA.

Blackman, S., Matlo, C., Bobrovitskiy, C., Waldoch, A., Fang, M. L., Jackson, P., ... & Sixsmith, A. (2016). Ambient assisted living technologies for aging well: A scoping review. Journal of Intelligent Systems, 25(1), 55-69.

Blackman, S., Matlo, C., Bobrovitskiy, C., Waldoch, A., Fang, M. L., Jackson, P., Mihailidis, A., Nyg ̊ard, L., Astell, A., and Sixsmith, A. (2016). Ambient as- sisted living technologies for aging well: a scoping review. Journal of Intelligent Systems, 25(1):55–69.

Brauner, P., Hick, A., Philipsen, R., & Ziefle, M. (2023). What does the public think about artificial intelligence?—A criticality map to understand bias in the public perception of AI. Frontiers in Computer Science, 5, 1113903.

Börsch-Supan, A., Kneip, T., Litwin, H., Myck, M., & Weber, G. (Eds.). (2015). Ageing in Europe: Supporting policies for an inclusive society (pp. 1-22). Berlin: de Gruyter.

Bochniarz, K. T., Czerwiński, S. K., Sawicki, A., & Atroszko, P. A. (2022). Attitudes to AI among high school students: Understanding distrust towards humans will not help us understand distrust towards AI. Personality and Individual Differences, 185, 111299.

Burgoon, J. K. Privacy and communication. Ann. Int. Commun. Assoc. **(1982)**, 6(1), 206–249

Calvaresi, D., Cesarini, D., Sernani, P., Marinoni, M., Dragoni, A. F., & Sturm, A. (2017). Exploring the ambient assisted living domain: A systematic review. Journal of Ambient Intelligence and Humanized Computing, 30(1), 69–77. https://doi.org/10.1177/1533317514539724

Cardinaux, F., Bhowmik, D., Abhayaratne, C., & Hawley, M. S. (2011). Video based technology for ambient assisted living: A review of the literature. Journal of Ambient Intelligence and Smart Environments, 3(3), 253-269

Cath, C. (2018). Governing artificial intelligence: ethical, legal and technical opportunities and challenges. Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences, 376(2133), 20180080.

Cesta, A., Cortellessa, G., Fracasso, F., Orlandini, A., and Turno, M. (2018). User needs and preferences on aal systems that support older adults and their carers. Journal of Ambient Intelligence and Smart Environments, 10(1):49–70.

Choung, H., David, P., and Ross, A. (2022). Trust in ai and its role in the accep- tance of ai technologies. International Journal of Human–Computer Interaction, pages 1–13.

Cicirelli, G., Marani, R., Petitti, A., Milella, A., & D'Orazio, T. (2021). Ambient Assisted Living: A Review of Technologies, Methodologies and Future Perspectives for Healthy Aging of Population. Sensors, 21(10). https://doi.org/10.3390/s21103549

Climent-Pérez, P., Spinsante, S., Mihailidis, A., & Florez-Revuelta, F. (2020). A review on video-based active and assisted living technologies for automated lifelogging. Expert Systems with Applications, 139, https://doi.org/10.1016/j.eswa.2019.112847.

Copeland, J. (1993). Artificial intelligence: A philosophical introduction. John Wiley & Sons.

Cohen, J. (1988). Statistical power analysis for the behavioral sciences and eii.

Davis, F. D., 1989. Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. MIS Quarterly, 13(3), 319–340.

Demiris, G.; Rantz, M. J.; Aud, M. A.; Marek, K. D.; Tyrer, H. W.; Skubic, M.; Hussam, A. A. Older adults' attitudes towards and 1000 perceptions of 'smart home'technologies: a pilot study.Med. Inform. Internet Med. 2004, 29(2), 87–94

Franke, T., Attig, C., and Wessel, D. (2019). A personal resource for technology interaction: development and validation of the affinity for technology interaction (ati) scale. International Journal of Human–Computer Interaction, 35(6):456– 467.

Gabriel, I. (2020). Artificial intelligence, values, and alignment. Minds and machines, 30(3), 411-437.

Ghazizadeh, M., Lee, J. D., & Boyle, L. N. (2012). Extending the technology acceptance model to assess automation. Cognition, Technology & Work, 14 (1), 39-49.

Goodwin, C. Privacy: Recognition of a Consumer Right. J. Public Policy Mark. **1991**, 10(1), 149–166

Gurrin, C., Albatal, R., Joho, H., & Ishii, K. (2014). A privacy by design approach to lifelogging. In K. O´Hara, M.-H. Nguyen, M. H. Carolyn, & P. Haynes (Eds.), Digital Enlightenment Yearbook 2014 (Vol. 1878, Issue January 1878, pp. 49– 73). IOS Press.

Halbach, P., Himmel, S., Offermann-van Heek, J., & Ziefle, M. (2018). A Change Is Gonna Come: The Effect of User Factors on the Acceptance of Ambient Assisted Living. In Human Aspects of IT for the Aged Population. Acceptance, Communication and Participation: 4th International Conference, ITAP 2018, (pp. 52-69). Springer International Publishing.

Hashemifard, K.; Florez-Revuelta, F. and Lacey, G. (2023). A Fallen Person Detector with a Privacy-Preserving Edge-AI Camera. In Proceedings of the 9th International Conference on Information and Communication Technologies for Ageing Well and e-Health - ICT4AWE;. doi: 10.5220/0012037200003476

Hick, A. and Ziefle, M. (2022). A qualitative approach to the public perception of ai. International Journal on Cybernetics & Informatics, 11(4):1–17.

Himmel, S., & Ziefle, M. (2016). Smart home medical technologies: users' requirements for conditional acceptance. i-com, 15(1), 39-50.

Holden, R. J., & Karsh, B. T. (2009). The Technology Acceptance Model: Its Past and Its Future in Health Care. Journal of Biomedical Informatics, 43(1), 159-172. https://doi.org/10.1016/j.jbi.2009.07.002

Holzinger, A., Langs, G., Denk, H., Zatloukal, K., and Mu ̈ller, H. (2019). Caus- ability and explainability of artificial intelligence in medicine. Wiley Interdisci- plinary Reviews: Data Mining and Knowledge Discovery, 9(4):e1312.

Jaschinski, C., & Allouch, S. B. (2015). An extended view on benefits and barriers of ambient assisted living solutions. International Journal on Advances in Life Sciences 7(1-2). 40-53.

Jaschinski, C., Ben Allouch, S., Peters, O., Cachucho, R., & Van Dijk, J. A. G. M. (2021). Acceptance of Technologies for Aging in Place: A Conceptual Model. Journal of Medical Internet Research, 23(3), e22613. https://doi.org/10.2196/22613

Jovanovic, M., Mitrov, G., Zdravevski, E., Lameski, P., Colantonio, S., Kampel, M., Tellioglu, H., and Florez-Revuelta, F. (2022). Ambient assisted living: Scop- ing review of artificial intelligence models, domains, technology, and concerns. Journal of Medical Internet Research, 24(11):e36553.

Kim, M. J., Cho, M. E., & Jun, H. J. (2020). Developing Design Solutions for Smart Homes Through User-Centered Scenarios. Frontiers in Psychology, 11. https://doi.org/10.3389/fpsyg.2020.00335

Kirchbuchner, F., Grosse-Puppendahl, T., Hastall, M. R., Distler, M., & Kuijper, A. (2015). Ambient intelligence from senior citizens' perspectives: Understanding privacy concerns, technology acceptance, and expectations. In Ambient Intelligence: 12th European Conference, AmI 2015, Athens, Greece, November 11-13, 2015, Proceedings 12 (pp. 48-59). Springer International Publishing.

Lecue, F. (2020). On the role of knowledge graphs in explainable ai. Semantic Web, 11(1):41–51.

Lee, J. D., & See, K. A. (2004). Trust in automation: Designing for appropriate reliance. Human factors, 46(1), 50-80.

Liao, Q. V., Gruen, D., & Miller, S. (2020, April). Questioning the AI: informing design practices for explainable AI user experiences. In Proceedings of the 2020 CHI conference on human factors in computing systems (pp. 1-15).

Lombardi, D. B.; Ciceri, M. R. More than defense in daily experience of privacy: The functions of privacy in digital and physical environments. Eur. J. Psychol. **2016**, 12(1), 115–136

Londei, S. T.; Rousseau, J.; Ducharme, F.; St-Arnaud, A.; Meunier, J.; Saint-Arnaud, J.; Giroux, F. An intelligent videomonitoring

Lorenzen-Huber, L.; Boutain, M.; Camp, L. J.; Shankar, K.; Connelly, K. H. Privacy, technology, and aging: a proposed framework. (2011). Ageing Int., 36(2), 232–252.

Luce, R.D., & Tukey, J.,W. (1964). Simultaneous conjoint measurement: A new type of fundamental measurement. J Math Psychol, 1. 1–27.

Lussier, M., Aboujaoude, A., Couture, M., Moreau, M., Laliberte, C., Giroux, S., Pigot, H., Gaboury, S., Bouchard, K., Belchior, P., Bottari, C., Pare, G., Consel, C., & Bier, N. (2020). Using Ambient Assisted Living to Monitor Older Adults With Alzheimer Disease: Single-Case Study to Validate the Monitoring Report. JMIR MEDICAL INFORMATICS, 8(11). https://doi.org/10.2196/20215

Maidhof, C., Offermann, J., & Ziefle, M. (2023) Living on video: Insights on the user perspective of video-based AAL technology. In Proceedings of the 9th International Conference on Information and Communication Technologies for Ageing Well and e-Health ICT4AWE, 1, 28-39. doi: 10.5220/0011759800003476

Maskeliūnas, R., Damaševičius, R., & Segal, S. (2019). A review of internet of things technologies for ambient assisted living environments. Future Internet, 11(12), 259.

McCarthy, J. F. (2009). 7 'Where is justice?'. Community, Environment and Local Governance in Indonesia: *Locating the Commonweal*, 22, 167.

McKnight, D. H., Carter, M., Thatcher, J. B., & Clay, P. F. (2011). Trust in a specific technology: An investigation of its components and measures. ACM Transactions on Management Information Systems, 2(2), 1-25. https://doi.org/10.1145/1985347.1985353

Menning, S., & Hoffmann, E. (2009). 2.2 Funktionale Gesundheit und Pflegebedürftigkeit. Gesundheit und Krankheit im Alter.

Milne, G. R. Privacy and Ethical Issues in Database/Interactive Marketing and Public Policy: A Research Framework and Overview of the Special Issue. J. Public Policy Mark.**2000**, 19(1), 1–6

Mucha, W., & Kampel, M. (2022, June). Beyond privacy of depth sensors in active and assisted living devices. In Proceedings of the 15th International Conference on Pervasive Technologies Related to Assistive Environments, 425-429. https://doi.org/10.1145/3529190.3534764

Mujirishvili, T., Maidhof, C., Florez-Revuelta, F., Ziefle, M., Richart-Martinez, M., Cabrero-García, J., (2023). Acceptance and privacy perceptions toward video-based active and assisted living technologies: Scoping review. J Med Internet Res. 1(5). https://doi.org/10.2196/45297

Nader, K., Toprac, P., Scott, S., & Baker, S. (2022). Public understanding of artificial intelligence through entertainment media. AI & society, 1-14.

Nissenbaum, H. Privacy in context. Stanford University Press: Stanford, USA. 2009

Offermann, J., Wilkowska, W., Poli, A., Spinsante, S., and Ziefle, M. (2021). Acceptance and Preferences of Using Ambient Sensor-Based Lifelogging Tech- nologies in Home Environments. Sensors, 21(24):8297.

Offermann-van Heek, J., & Ziefle, M. (2019). Nothing else matters! Trade-offs between perceived benefits and barriers of AAL technology usage. Frontiers in Public Health, 7, 134. https://doi.org/10.3389/fpubh.2019.00134

Offermann-van Heek, J., Schomakers, E. M., & Ziefle, M. (2019). Bare necessities? How the need for care modulates the acceptance of ambient assisted living technologies. International Journal of Medical Informatics, 127, 147-156. https://doi.org/10.1016/j.ijmedinf.2019.04.025

Offermann-van Heek, J., Arning, K., Sternberg, A., Bardow, A., & Ziefle, M. (2020). Assessing public acceptance of the life cycle of CO2-based fuels: Does information make the difference?. Energy Policy, 143, 111586.

OpenAI (2023). Openai. Accessed on 30th June 2023.

Otten, S. and Ziefle, M. (2022). Exploring Trust Perceptions in the Medical Con- text: A Qualitative Approach to Outlining Determinants of Trust in AAL Tech- nology:. In Proceedings of the 8th International Conference on Information and Communication Technologies for Ageing Well and e-Health, pages 244–253, On- line Streaming, — Select a Country —. SCITEPRESS - Science and Technology Publications.

Otten, S. and Ziefle, M. (2022). Exploring Trust Perceptions in the Medical Context: A Qualitative Approach to Outlining Determinants of Trust in AAL Technology. In Proceedings of the 8th International Conference on Information and Communication Technologies for Ageing Well and e-Health, doi: 10.5220/0011058300003188

Otten, S.; Wilkowska, W.; Offermann, J. and Ziefle, M. (2023). Trust in and Acceptance of Video-based AAL Technologies. In Proceedings of the 9th International Conference on Information and Communication Technologies for Ageing Well and e-Health, 1, 126-134. Prague, Czech Republic. doi: 10.5220/0011785500003476

Padilla-López, J. R., Chaaraoui, A. A., & Flórez-Revuelta, F. (2014). Visual privacy by context: a level-based visualisation scheme. In Ubiquitous Computing and Ambient Intelligence. Personalisation and User Adapted Services: 8th International

Conference, UCAmI 2014, Belfast, UK, December 2-5, 2014. Proceedings 8 (pp. 333-336). Springer International Publishing.

Parasuraman, R., & Riley, V. (1997). Humans and automation: Use, misuse, disuse, abuse. Human factors, 39(2), 230-253.

Patterson, D. (1990). Introduction to artificial intelligence and expert systems. Prentice-Hall, Inc.

Peek, S. T., Luijkx, K. G., Rijnaard, M. D., Nieboer, M. E., van der Voort, C. S., Aarts, S., ... & van Hoof, J. (2016). Older adults' reasons for using technology while aging in place. Gerontology, 62(2), 226-237.

Peek, S. T.; Wouters, E. J.; Van Hoof, J.; Luijkx, K. G.; Boeije, H. R.; Vrijhoef, H. J. Factors influencing acceptance of technology for aging in place: a systematic review. Int. J. Med. Inform. **2014**, 83(4), 235–248.

Pollack, M. E. (2005). Intelligent technology for an aging population: The use of AI to assist elders with cognitive impairment. AI Magazine, 26(2), 9-9.

Povey, J., Mills, P. P. J. R., Dingwall, K. M., Lowell, A., Singer, J., Rotumah, D., ... & Nagel, T. (2016). Acceptability of mental health apps for Aboriginal and Torres Strait Islander Australians: a qualitative study. Journal of medical Internet research, 18(3), e65.

Rashidi, P., & Mihailidis, A. (2013). A survey on ambient-assisted living tools for older adults. IEEE Journal of Biomedical and Health Informatics, 17(3), 579-590. https://doi.org/10.1109/JBHI.2012.2234129

Ravi, S., Climent-Pérez, P., & Florez-Revuelta, F. (2021). A review on visual privacy preservation techniques for active and assisted living. arXiv:2112.09422.

Reeder, B., Meyer, E., Lazar, A., Chaudhuri, S., Thompson, H. J., Demiris, G., & Lee, J. (2013). Framing the evidence for health smart homes and home-based consumer health technologies as a public health intervention for independent aging:

A systematic review. International Journal of Medical Informatics, 82(7), 565-579. https://doi.org/10.1016/j.ijmedinf.2013.03.007

Released, I. (2016). IBM SPSS Statistics for Windows, Version 24.0. IBM Corp, Armonk, NY.

Schomakers, E. M., Offermann-van Heek, J., & Ziefle, M. (2018). Attitudes towards aging and the acceptance of ICT for aging in place. In Human Aspects of IT for the Aged Population. Acceptance, Communication and Participation: 4th International Conference, ITAP 2018, (pp. 149-169). Springer International Publishing.

Schomakers, E.-M., Biermann, H., and Ziefle, M. (2021). Users' preferences for smart home automation–investigating aspects of privacy and trust. Telematics and Informatics, 64:101689.

Schomakers, E. M., & Ziefle, M. (2023). Privacy vs. security: trade-offs in the acceptance of smart technologies for aging-in-place. International Journal of Human–Computer Interaction, 39(5), 1043-1058.

Shin, D. (2021). The effects of explainability and causability on perception, trust, and acceptance: Implications for explainable ai. International Journal of Human-Computer Studies, 146:102551.

Sipior, J. C. (2020). Considerations for development and use of AI in response to COVID-19. International Journal of Information Management, 55, 102170.

Sixsmith, J., Sixsmith, A., Fänge, A. M., Naumann, D., Kucsera, C. S. A. B. A., Tomsone, S., ... & Woolrych, R. (2014). Healthy ageing and home: The perspectives of very old people in five European countries. Social science & medicine, 106, 1-9.

Smith, H. J.; Dinev, T.; Xu, H. Information privacy research: an interdisciplinary review. MIS Quarterly. **2011**, 35(4), 989–1015

Steinke, F., Bading, N., Fritsch, T., & Simonsen, S. (2014). Factors influencing trust in ambient assisted living technology: A scenario-based analysis. Gerontechnology, 12(2), 81-100.

Steinke, F., Fritsch, T., Brem, D., & Simonsen, S. (2012, June). Requirement of AAL systems: older persons' trust in sensors and characteristics of AAL technologies. In Proceedings of the 5th International Conference on Pervasive Technologies Related to Assistive Environments (pp. 1-6).

Thompson, H. W., Mera, R., and Prasad, C. (1998). A description of the appro- priate use of student's t-test. Nutritional Neuroscience, 1(2):165–172. PMID: 27406022.

Tlili, A., Shehata, B., Adarkwah, M. A., Bozkurt, A., Hickey, D. T., Huang, R., and Agyemang, B. (2023). What if the devil is my guardian angel: ChatGPT as a case study of using chatbots in education. Smart Learning Environments, 10(1):15.

United Nations (2015). Sustainable Development Goals: Goal 3 Ensure healthy lives and promote well-being for all at all ages. https://www.un.org/sustainabledevelopment/health/ (last accessed on: 31/08/2023)

Vallor, S., & Ganesh, B. (2023). Artificial intelligence and the imperative of responsibility: Reconceiving AI governance as social care. In The Routledge Handbook of Philosophy of Responsibility (pp. 395-406). Routledge.

Van Heek, J., Himmel, S., & Ziefle, M. (2018). Living with disabilities–the many faces of smart home technology acceptance. In Information and Communication Technologies for Ageing Well and e-Health: Third International Conference, ICT4AWE 2017, Porto, Portugal, April 28-29, 2017, Revised Selected Papers 3 (pp. 21-45). Springer International Publishing.

Van Heek, J., Himmel, S., & Ziefle, M., a. (2017). Privacy, data security, and the acceptance of AAL-systems–a user-specific perspective. In Human Aspects of IT for the Aged Population. Aging, Design and User Experience: Third International Conference, ITAP 2017, Held as Part of HCI International 2017, Vancouver, BC, pp. 38-56). Springer International Publishing.

Van Heek, J., Himmel, S., & Ziefle, M., b. (2017). Helpful but Spooky? Acceptance of AAL-systems Contrasting User Groups with Focus on Disabilities and Care Needs. In ICT4AgeingWell (pp. 78-90).

Van Heek, J., Ziefle, M., & Himmel, S. (2018). Caregivers' Perspectives on Ambient Assisted Living Technologies in Professional Care Contexts. In *ICT4AWE* (pp. 37-48).

Venkatesh, V. and Morris, M. G. (2000). Why don't men ever stop to ask for directions? gender, social influence, and their role in technology acceptance and usage behavior. MIS quarterly, pages 115–139.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. MIS Quarterly, 27(3), 425-478. https://doi.org/10.2307/30036540

Vervier, L., Valdez, A. C., & Ziefle, M. (2018). " Should I Trust or Should I Go?" or What Makes Health-Related Websites Appear Trustworthy?-An Empirical Approach of Perceived Credibility of Digital Health Information and the Impact of User Diversity. In ICT4AWE (pp. 169-177).

Vervier, L., Valdez, A. C., & Ziefle, M. (2019). " Attitude"-mHealth Apps and Users' Insights: An Empirical Approach to Understand the Antecedents of Attitudes towards mHealth Applications. In ICT4AWE (pp. 213-221).

Watch, A. I. (2020). AI Uptake in Health and Healthcare, 2020.

Wen, J. and Wang, W. (2023). The future of ChatGPT in academic research and publishing: A commentary for clinical and translational medicine. Clinical and Translational Medicine, 13(3):e1207.

Westin, A. F. Privacy and Freedom, Atheneum: New York. 1967

Wilkowska, W., Heek, J., and Ziefle, M. (2021). User Acceptance of Lifelogging Technologies: The Power of Experience and Technological Self-Efficacy:. In Pro- ceedings of the 7th International Conference on Information and Communication Technologies for Ageing Well and e-Health, pages 26–35, Online Streaming, — Select a Country —. SCITEPRESS - Science and Technology Publications.

Wilkowska, W., Ziefle, M. (2019). Determinants of Trust in Acceptance of Medical Assistive Technologies. In: Bamidis, P., Ziefle, M., Maciaszek, L. (eds). ICT4AWE 2018. Communications in Computer and Information Science, 982. 45-65, Springer, Cham. https://doi.org/10.1007/978-3-030-15736-4_3

Woo, K., & Dowding, D. (2018). Factors Affecting the Acceptance of Telehealth Services by Heart Failure Patients: An Integrative Review. TELEMEDICINE AND E-HEALTH, 24(4), 292–300. https://doi.org/10.1089/tmj.2017.0080

Woo, K., & Dowding, D. W. (2020). Decision-making Factors Associated With Telehealth Adoption by Patients With Heart Failure at Home: A Qualitative Study. Computers, Informatics, Nursing : CIN, 38(4), 204—214-204—214. https://doi.org/10.1097/cin.0000000000000589

Yusif, S., Soar, J., & Hafeez-Baig, A. (2016). Older people, assistive technologies, and the barriers to adoption: A systematic review. International journal of medical informatics, 94, 112-116.

Zhang, Y., Liao, Q. V., and Bellamy, R. K. (2020). Effect of confidence and explanation on accuracy and trust calibration in ai-assisted decision making. In Proceedings of the 2020 conference on fairness, accountability, and transparency, pages 295–305.

Ziefle, M. and Maciaszek, L. A., editors (2020). Information and Communication Technologies for Ageing Well and e-Health: 5th International Conference, ICT4AWE 2019, Heraklion, Crete, Greece, May 2–4, 2019, Revised Selected Papers, volume 1219 of Communications in Computer and Information Science. Springer International Publishing, Cham.

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