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Informations- und Kommunikationstechnologien, Internet und smarte Technologien sind omnipräsent. Immer relevanter wird damit auch die Frage, welche Rolle diese Technik in Zeiten des demographischen Wandels spielen kann. Im Zuge der Veranstaltung SMARTER LIVES beschäftigen sich Forscher und Praxisvertreter aus Wirtschaft und Gesellschaft jährlich mit dem Thema „Innovative Lösungen für eine alternde Gesellschaft“.

Der Einsatz innovativer Technologien zur Unterstützung eines selbstbestimmten, aktiven, sicheren und sozial integrierten Lebens älterer Personen gewinnt im Zeitalter des demographischen Wandels zunehmend an Bedeutung. Dank der schnell voranschreitenden Neuerungen im Bereich intelligenter Informations- und Kommunikationstechnologien (IKT) aber auch aufgrund der Tatsache, dass kommende Generationen mit IKT aufwachsen, gibt es in der Zukunft zahlreiche Möglichkeiten für ältere Personen, in vielfältiger Weise von der Technik zu profitieren. Doch nicht nur zukünftige ältere Personen, sondern auch die heute über 65-Jährigen sind Zielgruppe dieser assistierenden und aktivierenden Technologien, die sich in Form von Produkten und Dienstleistungen in den Bereichen Sicherheit, Komfort, Gesundheit und soziale Interaktion bereits am Markt befinden.

Um das Bewusstsein über die Aktivitäten in diesem Bereich zu unterstützen steht im Zentrum des Interesses der Veranstaltung SMARTER LIVES der multidisziplinäre Austausch zu Erfahrungen und künftigen Ambitionen zur Entwicklung und Erforschung innovativer Technologien für ältere Personen. So wurden auch im Rahmen der Veranstaltung SMARTER LIVES 2016 mit vielfältigen Fach- und Praxisvorträgen relevante Themen rund um aktives Altern sowie Chancen und Risiken einer Technikunterstützten Umgebung interdisziplinär näher beleuchtet und anschließend diskutiert. Ausgewählte eingereichte Forschungsbeiträge werden im vorliegenden Tagungsband veröffentlicht. Eine Einreichung war in deutscher und englischer Sprache möglich.

Ziel ist es, dadurch zu der wissenschaftlichen Auseinandersetzung rund um das Themenfeld Active and Assisted Living (AAL) beizutragen und einen Austausch aus Sicht der Forschung, Wirtschaft und Gesellschaft anzuregen. So möchten wir die multidisziplinäre

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linäre Forschungsdiskussion um das aufstrebende und zukunftssträchtige Thema AAL unterstützen. Der Tagungsband lässt sich in drei inhaltliche Abschnitte aufteilen.

AAL Anwendungsszenarien

Der erste thematische Block bietet Raum für die Darstellung bereits vorhandener oder zukünftig denkbarer AAL Anwendungsszenarien. Die Inhalte der Beiträge reichen von der grundlegenden Darstellung relevanter Wirkungsfelder von AAL [1], über die Vorstellung konkreter AAL Produktideen [2], sowie bereits im Einsatz befindlicher Anwendungs- und Benachrichtigungsprozesse [3], bis hin zu der Evaluierung des Ansatzes einer Modellwohnung, die Assistenzsysteme der breiten Öffentlichkeit zugänglich macht [4]. Die Beiträge reichen darüber hinaus von diesen, bereits in der Praxis angewandten AAL-Produkten und Konzepten bis hin zu visionären, in der Zukunft liegenden Anwendungsgebieten [5].

Forschungsansätze und Methoden

Innerhalb des zweiten inhaltlichen Abschnitts behandeln die Beiträge Forschungs- und Evaluierungsmethoden im AAL-Kontext. Dabei ermöglichen diese Forschungsergebnisse interessierten Lesern aus existierenden und angewandten Methoden zu lernen. Beispielsweise werden Ansätze zur Optimierung softwarespezifischer Testmethoden skizziert [6]. Darüber hinaus werden einerseits Erkenntnisse spezifischer quantitativer Usability-Methoden im Zuge der Entwicklung einer Online Plattform [7], sowie andererseits Evaluierungsergebnisse aus qualitativen Methoden zum Einsatz eines Glukose-Monitoring Systems präsentiert [8]. Beide Beiträge zeigen an zwei unterschiedlichen Anwendungsfällen beispielhaft, welche Faktoren für eine hohe Gebrauchstauglichkeit von AAL Produkten relevant sind. Den Abschluss dieses Kapitels bildet eine Zusammenfassung der, in der Praxis von österreichischen AAL Projekten eingesetzten Methoden zur End-user Involvierung und nutzerzentrierten Designentwicklungsmethoden [9].

Nachhaltige Etablierung von „*Social Innovation*“ Initiativen

Im letzten Abschnitt der Publikation erfolgt die Vorstellung des „motivational value approach“ auf der einen Seite [10] und des „design science research“ Ansatzes auf der anderen Seite [11]. Beide Beiträge haben es zum Ziel, durch spezifische Forschungsansätze zu der Entwicklung einer zielgruppengerechten, nachhaltigen und digitalen Form der Nachbarschaftshilfe und des Ehrenamts beizutragen.

Danksagung

Wir bedanken uns bei allen Autoren für ihre wertvollen Beiträge und dem Programmkomitee für deren Bewertung zu den Einreichungen. Wir hoffen, dass die Auswahl der Beiträge für die einzelnen Leser eine interessante Übersicht zu AAL-relevanten Forschungs- und Entwicklungsmethoden sowie Anwendungsgebieten liefert.

Ein besonderes Dankeschön geht an das MCI Management Center Innsbruck für das Engagement und dem zur Verfügung stellen der Räumlichkeiten für die Veranstaltung SMARTER LIVES 2016, den Kollegen der Standortagentur Tirol für deren Beteiligung und Unterstützung für das Gelingen der Veranstaltung und allen voran an Andreas Hagn von der Universität Innsbruck als Projektmanager der Veranstaltung.

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Teil I:

AAL Anwendungsszenarien

Age-related Safety and Security – Developing a Novel Threat and Risk Model for Older Adults

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Personal safety and security are essential factors for quality of life. In an ageing society, Active and Assistive Living (AAL) technologies aim to improve safety and security of older adults. Yet, there is no holistic model on risks and threats, which older adults are exposed to. In order to tackle this issue, a literature research is conducted, providing a holistic view on factors in safety and security related to health, ability, crime and social environment. Based on the insight, a novel risk and threat model for older is postulated and verified against literature. Suggested potential applications of the model promote future social and technical innovation in AAL and related areas tailored to the safety and security needs of older adults.

1 Introduction

According to the OECD Better Life Index and the OECD Well-Being Indicators, personal safety and security are two central factors for the quality of life [1]. Against the background of an ageing society, Active and Assistive Living (AAL) technologies aim to improve the quality of life, especially for older adults [2]. There are numerous international scientific publications, statistics, reports and initiatives focusing on specific aspects of personal safety and security of older adults, ranging from health- and ability-related threats [3] [4] [5] over different crimes against them [6] [7] [8] [9] to the perception of and influences to safety and security in living environments [19]. Yet, there is currently no comprehensive model available, summarizing and structuring the numerous different threats to personal safety and security of older adults.

In order to tackle this shortcoming and to promote the development of tailored safety- and security-focused AAL solutions, this paper analyzes existing literature on threats to older adults, including a specific perspective on the influences of gender. Therefore, the literature studied includes reports on crime and statistics, threat analysis and risk assessment, considerations from urban sociology as well as medical and care studies. Based on this analysis, a novel risk and threat model is postulated, in order to highlight the

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complexity of safety and security in an ageing society, to be addressed by future innovation, especially in the field of AAL. The model will provide a holistic perspective on threats and risks to older adults, verified against existing research work, which to date is not available, resulting in a better understanding of older adults' needs and in fostering tailor-made AAL safety and security solution development.

Therefore, the current paper presents an analysis on the currently available literature, identifying gaps and overlaps (Section 2). Based on these findings, a novel model on age-related safety and security is proposed and verified against the analyzed literature (Section 3). In order to promote the uptake and employment of the model proposed, various possible applications are suggested (Section 4), before concluding this paper (Section 5).

2 Baseline Literature Analysis

In order to achieve a holistic view on potential threats to older adults, a literature analysis is conducted, bringing together different only partially overlapping strands of research. Considerations from the field of ageing, health, care and AAL provide the baseline for the analysis, elaborating on risks and hazards derived from age-related decline in abilities. Building atop, criminological research and reports are studied, identifying further security and safety risks to older adults. This second strand focuses primarily on crime and violence against older adults. Rounding out the multiple perspectives considered, essential inputs from urban sociology are considered, which are related to perception and geographical location, building on effects of common narratives of places as well as social ties and networks. For all three strands, important aspects to consider are that individuals experience of safety and security very different [3], and that older adults tend to develop a behavior of avoidance and cautiousness [6].

The process of ageing is a very individual process of change, resulting in decline of body functions which lead to an increase of vulnerability, morbidity and mortality of the organism [10]. This increase is related to diseases on one hand side and accidents on the other hand side [5]. The most common lethal illnesses are diseases of the heart, like myocardia infarct or heart insufficiency [5], strokes and chronic obstructive pulmonary disease (COPD) [11]. Furthermore, consequences of diabetes, high blood pressure and pulmonary diseases are of relevance [11]. Gender-based differences in prevalence of specific diseases is an important factor in personal health, as men are for example more likely to suffer from a heart attack [12]. As ageing is a very individual process, many external factors influence it as well. These are for example social status, based on income and educational background [13].

In contrast, accidents and personal hazards derive from a decline of mental and physical abilities [4], strongly linked to so called functional health [14]. Not only falls [15] and loss of orientation [4] are to be considered as risks for older adults, but also hazards related to forgetting, for example turning off electrical devices [4].

Considering violence and crime against older adults, two settings based on relationship between the victim and the offender have to be considered. While the first setting covers offenders unknown to the victim, the second requires an existing relationship between

them [6] [7] [8] [9]. An important misconception in this context is the idea of older adults, through credulity, naivety, isolation and weakness, becoming ideal and therefore most often affected victims for crime [7]. Quite in contrast, older adults are less or equal likely to be victimized than younger ones [6] [8] [9].

Criminal studies involving unknown offenders investigate into statistical evidence on different forms of crime against older adults. These studies cover violent crime like assault and robbery, property crime like theft, and financial crime like fraud [9]. A special focus is most commonly set on fear of crime in older adults [6] and prevention measures [9], addressing the subjective experience of safety and security [3]. From a gender perspective it should be noted, that there are specific crimes more likely to be committed against older women. Examples are handbag theft [6] as well as fraud based on pretending to be a long-lost relative [8].

Risks and threats deriving from existing relationships derive from physical abuse, psychological abuse, financial abuse or restriction of personal freedom [8], most commonly in domestic settings [9]. From a gender perspective, it should be noted that domestic violence is more likely to be directed towards women [6].

At the cross-section of these two research strands, violence in informal care settings is explored in the scientific discourse. The study from Hörl & Spannring [8] highlights the different aspects and manifestation of violence in care settings. There can be differentiated between intentional and unintentional forms of violence, respective direct assaults or forcing nutrition intake on one hand side and neglect or exploitation on the other hand side [6] [8]. An interesting observation to be considered is that roles of victim and offender may switch between the older adult and the caring relative [8]. An important gender aspect, especially in informal care settings, is the fact that primarily female relatives are caring for older adults [3]. The fact that women need care earlier and live longer is another not

eworthy gender aspect in care [14].

Besides actual safety and security threats also the perception of these two aspects [3] is a crucial factor and has to be considered, as it influences behavior of avoidance and cautiousness [6]. Especially the positive or negative correlation of peoples' perception of security with the statistical crime rates reveal serious challenges to be addressed primarily in urban areas. Based on a comprehensive quantitative analysis in eleven European cities, Van den Berg et al. for example conclude that the perception of safety usually doesn't reflect the actual security situation in cities [16]. Hence, as such divergences can have an impact on an individuals' quality of live, it is crucial to take into this issue into account for the proposed model.

3 Building an age-relate Safety and Security Model

Based on the literature analysis provide above, a novel holistic model is developed to depict safety and security risks and threats to older adults. The proposed model is built up in shells, starting at the core, the older adults own body, expanding to stepwise to the environment. A schematic illustration is given in Figure 1.

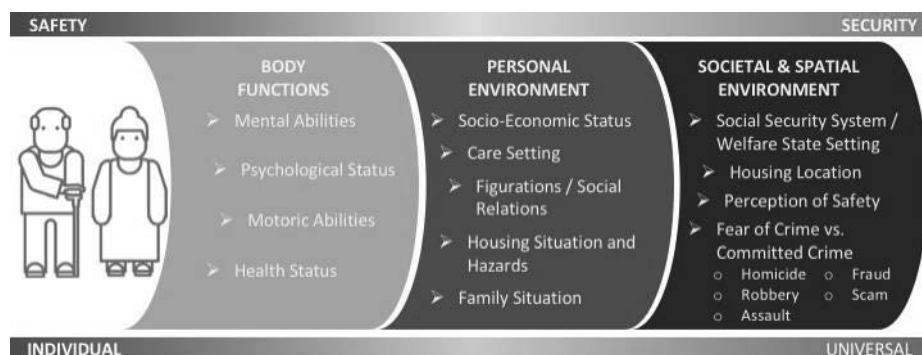


Fig. 1. Schematic illustration of the proposed threat and risk model for older adults.

The central part of the risk and threat model is formed by the older adult's body itself, declining in motoric skill and mental function. Health risks and accidents deriving from ageing are part of this inner shell. Stepping to the next shell, the personal environment of the older adult is in focus. This shell includes the socio-economic status, family, care and social settings as well as home hazards. Here, threats like domestic violence, being intentional or unintentional, exploitation, isolation and risks from the living environments are covered. The outer shell of the risk and threat model covers the full range of the societal and spatial environment. Here the general social security system, location and perception of safety and fear of crime compared to committed crimes (such as robbery, assault, fraud, scam as well as other criminal and violent acts against older adults) is essential.

When considering the shells of the model, two important factors are to be considered atop the actual risks and threats: first, going from the core towards the outer shell, risks become more universal. While the core, i.e. ageing and body functions, are highly individual, threats through societal and spatial aspects are almost universal to all older adults. Yet, this does not reflect the personal perception of risks and threats by the older adult. Secondly, the shells reflect different relation to needs in safety and security. While the inner shell is primarily driven by personal safety concerns, the importance of personal security risks is increasing when moving outward in the shells.

An interesting finding during the model building is that when dealing with the threats and risks for older adults, there is a possibility to connect them specifically to physical or psychological factors. While it is easy to associate risks to mental and body status in the inner shell and criminal victimization to physical or psychological approaches in the outer shell, the differentiation within the personal environment is not unambiguous. Most commonly, a mix of physical and psychological factors create threats and risks to the older adults.

Furthermore, perception of safety and security is an essential factor reflected by this model. For both the perception of safety as well as for security, the geographical location of a person plays a crucial role. Hence, the model needs to take into account whether a person is located in a rural area or in a small, mid-size or large city. Especially for urban areas, it is also the common narratives about places that needs to be taken into account.

Some places for example do have a bad reputation whereas others are considered as being a “good neighborhood” [17]. Urban researchers have shown that it is often the narratives which influence the perception of safety. Hence, a so called “bad neighborhood” does not necessarily have a higher crime rate nor does a “good neighborhoods” necessarily have a low crime rate [18].

Additionally, in close relation with the aspect of social space and physical place, the social ties and networks – or as N. Elias [19] called it – the figurations play a crucial role for the perceptions and manifestations of safety and security. The better a person is integrated into such networks, the more the person can count on reliable social relations that support him or her if needed, as reflected in the model.

4 Application of the Model

As the proposed model is created to be employed for various fields of application, this section provides an overview on potential assets deriving from a holistic view on age-related safety and security enabled by the proposed model.

First of all, risk analyses enable decision making for optimized care situations. Based on the proposed model, specific suggestions for care situations can be constructed in order to analyze existing care situations in view of safety aspects with respect to potential application of AAL solutions. These suggestions can be based on both individual and universal aspects such as psychological and physical constitution of an individual, a person’s environment or the overall exposure to criminal hazards. This also includes certain gender aspect mentioned in Section 2.

Furthermore, the model enables the sketching and analysis of specific threat scenarios and their frequency. Based on this, practical decisions on countermeasures through AAL technology can be conducted. The model also allows a more realistic estimation of threats and hazards and has the potential – in connection with existing scientific research – to allow a more realistic view on the target group, i.e. older adults and their needs in safety and security. As the literature analysis has shown, there is a misconception about the vulnerability of older adults to crime and violence against them. Thus, a more realistic view of this group can help in increasing age-related safety and security by specifying the actual risks and hazards. This is especially important in order to react and work against scaremongering which is often motivated by political or marked-based decisions. Finally, the model can also help developers of products and services to be aware of safety and security situations and interactions, which can lead to new or combined innovative AAL solutions, based on current shortcomings in technology provided.

5 Discussion and Outlook

The current paper provides a literature analysis and postulates a model to address safety and security of older adults, as the first of its kind providing a comprehensive and structured approach on illustrating risks and threats impacting their daily living. The novel approach presented, viewing safety and security from a holistic perspective, structuring it

in levels opens new chances for technical and social innovation in the field of AAL and other related areas, improving quality of life for the primary AAL stakeholders.

As the literature overview as well as our own experience from several projects in the fields of AAL, safety and security has shown the awareness especially on security related issues connected to older adults is often assessed in a wrong way or in some cases even neglected. The underestimation of security factors based on social abilities and circumstances as well as health related issues is a strong barrier to innovate appropriate concepts and services that better understand and fulfill the need of older adults. The risk and threat model for older adults proposed and verified in the current paper acts as an important contribution to the removal of these barriers, fostering future research and development. Furthermore, the provided applications of the model drive forward future scientific and implementation activities.

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