Adaptable Ambient Living Assistant

Collaborative Project

D1.1 Requirements list regarding the needs and preferences of the user groups

Published by the ALIAS Consortium

Version: 1.0

Date: 06/06/2011

Project Start Date: 1st July 2010

Project Duration: 36 Month

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Organisation name of lead contractor for this deliverable: **TUM-GSing – Partner 1**

WP1 Executive Summary	Reminder

- Preparation of requirements list regarding the needs and preferences of the user groups as input for other WPs:
  - Analysis of seniors tasks and activities and secondary analysis
  - Identification of possible interested user groups, specifying primary and secondary users
  - Methods
    - Development of questionnaire and interview guideline for elderly and relatives
    - Development of workshops with elderly people/relatives/companies
    - Implementation of workshops/interviews with elderly people/relatives
    - Implementation of questionnaire survey for relatives/companies
    - Literature research
  - Evaluation of the requirements from primary analysis
  - Colour psychology analyses
- Workshop details with concept and questionnaires

Document History:

Version	Author(s)	Date	Changes
0.1	TUM-GSING/Katharina Scheibl – Sandra Niedermeier	19-10-2010	Initial draft
0.2	YOUSE/Sebastian Glende	29/10/2010	Review, input of content and changes
0.3	pme Familienservice/Felicitas Kohl – Petra Dinckelacker	30/10/2010	
0.4	TUM-GSING/Katharina Scheibl – Sandra Niedermeier	20/11/2010	
0.5	TUM/Eric Bourguignon	22/02/2011	Review
0.6	Eurecom/Raphaël Troncy	14/04/2011	Major changes
	YOUSE/Sebastian Glende	21/04/2011	Review, input of content and changes
1.0	TUM-GSING/Katharina Scheibl – Susanne Ihsen	06/06/2011	Finalization

Deliverable Status

Dissemination Level of this deliverable	
PU	Public
Nature of this deliverable	
R	Report

Due date of deliverable	20/11/2010
Actual submission date	30/04/2011
Workpackage/Subtask	WP1/T1.1
Status	Draft version
Evidence of delivery	Public website: http://www.aal-alias.eu/ Concept for the workshop attached. Implementation of questionnaire, first YOUSE-workshop and preparation of the first requirement list. First PME workshop with relatives. Secondary analysis attached. Questionnaires attached.

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1. Abstract

This deliverable describes the inclusion of users and contains activities from all partners involved in WP1. It provides a first overview of progress in the process of user inclusion. In the secondary analysis, it identifies possible interested user groups. It describes the development of workshop concepts, the questionnaire as a first step for a useful requirement list, the needs and preferences of the user groups which was questioned. The current deliverable describes how the target group is composed, and how the requirements differ due to gender and social origin. It should be clear who is considered as the primary user of ALIAS, and what the relatives and care givers wish.

First workshops took place in Berlin (Germany) and first wishes from users were collected. There was a general interest in ALIAS, especially if ALIAS assist in household and communication, while he is friendly.
These first steps took place first in Germany due the consortium composition, but will soon follow in year two of the project in France and Austria.

Keywords: User inclusion, target groups, secondary analysis, workshop, questionnaires, interested user groups

2. Introduction

The work described here refers to D1.1. in the timeline from WP1 led by TUM-GSING. The overall goal is to establish a requirements list regarding the needs and preferences of the user groups as input for other WPs. The Task 1.1., Task 1.2. and Task.1.3. discover needs and preferences of the user groups. Task 1.1. and Task 1.2. aim at a final report on requirement lists, after the analysis of seniors tasks and activities with a secondary analysis to identify possible interested user groups including the development and implementation of questionnaires, workshops for elderly in September 2010 and relatives in november 2010. Partners involved in WP1 weekly follow the developments in the other WPs to identify potential fresh ideas that could relate to user inclusion.

This deliverable gives an overview, on how the target group is composed and who would be the primary users. The expressed requirements differ according to gender and social origins, which can be seen in the secondary analyze. In addition the wishes of family members, care givers and customers are also analyzed.

In the following, methods to specify secondary and primary users of ALIAS will be described besides a brief overview of the color question on the robot. In addition to a secondary analysis, which includes analysis of demographical data and data relevant for technical acceptance, social networking of elderly people and use of games in the target group over 60, details to the organized workshops and used questionnaires are given. Regarding this points, in an initial step, the minimum requirement by the robot should be recognizable.

Appendix content: The questionnaire workshop with elderly, the questionnaire workshop with relatives, customers, care givers, a requirement list from YOUSE and PME, the workshop guidelines, the case/personas members as guidance from PME.

After a first workshop at the end of September 2010 in Berlin with a questionnaire for elderly people, a first version of requirement list was available. A Secondary analysis is still in progress and includes demographical data and data relevant for technical acceptant, social networking of elderly people and use of games in the target group over 60. A second add-on workshop with elderly people was held in October 2010 and a third workshop with a questionnaire for relatives and informal care givers by PME was held at the beginning of November 2010 in Berlin. In the following, the findings are shortly described and the real versions could be found in the chapter 9.

The internal documents and methods used are:

- Questionnaires for elderly, questionnaires for relatives/care givers/customers
- Secondary analysis
- First requirement list from YOUSE was sent (06/10/2010)
- Second requirement list from pme and YOUSE (10/11/2010)
- Workshop Guidelines
- Case studies/personas of members

3. Workshops and Requirements

While it is still too early to precisely determine the requirements we continuously monitor the needs and preferences of the user groups.

YOUSE realized their first workshop aiming on the definition of requirements regarding ALIAS and gave a first version of the summarized results (06/10/2010) see chapter 5.1. In a next step, the feasibility and complexity of proposed functions has been discussed with the technical partners on 16th of November in Frankfurt. This discussion led to a reduced list of functions to be integrated into ALIAS. This discussion was finalised at the Berlin technical Meeting on January 27. The list is a key element of D1.2.

3.1 First Analysis

In the following, the questionnaires for the elderly and members are described and the detailed findings after a first workshop with elderly.

3.1.1 Description of Workshops and Participants

The first workshop with potential users of the robot was planned from 2:00 p.m. to 6:00 p.m. on the 30th of September 2010 in Berlin (YOUSE). Because of the higher age of the user group (mean age: 73), we planned regularly breaks during the workshop. There were ten participants that first brainstormed to expressed desire requirements of the robot by leading to suggestions made videos and saw what they expected from a robot. They were aged between 67 and 83 years old, six men and three women. The median age was 72 years old. A detailed description of the workshops attendees is in the evaluation below.

The second workshop focused on mobility of seniors and functions that might support mobility. It also was planned to discuss open questions raised in workshop one. The workshop took place on the 13th of October in Berlin (YOUSE). 11 participants aged between 54 and 79 years were involved, seven of those female. A big portion of the attendees has already been part of workshop one and was therefore more familiar with the topics.

A list of the timing and content of implementation of the first workshop is presented in chapter 6. A moderator led the participants through the workshop and also time for discussion was taken in account.

3.1.2 Description of the Questionnaires

Questionnaires were used in the workshops of 30th of September 2010 and 10th of November 2010, in order to include users and family members, potential clients and caregivers. The questionnaire was used to survey the members, contains questions about home environment, dealing with new communication media and detailed robot functions. The questionnaire was designed so that it could be answered in a maximum of ten minutes. Ten people of the target group were there interviewed. The questionnaire that was used on the survey of members includes 21 questions about health, daily activities, new communication media and the robot. It also contains questions about the urban/rural divide. Completing the questionnaire was set with a processing time of five till ten minutes on 10th November 2010 in the workshop of pme. Present were 11 people.
Both questionnaires are provided in the appendix (chapter 6 & 7).

3.1.3 YOUSE Workshop Questionnaire and Results

The results of the first questionnaire used in the workshop of YOUSE showed the following interesting findings:
The participants appreciated their health generally good to very good. Nevertheless, almost all respondents indicated that they have already physical disabilities. The following table shows the referred physical limitations:

Table 1: Type of physical limitations

Hearing loss
Memory deficits, awkwardness
Spinal disorders, high blood pressure
Diabetes mellitus II
Hip osteoarthritis
Diabetes
Knee osteoarthritis, meniscus symptoms
Diabetes

The majority of respondents indicated that they deal with technology rather easily. Here is certainly to be taken into account that the sample encloses only three women and all participants are well-educated, which means most of them did complete an university degree (70 %) and all of them have at least attended the secondary school. 8 of 10 respondents said that they already have experience with the Internet. The following table shows on what occasions they mainly use the Internet:

Table 2: Experience of elderly with the Internet

Good information about areas of interest through search engines, comfortable handling of bank transactions, good and fast communication through e-mails.
Use for research, therefore it's good.
For me, 80% info on the history, knowledge of many mining areas, contact with friends and like-minded people (e.g.?).
Informative, helpful, work saving (bank?)
Programs have been improved and more user-friendly, but there are a plethora of additional programs (free of charge and costs), without evident goals.
E-Mailing o.k., Internet search is often fraught with problems, even on accurate input options 100 000.
Use for communication, Information about events, destinations, route planner, some difficulties with attachments from e-mails/pictures.
Good experiences, you can look up a lot, play games, write e-mails etc.

So far the seniors made little experience with social networks. Only two respondents indicated that they use platforms like "facebook" and "stay friends" sometimes. Overall, it appears to be the case that the seniors are very open minded in new communications media. They will learn new technologies. The elderly are more modest on compared a robot. As the following table shows, workshops participants are skeptical in using a robot:

Table 3: Can you imagine using a robot that can help you in everyday life?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very	1	10,0	10,0	10,0
	some	1	10,0	10,0	20,0
	rather	2	20,0	20,0	40,0
	rather not	3	30,0	30,0	70,0
	not	2	20,0	20,0	90,0
	not at all	1	10,0	10,0	100,0
	Total	10	100,0	100,0	

However, the reason probably is that they still are physically fit and live without assistance. Other questions about the robot showed that they are not as skeptical as first thought. Only two of the participants feel observed if the robot would be in the same room with them. Also they do not feel disturbed, if the robot would be driving to its charging station.

The next table shows that most respondents prefer medium speed of the robot, when we ask, if they are afraid about some of these speeds. However it became obvious that the seniors are afraid of a too fast driving of the robot. 8 of 10 seniors share this concern.

Table 4: Which travelling speed of the robot do you prefer?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No matter	2	20,0	20,0	20,0
	medium	7	70,0	70,0	90,0
	slow	1	10,0	10,0	100,0
	Total	10	100,0	100,0	

Table 5 shows that the majority of the respondents prefer if the robot came close to support. Three of them prefer that the robot came rather close.

Table 5: Suppose the robot moves to you to help you (for example, when you measure blood pressure). How close should the robot drive up to you?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	rather close	3	30,0	33,3	33,3
	close	5	50,0	55,6	88,9
	very close	1	10,0	11,1	100,0
	Total	9	90,0	100,0	
Missing	no responds	1	10,0		
Total		10	100,0		

The survey has been found that most of seniors prefer a natural voice rather than an artificial voice. The comments of elderly highlighted however, that the type of voice is not the decisive factor. For them, understanding the robot easily is more important as well as a warm and friendly voice of the robot. The preferences in the gender of the voice are shown in table 6:

Table 6: Which color of the robot's voice would you prefer?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No matter	3	30,0	37,5	37,5
	Male voice	4	40,0	50,0	87,5
	Female voice	1	10,0	12,5	100,0
	Total	8	80,0	100,0	
Missing	No responds	2	20,0		
Total		10	100,0		

Operating the robot is an important topic for seniors. All are willing to accept and learn a small number of voice commands controlling the robot. They are also open minded participating in user trainings. If a fault occurs, the elderly prefer to continue the control of the robot by voice control as shown in Table 7. One participant of the workshop at Youse notes that the best praxis creates the possibility of switching between voice and keyboard control at any time.

Table 7: The robot understands not even a command from you. How do you want to continue the control of the robot?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Other	1	10,0	11,1	11,1
	Keyboard control	2	20,0	22,2	33,3
	Repeat voice command	6	60,0	66,7	100,0
	Total	9	90,0	100,0	
Missing	No responds	1	10,0		
Total		10	100,0		

It should be noted yet: people who filled out the questionnaire are well formed. Most of them did complete an university degree (70 %) and all of them have at least attended the secondary school. Three of the respondents live alone; all others live in a partnership. Probable in such families the robot will be used from more than one person.

Finally, respondents expressed criticism and their fears about developing the robot. A statement of an elderly: “I still see the problems that robots can also lead to isolation, instead of serving the communication”.

A requirement list from the workshop of pme is attached; further results would be communicated in D1.2.

3.2 Target Groups

During 2009/2010 YOUSE conducted a research study on barriers that avoid the market penetration of Ambient Assisted Living (AAL) technologies, products and systems. Parts from that study have been taken into account and reanalysed for ALIAS, since both projects aim on comparable markets.

Most important findings refer to the groups of potential stakeholders that influence success of ALIAS. These groups are described as personas. The groups are divided into seven categories with a total of 24 subgroups (Glende et al. 2011). YOUSE developed a set of persona cards (not part of ALIAS) that describe every target group in detail. These cards can be used also in the ALIAS project:

Category 1 – End Users

- Younger persons with chronic diseases
- Healthy early adopters
- Elderly persons with chronic diseases
- Persons in assisted accommodations
- Bored elderly persons with demential (and other) diseases
- Demanding/discerning “young” seniors

Category 2 – Social Support Networks

- Working and caregiving family members
- Helpful neighbours

Category 3 – Medical Networks

- Ambulant health workers
- Medical practitioners
- Telemedicine centres
- Staff nurses
- Business-management of hospitals

Category 4 – Service Providers and Product Manufacturers

- In-house emergency call providers
- Manufacturers of AAL-systems
- Service technicians
- Security agencies
- Educational institutions

- Caregiver consultancies
- Trade chains of electronic products

Category 5 – Domestic Building Services

- Housing societies
- Caretaker of houses/apartment complexes

Category 6 – Sponsoring bodies/financial backers

- Social insurances (health insurance, care insurance, annuity insurance)

Category 7 – Politics and legislative bodies

- European parliament; national parliaments; government departments

3.3 Secondary Analysis

In the second analysis, demographical data and data relevant for technical acceptance, social networking of elderly people and use of games in the target group 60+ was included e.g. from the “Deutscher Alterssurvey”, (N)ONLINER Atlas 2010 or DESTATIS.

A closer look to results of previous research shows that there is a heterogeneous picture of elderly people. There is a general trend of an older society, which will shrink in 2050 from the current 82.4 to 75 million members in Germany. There are more people of retirement age compared with significantly less working people. There will be twice more 60-years-old as newborns by 2050.

Although prevailing uncertainty and lack of understanding in technical aspects, a remarkable increase in Internet usage is recorded amongst the seniors. The so-called "silver surfers", which encompasses persons over 50, are increasingly accessing into the Internet. There is a growing number of elderly using social networks like www.feierabend.de. The preferred and most attractive online applications for the generation 60+ continues to send e-mails and receive general information, search for travel information or health issues. Regarding social networks and video portals, facebook and YouTube are most visited. Nevertheless “the digital outsiders" are still the largest and with a mean age of 62.4 years, the oldest group in Germany according to http://www.nonliner-atlas.de.

There is a general change of intergenerational support within the family. Given the large geographical distances between family generations and the decreasing participation rates

of caring women, who in previous generations took care of the elderly, it would be difficult in future, to maintain support services by family members. An important issue in the secondary analysis is the need for care. In 2030 there would be about three million people in need of care according to extrapolations of the Statistical Federal Ministry.
A detailed report on this fact with further literature and a clear summary to all partners is appended to this report.

There are five types of users presented in the secondary analyze to make clear who is primary and who is secondary user in the sense of the project (http://www.aal-alias.eu). As a primary user, persons who are technical affine and in good physical conditions are meant, as a secondary user, persons with real physical limitations and less technical use are meant. For details see chapter 9.1.

3.4 Color design of the robot

Colors are attached to human feelings and so the color of the robot is not self-evident. Emotions are strongly associated with colors (see figure 1). Some colors are age, gender and educational sensitive while others are not. So Red, Yellow and Orange are perceived more negatively by men than by women, blue is viewed as more emotionally “active” by men. Black is viewed more positively by men than by women (see Harrington L. & Lechner A).

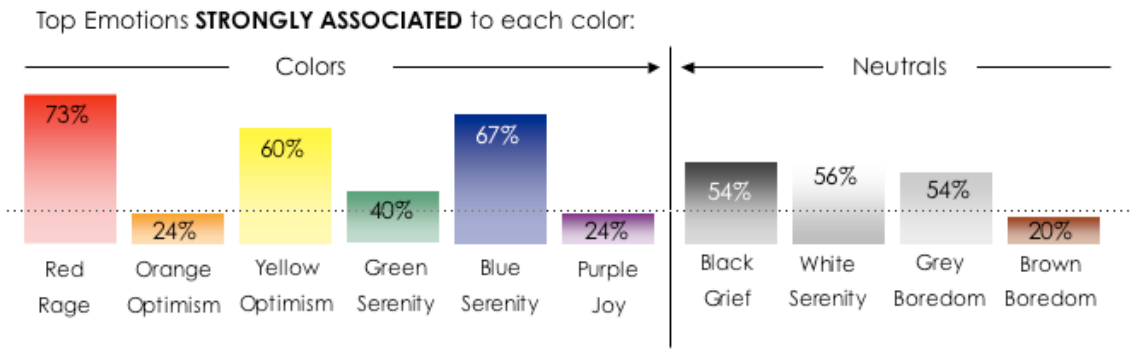

Figure 1: From Harrington L. & Lechner A. (2005); Colour Marketing Group Conference, USA

After research in colour psychology referring to elderly we suggest the following variants for the pilot:
light beige:
#f1e5bf

white:

#ffffff

dark blue

#002a72

We recommend the first one (light beige #f1e5bf) based on a neutral color.

4. Conclusion

This document lists an overview of the activities related to user inclusion. The next step is the implementation and a final report on requirement lists and a list of selected functions depending on completion of concepts by other partners in future (deliverable D1.2. task 1.4, M8). After the development and implementation of workshops, questionnaires and interviews the evaluation of the requirements. Main results concerning user inclusion will be reported and the requirement list will be updated to the other partners and WPs. In the following reports WP1 will provide additional details about ongoing and future ideas and results regarding user needs and preferences.

5. Appendix A – Requirement Lists of the Workshops

5.1 Requirement List from YOUSE

A) Categories and functions

A1) Secretary/Administration (Relevance „very high“)

- Reading support functions
  - scan and read out function
  - read out function for audio books
  - magnification of pictures and texts
  - translation of texts and user manuals
- Memory and reminder functions
  - Alarm clock for drugs and drinking
  - Reminder for birthdays, appointments, thinks not to forget and legal affairs (cancellation of contracts etc.)
  - Preparation of shopping list (e.g. with selected standard products and a reminder for possibly wanted specific products; preparation of shopping list regarding selected meals)
  - Opportunity to create reminders by different users (medical practitioner, relatives)
- Administrative functions
  - Filling contracts by speech
  - Tax computation

A2) Physical support (relevance „average“)

- Lift and carrier
  - Carriage basket
  - Storage/deposit space for heavy objects
- Handhold/walking frame
  - Handlebars for standing up and to hold on
  - Handlebars to hold on when showering (ALIAS needs to be waterproof)
  - Walking frame function
  - Foldable shelf to step on and be carried by ALIAS
- Cleaning functions
  - Vacuum cleaner (it might be difficult to clean up into narrow spaces)

A3) Device control and security (Relevance „average“)

- Speech control of household devices
  - Climate control (integration of air condition, heating, marquees or sunblinds)
  - Light control
  - Interval timer function
  - Smart grid (control of devices depending on electricity tariffs)
  - Speech control of other, complex and difficult to use devices (e.g. DVD-recorder; compatibility might be an issue)

- Surveillance of house/apartment
    - Burglar alarm
    - Surveillance of electric devices
    - Monitoring of inhabitants (surveillance of accidents etc.)

A4) Healthy living and health status surveillance (Relevance „average“)

- Motivation to live healthy
    - Recommendation of sports activities and contacts to training partners
    - Support with rehabilitation and sport exercises
- Health monitoring
    - Integration/connection to telemedicine devices
    - Emergency alarm
    - Measuring of health status (e.g. for diabetics)
    - Storage of health history and status (Important: data security and privacy)
- Video based communication with telemedicine center or medical practitioner
- Information on health topics
    - Information on drugs
    - Information on prevention and identification of diseases
- Organizational support of care
    - Scheduling with several different caregivers
    - Video based communication with caregivers
- Quality of sleep/falling asleep
    - Read out function
    - Music player

A5) Leisure and hobbies (Relevance „average“)

- Information on cultural and leisure events
    - Concerts
    - Theatres/plays
    - Museums
    - Connection to people with similar interests
- Advanced, speech based search function
- Cooking support functions
    - Receipts/interactive cooking
- Learning/teaching functions
    - Language training/coaching
    - Coaching on new high-tech devices (interactive user manuals)
    - Building and maintenance of technical devices and household
    - Plant care
- Virtual travelling
    - Multimedia-based information on holiday destinations (language, currency, health, food etc.; e.g. by usage of other web contents like Wikipedia)
    - Multimedia-based information on other cultures
    - Preparation of travels and vacations

- TV on demand
  - Sports entertainment
  - Infotainment
- Music
  - Listen to, buy and make music
- Gaming
  - Mentally challenging online-games (e.g. chess, cards)
  - Brain teasers
  - Sports games a la Wii, that help to train balance and coordination
  - Sing function/training (singing together with ALIAS, evaluation of singing, karaoke)
  - Games which can be played by young and old people together

A6) Communication (Relevance „average“)

- Telephone
- Contact building and motivation
  - Whom to call if you can´t sleep?
  - Who has similar health issues?
  - Who has similar interests?
- E-mail photos
- Easy-to-use contact list
- Support of intergenerational communication (e.g. with grandchildren; encouraged by playful elements)
- Encouragement of visits of grandchildren etc. by functions/games, that can be used by seniors and kids at the same time
- Communication with other services
  - Shopping services
  - Cleaning services

B) Usability and Design

- Application of handlebars to hold on
- Foldable seat
- Carriage basket and deposit space for heavy objects
- Flexible, adjustable display to be used by people with different body heights (applied on a flexible arm)
- Smaller size for narrow environments
- Customizable color; use of muted colors
- Importance of ports, connectors, sockets and card readers (Bluetooth, USB, reader for electronic health card, scanner with easy-to-use feeder)
- Use of ALIAS should be possible in not-barrier-free environments

Data input for users has to be very easy to use and speech based

5.2 Requirement List from PME and YOUSE after 2nd & 3rd Workshops

Secretary/Administration (Relevance non-valued)

Reading support functions

- scan and read out function (e.g. mail, newspapers, books, TV-magazines etc.)
- read out function for news

Writing support functions

- function for writing letters
- function for writing and adding shopping lists

Memory and reminder functions

- Alarm clock for drugs
- Alarm clock for drinking
- Alarm clock for eating
- Reminder for birthdays, appointments, thinks not to forget and legal affairs (e.g. cancellation of contracts etc.)
- Preparation of shopping list (e.g. with selected standard products and a reminder for possibly wanted specific products; preparation of shopping list regarding selected meals)
- Opportunity to create reminders by different users (medical practitioner, relatives)
- Reminder for body care (e.g. shaving or showering)
- Alarm clock for awakening

Physical support (Relevance „average“)

Lift and carrier

- Getting and bringing things Handhold/walking frame
- Walking frame function (for example as a height-adjustable rail to hold on)

Surveillance of inventories

- Device control and security (Relevance „average“)

Control of household devices by speech (or by touchscreen)

- Speech control of other, complex and difficult to use devices (e.g. DVD-recorder; compatibility might be an issue)
- Remote controlled opening of the door

Surveillance of house/apartment

- Burglar alarm
- Smoke detectors and fire extinguishers (e.g. inside the robot)
- Water detector
- Surveillance of electric devices
- Monitoring of inhabitants (surveillance of accidents etc.)
- Looking for the senior by video link in the apartment (taking a look around with

the eyes of the robot, giving it instructions to move to designated locations)

Warning against tripping hazards like carpets Light source for ground lighting in the night and gentle night light Acoustic amplification (e. g. for bells)

Healthy living and health status surveillance (Relevance non-valued)

Motivation to live healthy

- Recommendation of sports activities and contacts to training partners
- Support with rehabilitation and sport exercises (e.g. by giving instructions for early-morning exercise)

Health monitoring

- Integration/connection to telemedicine devices
- Emergency alarm
- Measuring of health status (e.g. for diabetics)
- Storage of important personal and health information (e. g. diseases, passwords, or who has a spare key for the apartment etc.)

Organizational support of care

- Scheduling with several different caregivers
- Video based communication with caregivers

Leisure and hobbies (Relevance „low“)

Specific Information on the living environment

- Shopping facilities
- Bargain advertising
- Events

Learning/teaching functions

- Coaching on new high-tech devices (interactive user manuals)

Healthy living and health status surveillance (Relevance non-valued)

TV on demand

- Entertainment broadcasts
- Easy possibility to record a running TV program and to play it time-displaced

Music

- Listen to, buy and make music

Gaming

- Sing function/training (singing together with ALIAS, evaluation of singing, karaoke)
- Games which can be played by young and old people together

- Replacing missing game-partners

Weather prediction

- Temperature, rain probability etc.
- Tips for appropriate clothing for weather

Receiving and performing tips for entertainment from relatives

- Photos and pictures
- Audio books
- TV-shows

Communication (Relevance “high“)

(Video-)Telephone Contact building and motivation

- Getting information what friends or relatives do or experience

Easy-to-use contact list

- Contact via photo

USABILITY AND DESIGN (Relevance “average“)

Application of handlebars to hold on

Flexible, adjustable display to be used be people with different body heights (applied on a flexible arm)

- Possibility to control the touch screen in sit and lie

Sharing the screen to see themself and the other one

Simple situational choice between voice control and touch screen control

Ensure the deactivation

Simple and intuitive operation

- Highlighting of the most important control elements

Adaption to individual requirements depending on the clinical picture and the level of care

- Individual adaptability of the degree of assistance (just aiding as much as it is necessary or requested by the senior)

Stepwise addition of new functions based on individual needs and interests

- leading careful to the operation
- repeating the steps of operation
- Giving feedback, whether order was understood or not

Remote configuration of functions and calendar events Individual determination of access privileges

CHARACTER (Relevance non-valued)

Humanoid face Independent perception and recognition of the user

- Making and maintaining eye contact

Choice between female and male voices e.g. the voices of celebrities

Calming the senior down

“Being a friend“ – ALIAS should:

- be loyal and gentle , take a joke (e.g. reading out the joke or the motto of the day)
- say welcome to the senior and his visitors
- say “good morning“ “good night“, “you are welcome“ and “thank you“
- announce date and day
- be authentic
- make offers e. g. “Would you like to go for a walk?“
- ask for rituals e. g. “Should the light stay on today?“
- not only give yes/no – answers

6. Appendix B – Workshop Guidelines

Table 8: Workshop Guideline

Timeline	Objectives	Method	Social form
till 2:00 p.m.	Create **atmosphere**	**Moderators:** check off list of participants, hand out name tags, welcome pack (?) **Moderators**: participants welcome, Smalltalk, final preparations	Plenary
2:00-3:00 p.m.	**Introduction** by the Moderator	**Moderator** welcomed the seniors - expresses gratitude for the participation - short presentation of the present moderators and himself (personally and professionally) - planned procedure: what will happen today (agenda/breaks)	Plenary
	Presentation of ALIAS	**Moderator** presents the project - stresses the importance of the participants for the project - targets, leads up to the task - gives instructions to the survey	Plenary
	Game rules are presented by the moderator	Transition: There are no bad ideas (to take over the fear of some elderly to make a mistake, for example by an anecdote, which was a spontaneous idea of a ground-breaking invention), participants are principals, clarifying that all participants agree to these rules.	Plenary
	6-3-5 Method Requirements of the elderly in everyday life, problems of coping	„**6-3-5 Method**“ - **Moderator** introduces the prepared various questions on the flipchart - distribute prepared paper and pens - Task: What tasks are the elderly compared with in everyday life? - How could they be supported by the robot?	Individual & group processing
3:00-3:45 p.m.	**Presentation and discussion of the results by the Moderator**	**Moderator** presents the ideas of the seniors - pushes the discussion about the topic	Plenary (Brainstorming and discussion)
	Definition of demand categories	**Moderator** summarizes what has been said - provides questions/clarifies misunderstandings	Plenary
3:45-4:00 p.m.	Break: “coffee and cake“		

4:00-4:15 p.m.	**Future scenario – Presentation of the robot in detail**	Presentation of the robot and possible functions of the facilitator	Plenary
4:15-4:45 p.m.	**Future scenario – Creative Technology** Identification of possible robot functions	**Moderator**: Example: My idea of life with the robot in 2020; Question: "Put yourself in the year 2020 and let your creativity run wild! How do you envision the use of the robot from the future? What features should have the robot? What comes as a future vision of the robot in the head? Do not pay attention to current technical limitations! What do you want? "Think about the possib Detailed concept ility of what until then everything could have changed (in their life and changing technical possibilities). Maybe there are great new technologies, media, communications, etc.	Individual & group processing
4:45-5:15 p.m.	**Presentation and discussion of the results by the Moderator**	Presentation and discussion of results, prioritization	Plenary (Brainstorming and discussion)
5:15-5:45 p.m.	**Survey**	Written replies to the questionnaire	Individual processing
5:45-6:00 p.m.	**Final round**/outlook	**Moderator**: Summary and way forward	Plenary

7. Appendix C – Questionnaire Workshop Elderly

Dear Sirs or Madam,

We want to discover if robots have the potential to support and enrich the life of elderly. The aim of the project ALIAS is the development of a mobile robot system for an older user group, to support in daily life and to promote communication and social integration.[1]

It will take approximately 10 to 15 minutes processing this questionnaire.

Thank you for your attendance!

Protection of data privacy:

Your information will be kept confidential and not disclosed to third parties. The data is stored and analyzed. Conclusions on your person are not possible.

1. How would you rate your health?

   not well ☐ ☐ ☐ ☐ ☐ ☐ very well

2. Do you have physical restrictions (such as hardness of hearing, diabetes mellitus, etc.)?

   ☐ no ☐ yes, namely: _____

   _____

3. Do you make activities with friends or acquaintances?

   not at all ☐ ☐ ☐ ☐ ☐ ☐ regulary

4. What technical equipment do you use in everyday life? (several answers possible)

   ☐ TV ☐ Game console/Wii or Nintendo
   ☐ Computer ☐ Route guidance system
   ☐ Photo camera ☐ Video camera
   ☐ Mobile phone ☐ other equipment _____

   _____

5. Do you easily deal with technology?

   not at all ☐ ☐ ☐ ☐ ☐ ☐ really easy

[1] The research project ALIAS is sponsored by the Federal Ministry of Education and Research under the Ambient Assistant Living (AAL) Joint Programme.

6. Do you use the Internet?

   not at all ☐ ☐ ☐ ☐ ☐ ☐ regulary

   If you do <u>not</u> use the Internet, please go to question 9.

7. Please describe your experience with the Internet:

   _____

   _____

   _____

8. If you use the Internet, do you have experience with social networks (Facebook, Xing, etc.) on the Internet?

   ☐ no ☐ yes, namely: _____

   _____

Questions regarding the operation of the robot:

9. Can you imagine, (as shown in the video) to use a robot that helps you in everyday life?

   not at all ☐ ☐ ☐ ☐ ☐ ☐ very

10. Do you feel observed, when a robot (as seen in the video) is in the room?

    not at all ☐ ☐ ☐ ☐ ☐ ☐ very

11. You sit on a sofa or chair and read the paper (like seen in the video). The robot has to charging station and passes in front of you. Did you feel this unpleasant?

    not at all ☐ ☐ ☐ ☐ ☐ ☐ very

12. Which speed of the robot do you prefer?

    ☐ slowly ☐ medium ☐ quickly ☐ no matter

13. Which speed makes you afraid?

☐ none ☐ slowly ☐ medium ☐ quickly

14. Suppose the robot moves to you to help you (for example, when you measure blood pressure). How close should the robot drive up to you?

very near ☐ ☐ ☐ ☐ ☐ ☐ very far

15. The robot has voice control. What voice do you prefer if the robot is talking to you?

☐ Natural voice ☐ synthetic voice ☐ no matter

☐ Other_____

16. Which voice color of the robot do you prefer?

☐ Female voice ☐ male voice ☐ no matter

17. Are you ready to learn a small number of commands (voice commands) to control the robot can?

not at all ☐ ☐ ☐ ☐ ☐ ☐ in any case

18. Are you willing to undergo a short training session so that the robot learns to recognize your voice?

not at all ☐ ☐ ☐ ☐ ☐ ☐ in any case

19. The robot understands not even a command from you. How do you want to continue the control of the robot?

☐ Repeat voice command ☐ Operation by keyboard ☐ no matter

☐ Other _____

Socio-demographic data

20. Sex: ☐ female ☐ male

21. Date of Birth: 19 ☐

22. What school did you attend?

☐ elementary school ☐ middle school
☐ graduation from high school ☐ college/university

23. How many people live in your household?

☐ i'm living alone ☐ two persons
☐ three persons ☐ more than four persons

24. Do you have any comments, requests or suggestions regarding the development of the robot?

_____

_____

_____

_____

_____

Thank you for your cooperation.

8. Appendix D – Questionnaire Workshop Relatives, Customers and Care givers

Dear Sir or Madam,

We want to discover if robots have the potential to support and enrich the life of elderly. The aim of the project ALIAS is the development of a mobile robot system for an older user group, to support in daily life and to promote communication and social integration.[2]

It will take approximately 5 to 10 minutes processing this questionnaire.

Thank you for your attendance!

Protection of data privacy:

Your information will be kept confidential and not disclosed to third parties. The data is stored and analyzed. Conclusions on your person are not possible.

1. Does your family member[3] have physical restrictions (such as hardness of hearing, diabetes mellitus, etc.)?

   ☐ no ☐ yes, namely: _____

   _____

2. Does your family member make activities with friends, and family?

   not at all ☐ ☐ ☐ ☐ ☐ ☐ regularly

3. In everyday life, what technical devices use your family member? (several answers possible)

   ☐ TV ☐ Game console/Wii or Nintendo
   ☐ Computer ☐ Route guidance system
   ☐ Camera ☐ Video camera
   ☐ Garden tools ☐ Kitchen applications
   ☐ Mobile phone ☐ Other equipment _____

4. Does your family member deal easily with technology?

   not at all ☐ ☐ ☐ ☐ ☐ ☐ very easy

[2] The research project ALIAS is sponsored by the Federal Ministry of Education and Research under the Ambient Assistant Living (AAL) Joint Programme.

[3] With "family" there are family members, maintained by you, friends, acquaintances or neighbors meant. If you are a caregiver, your patients are meant.

5. Does your family member use the Internet?

not at all ☐ ☐ ☐ ☐ ☐ ☐ regularly

If your family member does <u>not</u> use the Internet, please go to question 10.

6. Does your family member write e-mails?

Not at all ☐ ☐ ☐ ☐ ☐ ☐ daily

7. If your family member is using the Internet, does he/she have experience with social networks (such as Facebook, Xing, etc.)?

☐ No ☐ Yes, namely: _____

8. Which websites, portals and search engines use your family member?

☐ Social networks, e.g._____ ☐ Video portals, e.g._____

☐ Search engines, e.g._____ ☐ Sites for elderly, e.g._____

☐ Dictionaries, e.g._____ ☐ Shopping sites, e.g._____

☐ Online banking ☐ Photo file sharing, e.g._____

☐ City portals ☐ others, e.g._____

9. Could you imagine that your family member use platforms to communicate with friends and family in future (e.g. for the exchange of photos)?

☐ No ☐ Yes, namely: _____

_____

10. Could you imagine that your family members use a robot for assistance in everyday life (e.g. memorizing the medication)?

Not at all ☐ ☐ ☐ ☐ ☐ ☐ Very good

11. In your opinion, what should a robotic be able to do (e.g. instructions for exercises for movement, the possibility of keeping in contact with you)?

_____

_____

12. Can you imagine that your family member use a video phone to stay in touch with you?

☐ Yes ☐ No, because: _____

13. a) Can you imagine that the health of your family member is continuously recorded?

☐ Yes ☐ No

13. b) Can you imagine that an automatic transfer of the health status to the treating physician?

☐ Yes ☐ No

Socio-demographic data

14. Your sex: ☐ female ☐ male
15. Your birth year: 19 ☐
16. Sex of your **family member:** ☐ female ☐ male
17. Birth year of your **family member:** 19 ☐
18. Your living environment:

☐ City/city area ☐ rural area

19. Living environment of your **family member**:

☐ City/city area ☐ rural area

20. Your professional background: _____
21. Professional background of your **family member**:_____
22. Number of supervised **familiy members**: ☐

Thank you very much for your cooperation.

9. Appendix E – Secondary Analysis

9.1 Introduction

The following analysis is used to determine a target group in the project ALIAS and therefore the background of demographic change, primarily in Germany, would be considered. The analysis includes the acceptance of technology, social networks and games in the 60 + age group.

The differentiation of the target group is designed as difficult as in many studies, because of it is not clearly defined what is meant by elderly. Thus, the so-called "silver surfers" have included people from 50 years of age who are active on the Internet. To determine the requirements of the target group as precisely as possible, findings to the aging process as well as new communication and information media are included in the analysis.

The current studies show that especially television, radio and daily newspapers remain the dominant media for current information, entertainment and relaxation, yet an increasing use of the Internet can be recognized. In general, the following generation has more acceptance of technology, even when it comes to video games (e. g. Wii, Nintendo Touch Generation, see website) and of course social networks, which shows the increased number of portals and networks, as well as the growing number of partner search portals for the elderly. It must be assumed to be confronted with a very heterogeneous target group. On the one hand there are people, who could collect no or very little experience with the Internet; on the other hand there are people who have expert knowledge. The mobile robot should be designed to fit the divergent target group which also has different experiences with the Internet and social media. The aim is to help especially the elderly who have little to nothing experience with the Internet to take part in the World Wide Web. Exclusion criteria for the target group should be set, because the elderly differ. The target group has little physical discomfort, is not severely visually impaired, or deaf etc. The target group should be mentally fit and young at heart, so the elderly can cope with the use of a robot or a computer as well in a physical way as in a mental way to meet their friends online. In summary the primary users are well educated and familiar with the Internet. They use the Internet mainly to get information fastly and know social networks, but are often skeptical about the setting. The user community has

many interests, is outgoing and not afraid to deal with the robot, to pursue further training, and to read through a well structured, easy-held user manual.

Persons who are familiar with technology and in good physical condition are addressed as primary users, persons with physical limitations and who are less familiar with technical use are addressed as secondary users. Based on literature research to specify the target group following an example list of possible patrons and their main interests is presented. Following there are five specific user profiles (see Table 1):

Table 9: Profiles of five potential ALIAS-Users

User	Description	primary	secondary
Maria, 70	Family: living alone, no children Location: town (30,000 inhabitants), 1 room apartment Education: average education Occupation: Chief Secretary (retired) Facilities: no Internet Private: wide interests, social engagement (mutual aid), travelling Spare time: meets her friends twice a week to play Bridge Health: good, strong long-sightedness Primary interests of user: social contact, travel arrangements and be informed of events (theater program), get information on destinations, domestic help, reading texts, remember dates and birthdays	X	
Sieglinde, 75	Family: married, male doctor, 3 children (distance> 200 km) Location: City, semi-detached house Education: University degree doctorate, Profession: doctor (retired) Facilities: DSL Internet Access Private: communicating a lot with their friends via email Spare time: swimming, regularly Health: knee arthrosis, initial diabetes Special features: Plays video games (grandson) Primary interests of user: Stay in contact with family and friends (video calls), remain mentally fit, remember taking medicines, search for information on cultural and leisure activities	X	

Brigitte, 76	Family: Widowed, living alone, one daughter (distance <50 km) Location: City, 2 room apartment Education: Certificate of Secondary Education Occupation: Bank clerk (has given up work after marriage) Facilities: no Internet access, tele-shopping Health: rheumatism, osteoporosis (limited mobility outside the apartment unit), diabetes mellitus (who must be injected, nursing 3 times a day) Primary user interests: domestic help (cleaner, shopping list), contact with her daughter (by phone), physical stimulation and entertainment, get reminds of taking medicines, measurement of health status (glucose monitoring for diabetics), support when standing up (handles to hold on to)		X
Rainer, 72	Family: Widowed, two children (distance> 200 km) Location: City, 3.5-room apartment Education: High school diploma Occupation: Retired school teacher (mathematics, geography),wife: housewife Facilities: DSL Internet access, homepage, etc. Private: enthusiastic about technology, has already worked a lot as a teacher with the computer and programmed in Pascal itself, an avid chess player Health: keeps himself fit by cycling Primary user interests: retirement arrangement, exchange of information with family and friends, also uses social net-works and Twitter to keep up with technology and virtual entertainment, virtual chess, Silver Surfer	X	
Hans, 76	Family: Married, two children (resident of son and daughter> 200 km) Location: town (50,000 inhabitants), own house Education: average level of education, master Occupation: carpenter, helps the son still in operation 1-2 times a week Facilities: DSL Internet Access Health: Generally good condition, incipient	X	

	deafness (hearing aid!) Special features: strong dialect Primary user interests: stay in contact with children and stay informed to domestic security (shutter control, alarm system), video calls (to avoid feedback from hearing aid),		

These user profiles and priority user interests can be drawn from the analysis that follows part derived. Groups with strong psychological suffering and physical suffering were excluded from the user example.

9.2 Procedure

The following analysis is used to determine a target group for the project ALIAS based on the demographic change primarily in Germany. The analysis shows the acceptance of technology, social networks and games in the 60 + age group. The differences within the target group is composed as different as in many studies, so it is not clearly defined what is meant by the "elderly". Thus, the so-called "silver surfers" are people starting from 50 years, who are active on the Internet. To determine the requirements of the target group as precisely as possible, findings to the aging process as well as new communication and information media are included in the analysis.

9.3 Demographic Changes in Germany

Current projections talk about a decreasing development of the aging society in Germany, which will shrink in 2050 from currently 82.4 to 75 million members, with a simultaneous increase in life expectancy. According to the Federal Statistical Office (2006), there will be twice as many 60-year-old men as newborns. Germany will "be characterized by fewer children and more elderly" (Bieber 2008)[4], in 2035 Germany will have one of the oldest populations in the world. It is expected that one in three people will be older than 60 years. VDI/VDE innovation + technology[5] present some facts about demographic change: 10 percent of the age group of 65-year-olds suffers from cognitive

[4] Bieber, Daniel (2008): Grundlagen des Demografiediskurses. Eine kritische Würdigung. Online unter: www.iso-institut.de/download/Grundlagen_des_Demografiediskurses08-05-05.pdf
[5] http://www.aal-deutschland.de

problems, often as a result of a heart attack. 50 percent of the age group of over 85-year-olds depends on aid in everyday life.

The aging and old are evolving as a result of a general societal, social and technological change. Many elderly want to get very old with their family and want to keep good relationships with neighbours and friends. As studies show social contact is very important for the quality of life and helps to cope with changes in life. Caritas[6] points out that people of a certain age face the following psychosocial risk factors that affect the quality of life (see Table 10):

Table 10: People of a certain age face the following psychosocial risk factors

- Completion of working life
- Problems of adaptation to the new stage of life
- Schedule of Children
- Feeling no longer needed, emptiness, boredom
- Thinning out social networks, loneliness, isolation
- Experience of loss, widowhood, loss of independence
- Decrease of mobility
- Helplessness according to depletion of activity
- Decrease of physical and intellectual capacity
- Diseases, increase in physical afflictions
- Multi-morbidity

Elderly are living more and more often alone and the "proportion of one-generation and single-person households" is increasing[7] (Kelle 2008). In the course of social development also the physical distance between seniors and their families increase. However, a very positive and close emotional bond exists between elders and their families[8] (Backes & Clemens 2008). Social media like Facebook, Skype and Twitter act to share one's life and represent an opportunity for elderly and their families to network over long distances, make new acquaintances and stay informed about each one's life despite physical limitations. Depending on the path through life of each elderly, the life situation, the health status, the income and the access to technology has significant differences: This variety is considered in the development of new assistance systems.

[6] http://www.caritas-mannheim.de/72682.html

[7] Kelle, U. Alter und Altern (2008) In Handbuch Soziologie. Nina Baur (Hrsg.).Wiesbaden : VS Verlag für Sozialwissenschaften

[8] Backes, G.& Clemens, W. (2008): Lebensphase Alter. Eine Einführung in die sozialwissenschaftliche Alternsforschung. 3. Auflage. Weinheim: Juventa

The new "Deutscher Alterssurvey" (DEAS)[9] shows that the income gap increases among the elderly, especially between different educated groups. However, the health status of seniors is well. Elder birth cohorts generally suffer from fewer diseases. This is especially evident in the age group of the 64 to 69-year-olds, where the proportion of persons with five or more diseases halved from 20 percent in 1996 to just nine percent in 2008. Furthermore, people live less in traditional couples with children. This trend will change the long-term aging situation and the necessary support services, as care can be supported more often by a relative. A general change of intergenerational assistance within the family will appear. With greater distances between the generations within the families and future increasing rates of working women, according DEAS, it will be difficult to maintain daily support for elderly by family members. The urgency for possible solutions with regard to this situation rises. Currently in particular spouses and daughters care for their relatives.

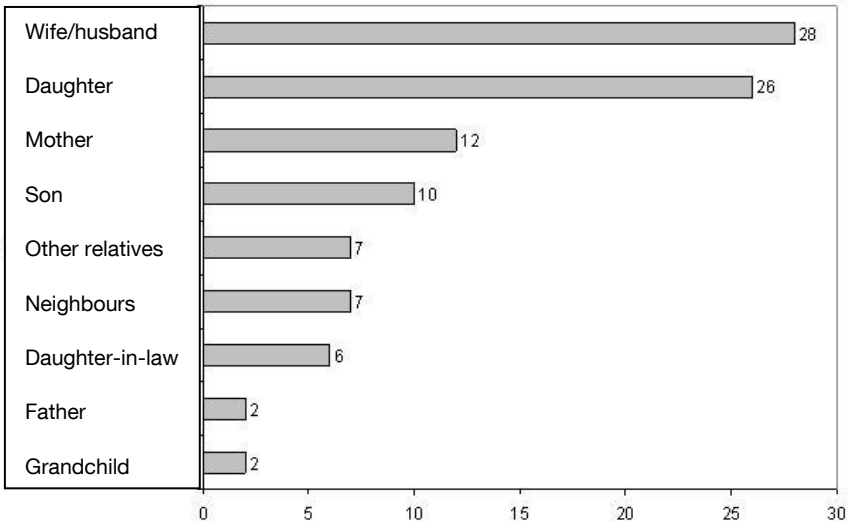

Figure 2: Main carers of the disabled in private homes – the main caregivers of female beneficiaries and recipients of social and private care insurance in Germany in 2002 (in%) (Quelle: Infratest Sozialforschung 2003: 19 ff.)

Further evidence of demographic change, which is characterized by the emerging new forms of cohabitation, processes of feminization and single-person households, can be found at the Federal Statistical Office[10].

[9] DEAS (2010): http://www.bmfsfj.de/BMFSFJ/Service/Publikationen/publikationen,did=35236.html
[10]http://www.destatis.de/jetspeed/portal/cms/Sites/destatis/Internet/DE/Content/Publikationen/Fachveroeffentlichungen/Bevoelkerung/FrauenMaenner,property=file.pdf

These current demographic trends will affect the lifestyles of elderly in following ways: women aged 60 and older more frequently lived alone in 2008 (41 percent) than men (17 percent), which can be traced to their higher life expectancy (85 years), which will increase the number of women living alone again strongly (76 percent). „Social networks of widows are structured similar to that of married couples. By contrast, those without children compared with parents and residents of nursing homes in comparison to persons in private households, have smaller networks. Married feel less lonely and residents of nursing homes without children often feel lonely. The 85-year-olds and older receive significantly more help than they give, but there are many older people who still support others, e.g. their family (e.g. babysitting their grandchildren) (Wagner et al. 1996)“[11].

Important for an overview of Germany is also to look at the amount of insurance benefits elderly make use of. In Germany some 2.25 million people made use of insurance services in May 2010. More than 1.5 million people are cared for at home by their families and community services.[12] The Federal Statistical Office forecasts that in 2030 about 3 million people will be in need of care.[13]

Looking at these figures it is clear that especially of social contacts and networks in old age are fundamental and important factors.

9.4 General Acceptance of Technology

For older users the use of information and communication technologies, due to less previous experience, reduced cognitive skills and a lower acceptance of technology, is often problematic. A recent consumer electronics industry-commissioned study found that one in three persons over 60 at least once did not buy an electronic device, because he or she was afraid of not being able to use it. This helplessness has a direct impact on the purchasing decision.[14]

[11] Wagner, M., Schütze, Y., & Lang, F. R. (1996). Soziale Beziehungen alter Menschen. In P. B. Baltes & K. U. Mayer (Eds.), Die Berliner Altersstudie (pp. 301-319). Berlin: Akademie Verlag.
[12] http://www.bmfsfj.de/BMFSFJ/familie,did=140672.html
[13] http://www.wimi-care.de/pdfs/WiMi-Care%20-%20WB%201%20-%20Demografischer%20Wandel%20-%20Darstellung,%20Entwicklung.pdf abgerufen am 07.09.2010
[14] http://www.qvc.de/deqic/qvcapp.aspx/main.html.file.|dehtml|ueber_uns|produkt_pr|04_03_2008,html/left.html.file.|dehtml|ueber_uns|drill_down|drill_ueberuns,html/nfs.|degasp|germany_nest,tpl

Nevertheless, it is assumed that the „current generation of older adults brings inter-individual variation of different cognitive skills, experiences and differing attitudes towards technology. When investigating age-related issues in human-machine interaction it should be taken into account that there should be a user-centered, participatory approach, since only then the development of effective training and design inventions is given“ (Arning 2008).[15]

According to Göbl & Neth (2004)[16] there is often uncertainty and a lack of understanding of the logic of the menu, which is reflected in the fact that many elderly believe their lack of understanding resulted from lack of memory. Also there is a fear to cause the failure or damage of a device by using it incorrectly (Schwender 2005).[17]Researches on technology acceptance so far were had their focus on younger generations (e.g. Davis, 1989; Mathieson, 1991; Szajna, 1996). There are just a few studies which can be taken not just to explain technology acceptance of younger people, but also to transfer their findings to older generations (65 years and older) (e.g. Ziegler & Machate, 1997, Chadwick-Dias, McNulty and Tullis, 2003; Biljon & Renaud, 2008). The present studies already point out that elderly generally have more difficulty in dealing with technology (e.g. operator error), in understanding the structure of the software and therefore rely more on training in using a technical device than younger people.

To clarify the causes of the problems with technology of elderly the new insights are taken to rehabilitation medicine and geriatrics. The challenge for rehabilitee is that the target group of the elderly has usually multiple diseases (multiple long-term chronic diseases). The multiple diseases affecting elderly include the lack of memory, sight, hearing or mobility (especially fine motor tasks). Aging makes it difficult for seniors to handle complex technical devices (e.g. Lorenz et al., 2007).

Another approach to investigate the lack of technology acceptance in the target group of elderly is found in psychology. Elderly have gained less experience in dealing with technology, accordingly elder people seem more likely to have reservations about this

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[15] Arning, Katrin (2008): Bedientrainings für ältere Nutzer von Informations- und Kommunikationstechnologien : Ansätze für eine bedarfsorientierte Trainingsgestaltung. Hamburg: Kovac.

[16] Goebel, M., Neth, K.-U. (2004). [Elderly persons - the effect of demographic changes on ergonomic product design] Junge Alte - der demografische Faktor bei der Produktgestaltung. In R. Bruder (ed.), Ergonomie und Design, Stuttgart: Ergonomia, 111-122.

[17] Schwender, C. (2005) Technische Dokumentation; In: Medien und höheres Lebensalter: Theorie, Forschung, Praxis (2009) von Bernd Schorb, Anja Hartung, Wolfgang Reissmann (Hrsg.)

issue (Hart, 2008). "If engineering processes are poorly understood due to lack of experience, older users tend to lose motivation and face frustration" (Holzinger, Nischelwitzer Searle, 2007). Other results also show that assistance systems for elderly people sometimes lead to undesirable effects. That occurs when the seniors are not supported by the assistance system, so they might rather feel "frail" or "disabled" (Voss, Voss & Brandt, 2003). Another reason for the lack of technology acceptance in old age is that elderly do not dare using electrical devices, which is associated with a growing need for support.

Medicine and psychology provide important insights regarding the development of technical assistance systems. A high emphasis has to be put on a user-friendly and needs-based development. When designing an interface, which is easy to use for elderly, the specific needs of the beneficiaries should be carefully analyzed and considered. Important are high contrasts and large letters for example (e.g. Bederson et al., 2003). In addition, a technical assistance system should fit well into the apartment of an elderly man or woman and address his or her aesthetic taste and be unobtrusive at the same time (e.g. Broadbent, Stafford & MacDonald, 2009). Note also that older users like analog or mechanical operated devices more than the averagely preferred digital (e.g. Tully, 2003).

In the development of AAL technologies the uncertainty of the target group must be considered so that potential users get rid of the fear of of using the mobile robot.

9.5 Internet Usage of Elderly

According the (N)ONLINER Atlas 2010 the Internet use within the group of 60 to 69 years old has the highest growth rate. However, not even one of four seniors over 70 years knows how to use the Internet. It would be wrong to call seniors familiar with the Internet. The development of the Internet use in 2010 is shown in the following figure:

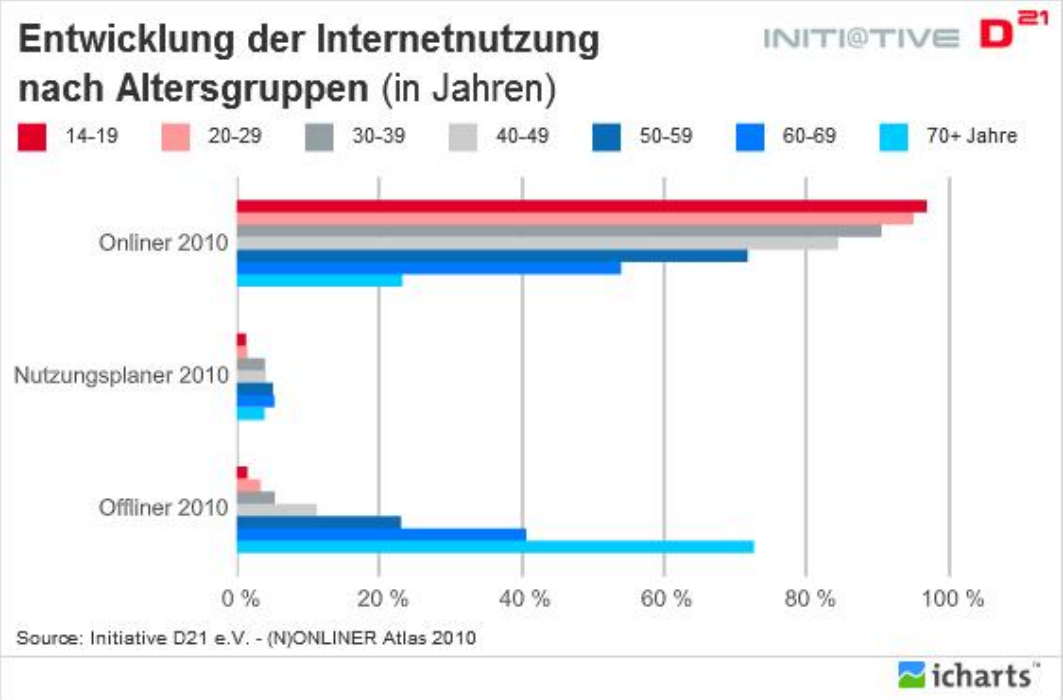

Figure 3: Development of Internet usage by age (in years) after (N) ONLINER Atlas 2010

On closer examination a highly varied picture can be seen: 71.8 percent of the 50 to 59yearsold are seniors while their use of Internet still is close to the national average, among 60 to 69yearsold the number of Internet users drops to 54.0 percent, whereas within the more than 70yearsold only just one in four uses the Internet (23.3 percent). Yet the group of the 60yearsold has the highest increase of Internet use in the recent years in comparison to all other age groups. Strikingly different is the use of Internet considering the gender aspect “Within the over 70yearsold about every third man uses the Internet, but only every seventh woman“ ((N)Onliner Atlas 2010).[18]

One can often hear of the so called “digital society”. The results of the new specialized study called "Digital Society in Germany", however, shows that in Germany many elderly still have no access to the Internet. Only a quarter has basic electronic equipment (such as computers and printers). Therefore skills for dealing with digital media are scarce. Even concepts such as e-mail, operating systems or the digital home are largely unknown to outsiders and only a fifth of the digital outsiders can be found on the Internet. Following user groups can be defined: "casual users" (30 percent), "professional users" (9 percent), "trend users" (11 percent), "digital professionals" (12 percent) and "the digital avant-

[18] http://www.nonliner-atlas.de

garde" (3 percent)[19]. Since the Internet provides almost unlimited access to information, the number of older users will be growing in the future.

But reservation remains: „Bei den älteren Mediennutzern bleibt die klare Kompetenzzuschreibung für die einzelnen Medien bestehen. Fernsehen, Hörfunk und Tageszeitung bleiben für sie die dominanten Medien für aktuelle Information, Unterhaltung und Entspannung. Ein Zusatznutzen durch das Internet wird von vielen aus dieser Generation nicht gesehen. Dieser nur langsame Anstieg in der älteren Generation zeigt die Grenzen des Internetwachstums in Deutschland auf. Der Grenzwert könnte bis 2015 bei 75 Prozent liegen [..]“[20] (van Eimeren & Frees 2010).

The proportion of female and male Internet users is approaching the average partition more and more. The highest increase is found within the women over 50 years (34.3%). General differences with who uses Internet can be seen. So after van Eimeren & Frees men are more likely to use for example Internet radio or music and audio files than women. Generally the 50yearsoldwatch 36 percent of videos on the Internet, be it via video portals or the libraries of TV channels or (even at a low level) social networks. Trigger of this development are video websites, especially YouTube. Video websites in Germany, according to the ARD/ZDF Online Study 2010, will be more used of 60 years old users in the future. Elderly with high education, according to (N)Onliner Atlas, will have the largest share: 74.6 percent of the 50yearsold study online while only 13.6 percent of less educated people do online studies.

The splitting of the society into a participatory and a non-participating part in the new information and communication technologies and their possibilities is a key future issue of the structural change of knowledge society. "The digital outsiders" remain the largest and -with a mean age of 62.4 years- the oldest group. Compared to the other groups they have the smallest digital potential (14 percent) (ARD/ZDF Online Study 2010)[21]. For the over 60 years old following features of the Internet are most attractive: e-mail services,

[19] www.initiatived21.de

[20] Van Eimeren, Birgit/Beate Frees: Fast 50 Millionen Deutsche online –Multimedia für alle? Ergebnisse der ARD/ZDFOnlinestudie 2010. In: Media Perspektiven 7-8/2010, S.334-349. Studie auf http://www.media-perspektiven.de/uploads/tx_mppublications/07-08-2010_Eimeren.pdf

[21] ARD/ZDF-Onlinestudie 2010:Deutschsprachige Onlinenutzer ab 14 (n=1252). http://www.ard-zdf-onlinestudie.de

search and retrieval of schedule and travel information, information on agencies and authorities and health issues and searching information in general.

We should also mention that in order to increase the proportion of seniors who are active in the network, the demand for voluntary work gets louder. The support can take place in the private sector or in senior centers, retirement homes, et cetera. The best example in Germany for this initiative is "Internet experience - together through the power of the Federal Ministry of Economics and Technology". It teaches elderly how to get access to the Internet in courses.[22]

The question "For which of the following products have you ever searched for information on the Internet?" Following answers aroused in the study of the AGOF Internet users aged 60+:

- Holidays and Last Minute Travel
- Hotels for leisure or business trips
- Books
- Train tickets
- Tickets for cinema, theater, classical concerts, pop concerts and sports events

9.6 Social network usage of elderly

The Federal Association for Information Technology, Telecommunications and New Media e. V. Germany, stated that almost one of two Germans aged 55 to 74 years uses the Internet (45 percent). More and more elderly also use the most common social network Facebook. The growth rate of users in the age of 35 years to 54 years was 513 percent in the first seven months of this year. It is worth noting that the number of users over 64 years also increased rapidly. In the United States the number of seniors who are active in the World Wide Web increased between November 2004 and November 2009 to approximately six million (from 11.3 million to 17.5 million). Almost half of the seniors, who are familiar with the Internet, attended to Facebook or YouTube in the last month. Facebook was the third most visited page of this generation in the United States. YouTube lands on fourth place. Elderly also spend more time on the Internet: averagely 58 hours per month.[23]

[22] http://www.internetpaten.info/Digitale-Integration/Internet-Patinnen-und-Paten
[23]http://blog.nielsen.com/nielsenwire/online_mobile/six-million-more-seniors-using-the-web-than-five-years-ago/print/

The so-called "Silver Surfers", Internet savvy people in the target group 50+ are called, get more and more. About 30 million people are 50+ in Germany and about a third of them are Silver Surfers. 60 percent of the age group of 50 to 59yearsold regularly surf the Internet and a quarter of the 60yearsold can be found there. Receiving e-mails, searching for information and reading news on the Internet are the three most common reasons for the age group from 60 to access the Internet. It appears that many sites are present for elderly in the network. In particular, forums and partner searches, such as www.feierabend.de or www.50plus-treff.de are on the rise. Also more and more blogs are for and by seniors as http://www.senioren-internetz.de which deals with topics related to aging. Many sites like www.seniorentreff.de offer a free complete program to chat, exchange photos and videos and search a partner. Sites that are specialized on finding partners in the "best years" get there are more and more, such as www.lebensfreude50.de. Even the -blogging service Twitter has discovered the target group of senior citizens for themselves. Twitter profiles as http://twitter.com/senioren or http://twitter.com/Senioren_Netz is growing trend. However, many users find out about events for and by seniors, such as http://twitter.com/Senioren.

9.7 Games usage of 60+

According to the study of the German Bank especially in the games section there are increasing numbers of seniors. In addition to the offerings in the areas of assistance systems and e-health more and more seniors are also interested in offers from the games sector.[24]

Diakonie Bayern already has done a study on the use of Wii Sports in a nursing home. It was found when the participants accepted the Wii the cognitive test scores of MMSE DemTect during use of the Wii Sports increased.[25] Games console producer Nintendo has already responded the developments in the Japanese games market, so the new target group 50+ now has their own games series for the Silver Gamer and there is also a cross-generational series of games of Nintendo. With the titles of "Touch! Generations" one can do puzzles, play Sudoku, learn cooking and much more.[26] Particularly activity games can

[24] www.dbresearch.de
[25] http://www.diakonie-bayern.de/presse/publikationen-des-diakonischen-werkes-bayern/pflege/wii-pilotstudie.html
[26] http://www.nintendo.de/NOE/de_DE/touch_generations_5027.html

improve the sensory-motor skills of elderly and counteract degenerative diseases. Students studying social work at the Munich High School for Applied Social Sciences started interesting project: The „1. Deutschen Wii Sports Bowling Seniorenmeisterschaft“[27] where the residents of nursing homes in ten major German cities were playing the game “Wii bowling” against each other, noting that was evident in all subsequent unions to improve the course of movement and increased in addition to the understanding of the motor skills and the ambition of the participants.

In summary games that support cognitive and physical abilities are very suitable for elderly, but also the particular health condition and preferences must be taken into account. Seniors with limited motor skills (e.g. stroke) could have their limitations when using the Wii controllers and be confused and discouraged when using it.

[27] http://www.wii-senioren.de

10. Appendix F – Interview Guidelines

Interview Guide for the ALIAS project

Thank you for having agreed to this interview. We want to see if robots have the potential to support the life of older people and to enrich.

The conversation will remain completely confidential. All your statements are anonymous and not disclosed to third parties. Do you agree that we take the conversation on tape?

Do you have any questions?

Questions about personal and life situation

Introductory questions

- Can you give us a description of a normal day of yours?
- The seniors are invited to consider based on your typical daily schedule of when they use that media in everyday life. (At 7:00 a.m. my alarm clock rings, at breakfast, I always read the newspaper, etc.)
- How do you arrange your free time? (Hobbies, visits to events, club membership, etc.)
- How do you find out about the latest leisure facilities? (Daily newspaper, acquaintances, Google, etc.)
- How do you keep in touch with your family/friends? (Phone calls, emails, visits etc.) Do you have children/grandchildren?
- How do you live? (Apartment/house, own/partners, etc.)

Cope with everyday life/of aging

- Was it difficult for you to go in retirement? What was difficult for you? (Canceled contacts with work colleagues, loneliness, etc.)
- Are you afraid of growing old/aging/future? What do you fear?
- Do you have health problems? (Physical limitations)

Media equipment and access to media

- Which media do you have in your household? (Radio, television, newspaper)
- Do you have any other media? (CD players, DVD players, game console or a Wii, etc.)
- Has your household a computer/Internet connection? (Computer, Internet, etc.) Can you operate the computer? (Programs, browsers, etc.)

Used patterns and motifs

New Media

- Do you use the Internet?
    - On what occasions do you use the Internet?
    - What pages do you visit on the Internet?
    - How often do you use the Internet?
- Can you imagine using the Internet in the future?
- Do you know of new communication media such as e-mails (Skype)?
    - Do you have an e-mail address?

    - How often do you write e-mails?
    - On what occasions you write e-mails?
- Can you imagine the use of e-mails in the future? Why or why not?
- Do you know social networking sites such as Facebook or Feierabend.de?
    - If you are logged into a social network as a user?
    - How active you are in the social network?
    - On what occasions you use the social network?
- Can you imagine the use of social networks in the future? Why or why not?
- Do you know photo sharing on the Internet (e.g. Flickr. Com)?
    - Do you take advantage of this photo-sharing?
    - How often do you use these file sharing?
    - On what occasions do you use the file-sharing?
    - Can you imagine sharing photos on the Internet in the future? Why or why not?
- Do you play computer and video games (Wii, Nintendo) in your spare?
    - What games do you play?
    - How often do you play computer or Video games?
- Did your usage of media changed, since you are in retirement?

Robots Review

- What do you expect from the use of the robot?
- In which should the robot support you?
- Do you have more suggestions?

Thank you for the informative interview.

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