D 1.4 – Analysis of pilot's first test-run

D1.4

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with a copy to the WP leader.

Del 1.4	Abstract
Analysis of pilot's first test-run: This Deliverable describes the first field trials, which have been conducted at pme Familienservice in Berlin on 29th and 30th September 2011. 20 Persons ran through the tests, which consisted of three parts: test of telephone scenario, games scenario and of the e-ticket-application. The test runs were evaluated with surveys and participant observation. The preparation, implementation and evaluation of the first field trials are described in this deliverable. **Keywords:** User inclusion, selected functions, workshop results	

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1   Abstract

The first user trials have been conducted at pme Familienservice GmbH in Berlin on 29th and 30th September 2011. Participants from project partners were:

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Tobias Rehrl (TUM MMK)

Felicitas Kohl, Petra Dinkelacker and Anna Heindorf (pme)

Sebastian Glende, Monika Friess, Christoph Nedopil and Valerie Hunstock (YOUSE)

Katharina Scheibl (TUM GSing)

Ten test pairs (five each day, 14 elderly people and 6 caregivers and care consultants, 6 male, 14 female) ran through the tests. The test runs consisted of three parts:

- test of telephone scenario (one test run each test person, exactly predefined test procedure)
- test of games scenario (one test run each test person, exactly predefined test procedure)
- test of parts of the e-tickets-application (one test run both test persons together, without speech recognition, mostly to test touch screen usability issues)

These scenarios also included testing the speech recognition (always with headset and based on predefined phrases), the motion and the face recognition of ALIAS.

The telephone and games scenario could be conducted completely as defined in the latest version. The test persons needed several attempts to be understood by the robot, but most functions could be initialized without using the touch screen (except starting specific games, which worked rarely without using the screen). Obviously persons with higher voices were harder to recognize, maybe due to the fact that the speech recognition training material contained only 3 female but 14 male voice recordings. The quality of the Skype connection was predominantly fine. Starting the games menu worked quite well. Also the navigation works good. Some difficulties occurred since ALIAS functions were not limited to a specific context – so it happened, that the robot misunderstood something during a phone call and e.g. left its position then.

The e-tickets-application was more difficult to test: The state of implementation did not allow to go through the scenario as defined. Also just playing around with it to test its functionality was a bit tricky, since keywords and event descriptions have been mostly in English language (which most elderly test persons were not used to) and it was not possible to type a keyword due to a not implemented onscreen keyboard. So the test focused more on handling a "normal" website (made to be used with a PC-mouse) with the touch screen instead. Several elements are too small to be used with fingers (like scrolling the page or magnifying the Google map). Referring to functionality, it would be important to include search options (type of event, distance from home, age group etc.) and to search events in the future, not (only) in the past.

Keywords: User inclusion, selected functions, workshop results

2   Introduction and Purpose

The field trials are an important part of work package 1 "user inclusion", task 1.6 "continuous testing and optimization": This task represents the main task of this WP and will provide profound analysis of user-opinions and wishes and their accordant technical realization. In a two-cyclic manner, a refinement of the ALIAS's functions will be performed to make sure to meet the needs and preferences of the elderly people and to create a marketable relevant robot platform. Therefore the first two ALIAS pilots are tested in two user studies with seniors and caregivers or relatives of seniors under realistic and real-world conditions.

The field trials described hereafter represent the first of these two user studies.

The deliverable 1.4 "analysis of pilot's first test-run" aims on giving qualitative advices on how to improve specific functions as well as the usability of the robot.

The deliverable is organized as follows: In chapter 3, we describe preparation of the field test. In chapter 4, we detail the methods we have used so far and in chapter 5, we present the results and recommendations.

3   Preparation of Test

The presentation of the results in this chapter is – among others – the basis for a checklist for the design of a user manual. It is necessary to light up the situation of older women and men to have a secure idea of what is important for the target group in a user manual.

3.1   Preparation of test scenarios

To define clear test scenarios, detailed descriptions of these have been proposed by YOUSE and discussed in WP1. These scenarios were based on the scenarios already defined in the beginning of the ALIAS project (for detailed description see **Fehler! Verweisquelle konnte nicht gefunden werden.**).

- Alarm-/Call Scenario
- Games Scenario
- E-Tickets-Scenario
- Physiological Monitoring Scenario

All project partners were asked to revise these scenarios and comment, which steps are feasible and which not within two weeks. Afterwards all comments have been integrated and the scenarios were updated/shortened. After that feasible scenarios were (for detailed descriptions see **Fehler! Verweisquelle konnte nicht gefunden werden.**):

- Call Scenario (shortened by alarm function and use of answering machine)
- Games Scenario (shortened by choice between disc and browser games and by multiplayer mode)
- E-Tickets Scenario (shortened by speech control, buying function and invitation function)

By beginning of September 2011 the modules needed for scenarios have been integrated at an integration meeting in Oldenburg, Germany. The call and games scenario have been integrated successfully, the e-tickets-scenario have been integrated later only as application.

Two days before the field trials MLAB started to prepare the robot at PME in Berlin. With help of the experience made during the pretest – shortly before the official test – only small revisions referring to the scenarios were necessary (mostly regarding the list of speech commands to be used).

3.2 List of commands for speech control

To ensure a smooth process, a list of commands for the speech control was pre-pared. If the robot does not react or react in a false way after the participants said something, we can give them the list with which the speech control will work well.

3.2.1 Call robot = German "Rufen"

German command	English translation
Komm näher	Come closer!
Komm her	Come along!

3.2.2 Send robot back to parking position = German "Wegschicken"

German command	English translation
Hau ab	Go away!
Verschwinde	Get along with you!

3.2.3 Phone call = German "Telefonieren"

German command	English translation
Bitte ruf meinen Enkel Bob an	Please call my uncle Bob
Bitte ruf Elke/Britta an	Please call Elke/Britta
Kannst Du meine Tochter Elke anrufen	May you call my daughter Elke?
Ruf Britta/Elke/meinen Sohn an	Call Britta/Elke/my son
Bitte die Nummer von Anton wählen	Please dial the number of Anton

3.2.4 Playing games = German "Spielen"

Displaying games menu	
German command	English translation
Zeig mir bitte alle Spiele die Du hast	Please show me the list of games
Ich würde gerne ein Spiel spielen	I would like to play a game
Welche Spiele hast Du	Which games do you have
Zeig mir bitte meine Lieblingsspiele	Please show my favourite games

Starting specific game	
German command	English translation
Ich würde gerne Solitär/Sudoku/Schach spielen	I would like to play solitaire/sudoku/chess
Hast Du das Spiel Sudoku	Do you have the game sudoku
(Kannst Du) Bitte Solitär/Sudoku/Schach starten	Please start solitaire/Sudoku/chess

3.3 Accomplishment of Field Trials

The actual field trials took place on 29th/30th of September 2011 at PME in Berlin.

Ten test pairs (five each day, 14 elderly people and 6 caregivers or care consultants, 6 male, 14 female) ran through the tests. All of them received about 20 minutes individual instructions on the project itself and on how to test exactly. This included a general description of the project, a description of the actual status of the robot and a description of the test steps to be conducted. We decided to test pairs due to the limited time, we only had two test days available and in the intention to include a variety of persons.

Afterwards the test persons filled a short questionnaire asking for their general attitude on technical products and robot acceptance, then passed the tests, and finally filled another questionnaire asking specific questions about the test and the evaluation of functions and usability.

They test runs consisted of three parts:

- test of telephone scenario (one test run each test person, exactly predefined test procedure)
- test of games scenario (one test run each test person, exactly predefined test procedure)
- test of parts of the e-tickets-application (one test run both test persons together, without speech recognition, mostly to test touch screen usability issues)

These scenarios also included testing the speech recognition (always with headset and based on predefined phrases), the motion and the face recognition of ALIAS.

3.4 Tested Modules

From a technical point of view, several software modules were integrated and used during the user trials. To have an overview over the technical development, please see the Deliverables from the technical partners.

* Linux:

- MetraLabs navigation software CogniDrive (MLAB)
- Blackboard based application based on RobotDaemon (MLAB + TUM-MMK)
- User detection in OmniCamera (TUM-MMK)
- Face identification (TUM-MMK)

- Interface to the dialog manager (MLAB + TUM-MMK)

* Windows:

- Dialog manager (COG)
- Speech synthesis (TUM-MMK)
- Speech recognition (FhG)
- Graphical User Interface (FhG)
- Audio device management using JACK (FhG)
- Event search application (EURECOM)

4   Test Methods

Design of evaluation, documentation and research

The following methods are conducted with the scientific monitoring of the field trials because of the small number of participants: Ten test pairs ran through the tests. All of them received about 20 minutes instructions on the project itself and on how to test exactly.

Participating observation: To assure realistic results about how a product is used, task oriented test methods should be chosen. These methods allow the user to use the product in a way he/she likes to get to a defined goal.

Deviating, in the field trials described here, a process oriented test method has been used. The test followed a clearly defined chain of test steps (see table 1 in chapter 5.1). This was necessary due to the restricted choice of functions already working. It meant to define the place where users sat during the test, the order of commands and the words/sentences that had to be used to give these command.

The process oriented user test gives answers about the quality and reliability of the functions tested. Along the way, users behaviour and comments are taken into account to optimize the functions tested. But the test is not originally designed to find out how to design the interaction process between product and user.

The observation and documentation of the test was based on the natural situation of the investigation. Observers and test persons resided in the same test room. Through the participation respectively the immediate experience of the situation, aspects of action and thinking got observable, which comparatively won't be observable within mere interrogations or documents about these interactions respectively situations. Valuable conclusions about acceptance and the status quo of the robot platform were drawn from observations and action advices for the further development are derived. A sheet of observation was aimed at documenting the behaviour of the users and specialists during the tests.

Interrogation: The methods of research were complemented with a standardised interrogation of the participating seniors and specialists before and after the test participation. With that, on the one hand the motifs and expectations of the participants and on the other hand the level of satisfaction because of the test as well as sociodemographic data were ascertained.

5   Results and Recommendations

5.1   Results Call Scenario

The call and the games scenario could be conducted completely as defined in the latest version of the scenarios. The test persons needed several attempts to be understood by the robot, but most functions could be initialized without using the touch screen (except starting specific games, which worked rarely without using the screen). Obviously persons with higher voices were harder to recognize, maybe due to the fact that the speech recognition training material contained only 3 female but 14 male voice recordings. The quality of the Skype connection was predominantly fine. Also starting the games menu worked quite well and moving around without crashing into anything or anybody too. The movements of the robot were determined in advance on a particular route. If in doubt, the robot was remote controlled. Some difficulties occurred since ALIAS functions were not limited to a specific context – so it happened, that the robot misunderstood something during a phone call and e.g. left its position then.

Table 1: Evaluation Call Scenario

Step No	Step description	Attempts / Success Rate	Qualitative comments	Possible Error Sources	Ideas for optimization
1	Senior asks ALIAS to come over (speech with headset)	Min: 1; Max: 7; Median: 4; Standard Deviation: 1,479	male voices better understood by ALIAS; for women voice modulation sometimes helpful; headset difficult to put on for some testers	low microphone quality, unclear speech by testers, testers' female voices, sentences too complex or some words unknown to ALIAS	robot should understand free speech
2	ALIAS comes to Senior	Success Rate: 100%	robot often not focuses user with eyes; sometimes crashes into users feet; users often leaned forward to get closer to screen	users sat in chair, might not have been in camera range and were difficult to focus via camera; robot steered via "wizard of oz" (remote control)	robot touch screen should closer to user (flexible arm necessary); robot should approach user with eyes and monitor directed at user; robot should not infringe feet space
3	ALIAS identifies user saying "Hello USER-NAME"	Success Rate: 21%	robot often misidentified persons and called them with wrong name	users sat in chair, might not have been in camera range and were difficult to focus via camera; first face scan might have been too ambiguous	identification needs more certainty

4	Senior asks ALIAS to initiate a telephone call to BRITTA, ANTON, etc. (speech with head-set)	Min: 1; Max: 11; Median: 6; Stan-dard Deviation: 2,63	user varied several speech commands given by the command list, but voice modulation was more effec-tive to make robot under-stand command	low microphone quality, unclear speech by testers, testers' female voices, sentences too complex or some words unknown to ALIAS	robot should understand free speech
5	ALIAS initiates the call	Success Rate (initiation by speech com-mand): 48%; rest started function via touch screen			photo of the person called could be shown
6	Felicitas Kohl responds to the call and talks to senior	Success Rate: 100%	in few cases low connection quality	problems with Skype or internet con-nection	videostream of persons involved in call could be shown
7	Senior ends the call (touch)	Success Rate: 100%	users often tried speech command, but that was not installed		all buttons shown on touch screen should also be available as speech command
8	Senior sends ALIAS back to waiting position (speech with headset)	Min: 1; Max: 6; Median: 3,5; Standard Devia-tion: 1,48	robot sometimes misunder-stood other commands as "sending back command" during other test steps	low microphone quality, unclear speech by testers, testers' female voices, sentences too complex or some words unknown to ALIAS	robot should understand free speech; departing from tester with eyes and monitor directed away from tester

5.2 Results Games Scenario

Table 2: Evaluation Gaming Scenario

Step No	Step description	Attempts / Success Rate	Qualitative comments	Possible Error Sources	Ideas for optimization
1	Senior calls ALIAS to come over (speech with headset)	Min: 1; Max: 6; Median: 3,5; Standard Deviation: 1,56	male voices better understood by ALIAS; for women voice modulation sometimes helpful; headset difficult to put on for some testers	low microphone quality, unclear speech by testers, testers' female voices, sentences too complex or some words unknown to ALIAS	robot should understand free speech
2	ALIAS comes over	21x yes, 1x no.	robot often not focuses user with eyes; sometimes crashes into users feet; users often leaned forward to get closer to screen	robot touch screen should closer to user (flexible arm necessary); robot should approach user with eyes and monitor directed at user; robot should not infringe feet space
3	ALIAS identifies user saying "Hello USERNAME"	Success Rate: 21%	robot often misidentified persons and called them with wrong name; users often answered when robot said "Hello USERNAME"	users sat in chair, might not have been in camera range and were difficult to focus via camera; first face scan might have been too ambiguous	identification needs more certainty

4	Senior tells ALIAS that he or she wishes to play a game (speech with headset)	Min: 1; Max: 6; Median: 3,5; Standard Deviation: 1,50	user varied several speech commands given by the command list, but voice modulation was more effective to make robot understand command	low microphone quality, unclear speech by testers, testers' female voices, sentences too complex or some words unknown to ALIAS	robot should understand free speech
5	ALIAS shows game menu				
6	Senior tells ALIAS, which game he wants to start (speech with headset or touch)	Mini: 1; Max: 9; Median: 5; Standard Deviation: 1,99	mostly robot only showed list of games but did not start specific game; not all games were available with speech commands	low microphone quality, unclear speech by testers, testers' female voices, sentences too complex or some words unknown to ALIAS	robot should understand free speech
7	ALIAS activates the game.	Success Rate (initiation by speech command): 24%; Rest started function via touch screen			
8	Senior plays game (touch)	only some test persons played	only two games playable, rest were dummies; only some test persons played due to unawareness of game rules; good usability of touch screen in tested games	game description should be available; more games needed	

9	Senior stops playing (touch)	Success Rate (when tried): 100%	users often tried speech command, but that was not installed		all buttons shown on touch screen should also be available as speech command
10	Senior sends ALIAS back to waiting position (speech with headset)	Min: 1; Max: 6; Median: 3,5; Standard Deviation: 1,23	robot sometimes misunderstood other commands as "sending back command" during other test steps	low microphone quality, unclear speech by testers, testers' female voices, sentences too complex or some words unknown to ALIAS	robot should understand free speech; departing from tester with eyes and monitor directed away from tester

5.3 Results E-Ticket Application

The e-tickets-application was more difficult to test because it was designed to support search of past events and not upcoming events: The state of implementation did not allow going through the scenario as defined. Also just playing around with it to test its functionality was a bit tricky, since keywords and event descriptions have been mostly in English language (which most test persons were not used to) and it was not possible to type a keyword due to a not implemented soft keyboard. So the test focused more on handling a "normal" website (made to be used with a PC-mouse) with the touch screen instead. Several elements are too small to be used with fingers (like scrolling the page or magnifying the Google map). Referring to functionality, it would be important to include search options (type of event, distance from home, age group etc.) and to search events in the future, not (only) in the past.

Table 3: Evaluation E-Ticket-Application

Usability	several information fields are empty
	soft keys for scrolling and magnifying are too small to be used with fingers
	map-area should be bigger
	view options should be clearly labelled and chooseable (street view, maps view) and it should be possible to switch back and forth between them easily
	screen should always point to the user
	function to zoom in and out with plus and minus was unclear to some testers
Functionality	search function was missing
	events listed should take place in the future, not in the past
	search criteria were missing; e.g.: - distance from home (km, and by car, on foot or by bike) - type of event (sports, culture) - age group - type of location (opera house, cinema etc) - name of location - adequacy for elderly users (senior cafes, presentations, information events on health topics, cultural events (opera, theatre, cinema)…) - accessibility for handicapped people
	search possibilities should be: - click on a location and see all events scheduled/taking place there - select a time and see all location taking place at this time - the neighbourhood and surrounding area (events in the neighbourhood would be useful to list (radius should be easy to set))
	event and schedule should be explained (ticket prices and availability, actors, singers, filmmakers, opera staging etc, preferably with photos)
	doctors , galleries and libraries should be localisable apart from entertainment events
	tool should farcify user (recognize him/her by face) and propose future events on the basis of previously-chosen ones
Further ideas for services via the e-ticket application	tickets should be bookable directly via online tool
	car service / taxi should be organisable via this tool
	doctor's appointments should be bookable via this tool
	option to invite friends to events is missing

5.4 General Optimization Ideas

Test persons and probably users compare the quality of functions with other products already on the market. Due to this, they have high expectations e.g. regarding speech control. This has to be taken into account when developing or optimizing ALIAS.

Following, several optimization ideas or requirements are listed and allocated to technical modules of the robot:

- Touch screen: bending forward to screen is uncomfortable; screen should be movable (mounted to flexible arm) towards user and away from user; participants would like to take touch screen onto their lap for better touch control (screen too distant)

- Body Design/Direction of Eyes and Touch screen: front or back of ALIAS difficult to tell apart for testers; participants have the impression that ALIAS approaches them backwards due to monitor and eye position

- Speech Recognition: should understand free speech; should be usable without headset; should recognize command with high certainty; should not be disturbed by background conversations; pre-voice check with testers in combination with face detection might help to adjust ALIAS to tester's voice level and volume

- Online Help/Manuals: ALIAS should provide descriptions of functions (e. g. call function, game instructions) online, preferably also as speech

- Identification of User: needs to be more certain; maybe process for taking pictures of users at first encounter should be standardized; maybe camera needs a fish eye focus and higher resolution to provide more certainty

- Motion of robot/approaching user: robot should not infringe feet space

6   Further Activities of WP1

6.1   Results of the open questions to the users

In addition to the observation protocols and the questionnaire, the field trials were evaluated by open questions to the participants. In particular, motivations, expectations and attitudes about the field trials were obtained.

1)   What is interesting for you with the robot project ALIAS?
The people who participated at the field trials show great interest in the project ALIAS. They also wanted to know more about technical developments in this field and the interaction between humans and technology. Furthermore, the possibilities for support on care and opportunities for control of medical records were a motivation to participate. Moreover, the possibilities for effective help in everyday life for older people and the interest for help in household were mentioned.

2)   Why do you want to participate at today's test?
The people participated to the field trials especially out of curiosity. They wanted to know more about the possibilities in the technical area and contribute actively concerning the development. The practical test should bring information about the usefulness and usability for them; they would therefore also like to contribute to the Enlightenment.

3)   What are your expectations regarding the robot platform ALIAS for today's test?
Many people came with expectations very open to the Field Trials. They had interest to see the technological development from the beginning. They wanted to learn more about the functionality and applications of this technology and know the state of development. They had the expectation that they can help to create practical solutions and would like to help in the process of development.

4)   What are your attitudes towards technological developments in general?
The attitudes towards technological developments are very broad. All have in common that they are very positive about technological developments and are interested in technical developments (but for different reasons). Some people are dealing with technology and developments in this area for a long time (both professionally and personally). They are fascinated of the technical developments which they noticed in their lives and are interested in new developments. Others see the technology and developments more pragmatic: They

would like know how much they benefit from the developments and how these developments could help or support them.

5) What are your attitudes towards technological developments in the field of assistance systems?

The attitudes towards Ambient Assisted Living are ambivalent: on the one hand, this area is considered as an important and significant one for the future. On the other hand, people have fears, problems and unanswered questions. Technical systems are seen as getting used to and may not make people dependent. A help or support for everyday life should be more targeted and people want to get in direct contact not only with a machine. Technology must not interfere with communication and the human-human social contacts may not be prevented. Ambient Assisted Living systems are mainly people empower themselves to make life easier and embellish if they wish. Issues facing the participants are mainly: Can it replace a man? I am concerned not lost contact with the other?

6) Do you have further remarks?

The further comments of the participants were as follows:

- Is the social structure taken into account during the development?
- Does the robot have the ability to learn the user's preferences?
- The project should be modular, so you put together the modules you need

6.2 Questionnaire for participants of the field trials

The following section describes the results of the feedback given by the test participants after they have tested ALIAS. The original and translated questionnaires are provided in the appendix of this document. The questionnaire is divided into three parts: a) questions concerning the telephone scenario; b) questions concerning the gaming scenario; c) at last a short part about socio demographic factors.

In total, 18 persons were questioned about their opinions and impressions during the test (two didn't answer the questionnaire); including 12 women and 6 men between 42 and 84 years (figure 1).
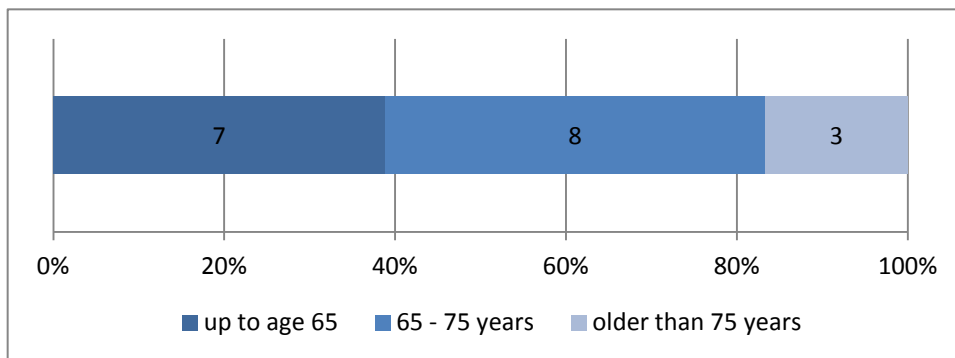
Figure 1: Age

Most respondents were well educated: half of them have university or college degree. Five respondents attended the German "Gymnasium", two the secondary school and the residual (2 persons) elementary school. The participants differ according to their professional background: almost one third of them have a technical training or university degree (e. g. engineers, technical staff), another third has a social or health care background (e. g. doctors, teachers, caregivers) and the last third has an economic or administrative background (e. g. economists, clerks). Most of them live together with their partners (11 persons), however, every third person lives alone (6 persons).

6.2.1 The telephone scenario

Most of the participants told us that they will frequently use the telephone function of ALIAS as shown in figure 2:

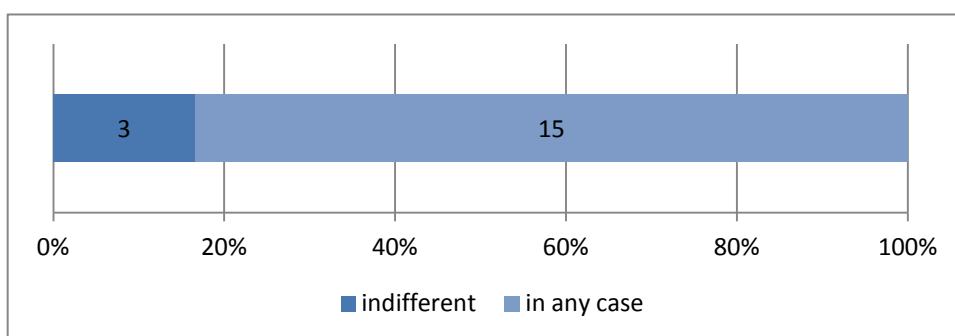**Figure 2: Will you frequently use the telephone function?**

For the majority (13 persons) of users the operation of the telephone function was very easy. Only three participants reported having problems with the handling. Others (2 persons) were undecided. In particular this was due to the fact that the voice control is not yet working properly. The high voices of women are particularly difficult for ALIAS to understand.
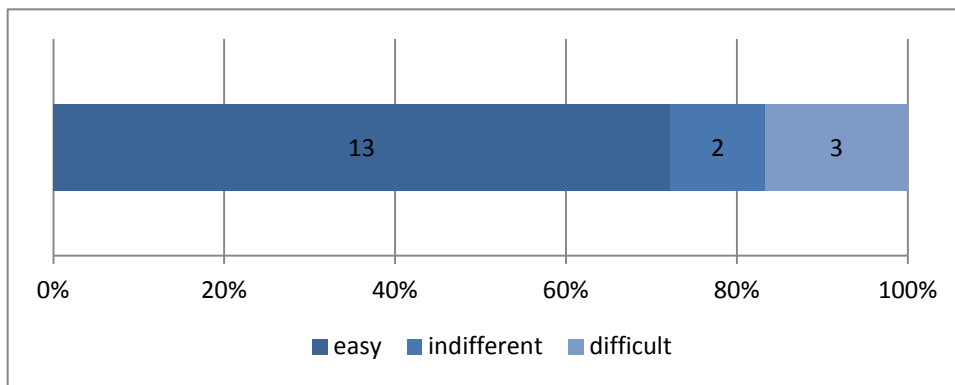
Figure 3: How do you assess the operating characteristics of the telephone function?

Elderly people wish to have training or other support before trying out the telephone function of ALIAS unassisted. In this context, it has been questioned how the address book works and where new contacts can be registered or deleted. Seniors should be involved in finding good answers on these questions.
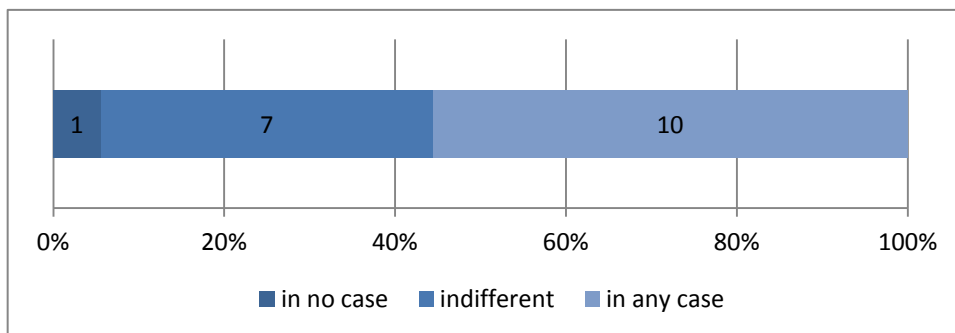
Figure 4: Will you need training or other forms of support to use the telephone function?

We also received a positive feedback from the users on the question "Are the various functions of the telephone system well integrated". It should be pointed out here that there is still a room for further improvements! Most seniors answered the question from standpoint of a fully functional ALIAS, not from the current development status. This should be kept in mind when interpreting the data.
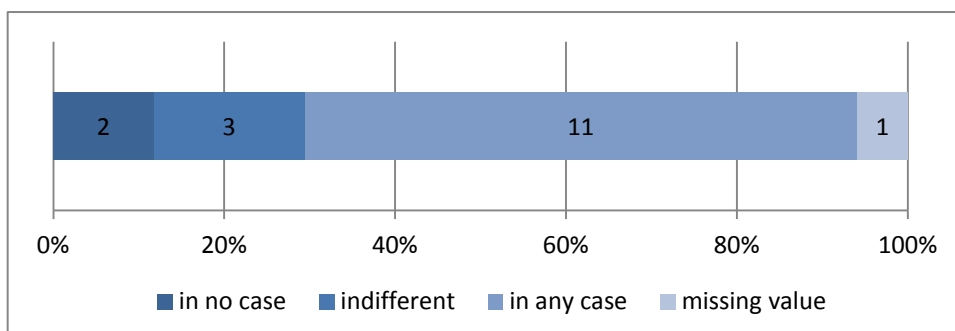
Figure 5: Are the various functions of the telephone system well integrated?

The participants were also highly satisfied with the matching of all components for the phoning function. 15 persons answered that the components work well together and the other three were undecided.
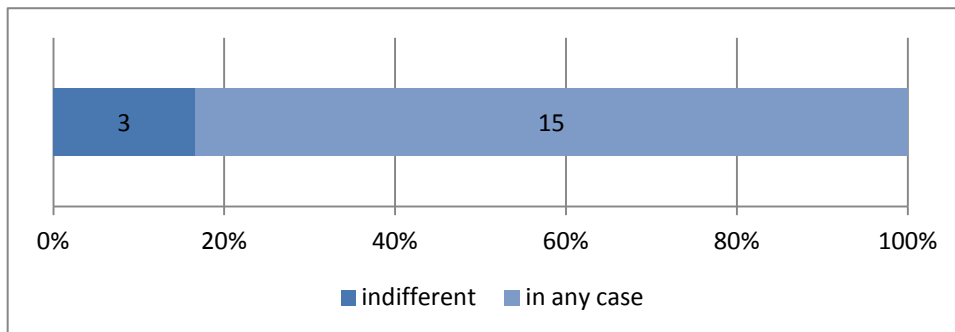
Figure 6: Do the functions work well together?

Fortunately the majority (15 persons) of participants believe that the telephone function is simple enough for elderly people in general. Therefore we can conclude that persons interested in technique – like the testers – can learn operating ALIAS.
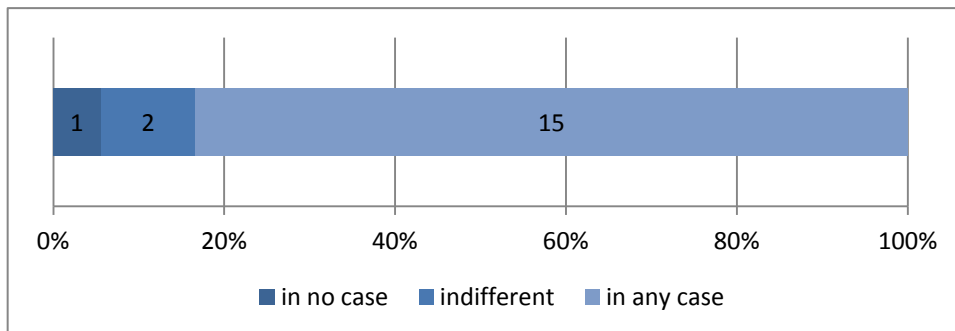
Figure 7: Can you imagine that most seniors will learn to use the telephone function quickly?

In particular, the seniors highlighted the user-friendliness of the system as shown in figure 7: almost all (15 persons) praised the improved technology and good idea of ALIAS. What we pick up from the discussion with testers is that the majority evaluate AAL systems in general, but not ALIAS at the state of the art. Seniors saw the need for improvements particularly in the field of speech recognition. Its reliability must be improved.
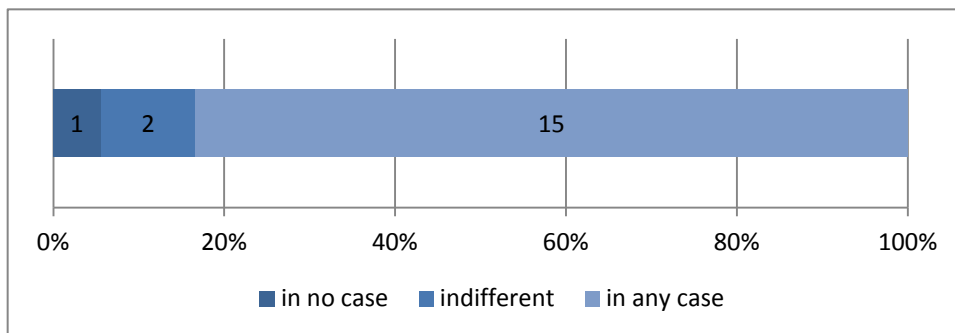
Figure 8: Is the system cumbersome to use?

Another positive finding is that respondents do not have to learn a lot of new things in order to operate ALIAS (17 persons). Only one person reported that she or he has to learn a lot of new things to operate the system. This demonstrates the usability of the robot platform. However, in this context, it should be kept in mind that all participants of the field trials had great interest in new technology. In the long run the project faces the challenge to integrate more demanding user groups (e. g. low educated target groups or dementia patients).
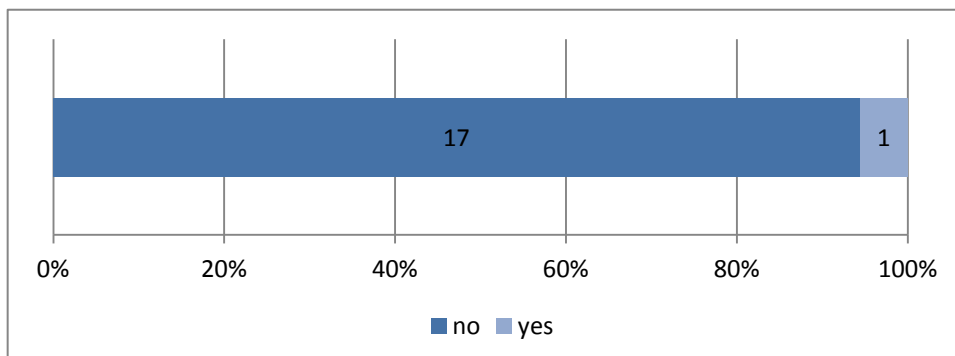
Figure 9: Do you have to learn many things before using the telephone function?

Table 4: How do you handle this learning task?

Voice control of the robot is still a little bit difficult. Otherwise, operating manual is very easy for understanding thanks to visual support.
Need to be adjusted to ALIAS.
With enthusiasm and passion for future technology.
How can I assort telephone numbers, record a new number or delete the old one?

Table 5: What do you particularly like about the telephone-scenario?

Simple and convenient
ALIAS knows all the telephone numbers, I just need to name.
simple, fast communication without key operation
…that you can quickly call someone..
…easy operation and visual support (these functions are often too small on regular telephones)
Simple and easy control, very comfortable and enjoyable
Interlocutor could be programmed
easy accessible
voice recognition
Functioning from dictation, no manual settings
It is very helpful if it functions properly. I could make all the calls over the robot.
Voice control, size of the display
Communication was good; came quickly to conclusion
easy to use, immediate contact to the persons
I didn't have to type anything and could freely speak in the room and as well as to listen
communication was established orally, without using keyboard
Language choice – with a touch

6.2.2 Gaming scenario

The survey indicates less interest of the participants in gaming compared to the telephone function. In fact, only seven respondents said that they plan to use the offered games. Another seven people do not know yet and the rest will not play any games on ALIAS. The sceptics asked for alternatives as the following quotation shows: "I am not interested in playing games, but in reading books, therefore the robot platform should also provide books". That is why ALIAS should also provide, for example, the Kindle App.
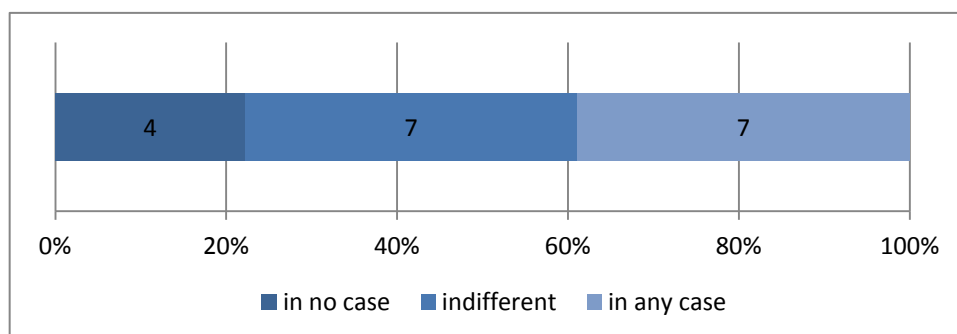
Figure 10: Will you frequently use the robot for playing games?

At the moment most users appreciate the easy handling of ALIAS (13 persons). Only two testers voted indifferent and three are not convinced of operating the games. In this context, participants have made it quite clear to us that the functionality of the voice control must be improved.
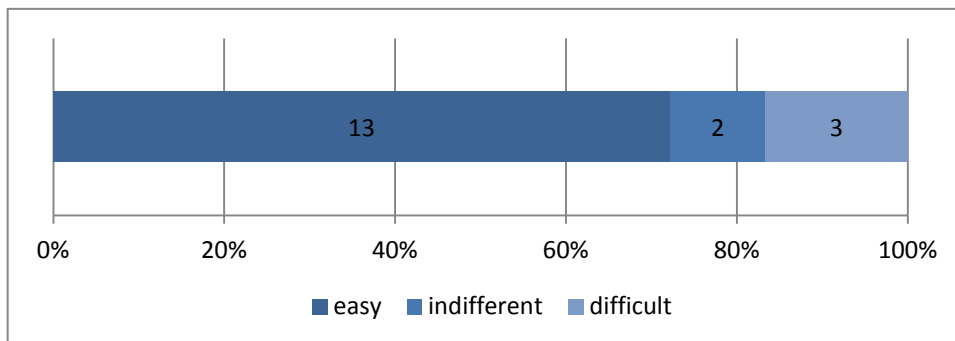
Figure 11: How do you assess the operating characteristics of the games?

Nobody asks for a special training for gaming on ALIAS. However, several respondents pointed out the fact that game instructions (maybe with pictures) have not yet been integrated. They emphasized that such an offer is important for them, especially when they do not know the rules. More than half of participants (9 persons) are uncertain whether they want a special training.
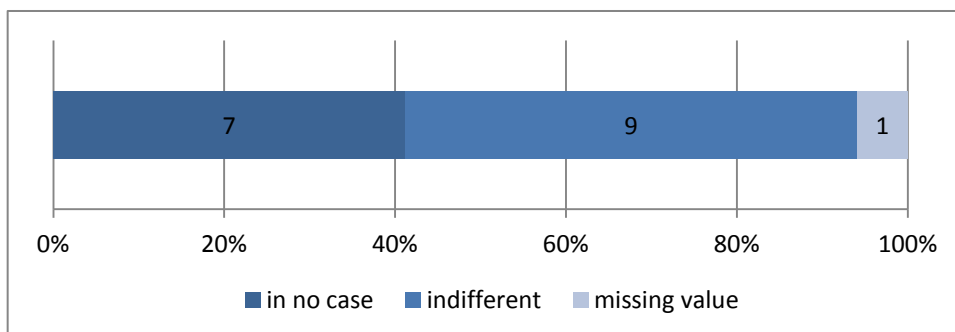
Figure 12: Will you need training or other forms of support to use the games?

The design of the user interface convinced the predominant majority of participants (11 persons). A few testers (four persons) are not sure and only one person does not accept the latest integration level.
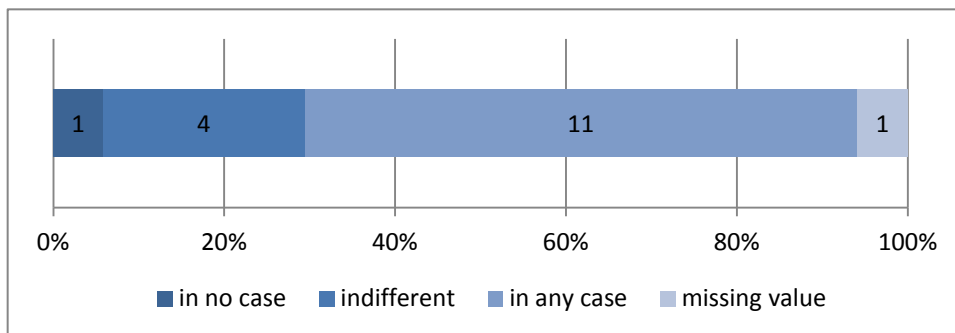
Figure 13: Are the various functions of the games well integrated?

Most seniors (11 persons) told that the gaming functions matched very well.
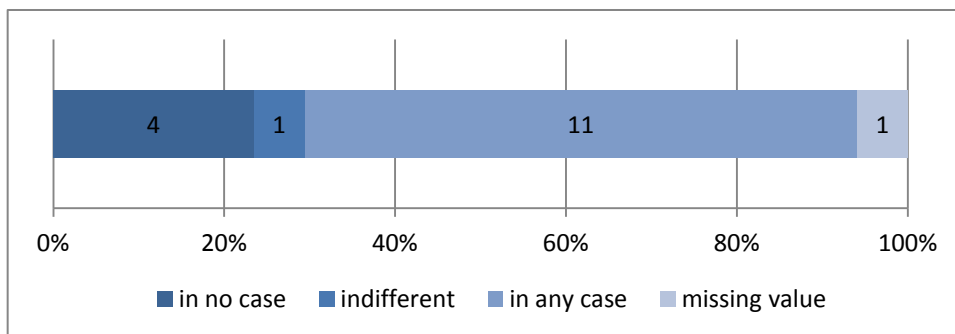
Figure 14: Do the functions work very well together?

The respondents believe that seniors do not have problems facing the provided games. Most of them (11 persons) say that seniors deal with ALIAS without problems, six of them are uncertain yet and only one person thinks that elderly people will have difficulties.
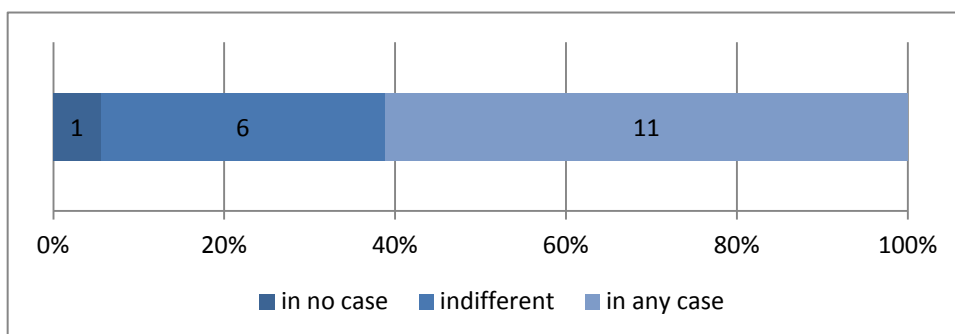
Figure 15: Can you imagine that most seniors will learn to use the games very quickly?

Most seniors (12 persons) estimate the operation of the provided games as very comfortable. They said that ALIAS provides an "intuitive user interface that requires little training". Only one member of the testers indicates that she or he didn't find the gaming very comfortable.
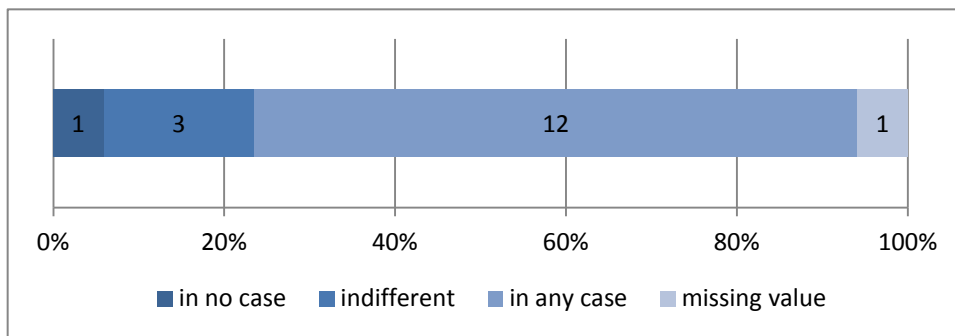
Figure 16: Do you find the usage of the games comfortable?

Most participants are not afraid of facing challenges when learning the operation of ALIAS. They said that they will "take it easy". Some of them told us that they are looking forward to the challenge because they are "very curious about the new" or "interested in learning". But they wished "to know the rules better".

Other users told us that they are not actually interested in playing games. They rather wish that ALIAS provides books like Amazon Kindle. Here it would be good to install the Kindle App on the ALIAS platform.
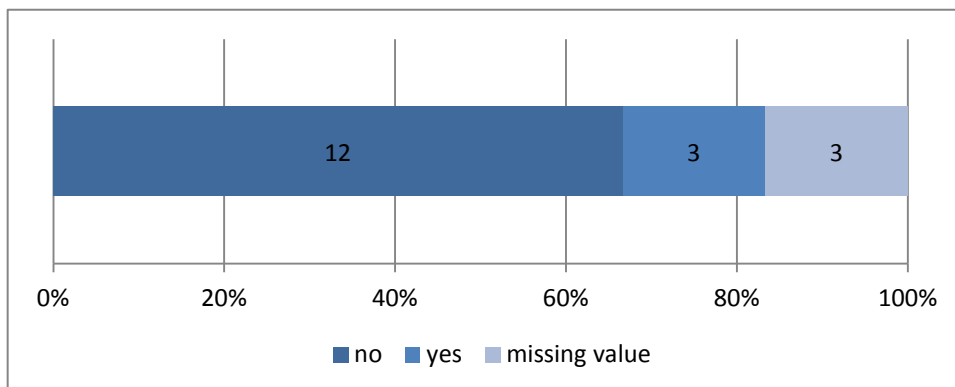
Figure 17: Do you need to learn a lot of things before using the games?

The testers responded to this challenge diverse as shown in table 6:

Table 6: How do you handle this learning task?

Easy, relaxed
Explain the rules of the games/ to read before starting unknown games
had not any problem (is easy to learn)
curious, interesting, entertaining
It would be boring for me, may be literature
Condition: the end of the games should be declared
you must know the rules
I definitely need help in operating with games.
Operation of the games, options such as in traditional PC games. I had to adopt/adjust. Where can I find what games? Where and how can I get new one?

Table 7: What do you like particularly about the game-scenario?

good picture, clear
common games, easy to learn
too little details for games
Easy to play
requires intellectual and motor activity
Easy games, well-known games, for multiple players to play together
Availability/accessibility
adequate display size
I like to play computer games. The screen is great and good to be used for major games in a reasonable size, convenient to watch, panels are large enough
they were clearly visible
large and clear font, characters can be easily recognized
Since not everything is testable at the moment, I can't judge
tested only partially, almost nothing worked
visual representation, knowledge of games and rules required

Seniors praised the clarity and a good visibility of the screen. Also they were pleased with easy operation and with the familiar games. Moreover, the testers provided various ideas for improvements regarding the gaming scenario:

- Necessary electronic instructions to the games are missing yet; elderly people wish to "know the rules".
- Different levels of games' difficulty are needed (e. g. chess)
- Possibility of confirmation after selection before final choice
- Games accompanied by music?
- holistic mnemonic training
- Even broader functionality/more options (memory, checkers, halma)
- Help function to control "next" and "back" (e.g. conventional computer games)
- ALIAS should congratulate the winner: mainly because the elderly people play for their own!

- Desktop should be used as a tablet pc.

Table 8: Do you have any comments, requests or suggestions regarding the development of the robot?

Assistance with physical disabilities in old age, domestic help, security, maximum independence, nursing
Uses need to be more diverse. It should be possible to enlarge easily the text messages on screen. Make touch points larger e.g. (+/-).
Robot should react to turn off/turn on, should have magnifier, should adjust to persons' environment, "Stummer Diener" should build up personal relationships, must not lead to isolation, quality of life should improve by means of Alias + health monitoring
In my opinion robot is …in the early stages of development. I would have think about future development only when the voice control and the menu system will run better.
To improve voice control. Make the robot a bit smaller. Memory games. Event functions (larger choice)
I find it great that there is such a thing that will embellish elder people life.
Computer should greet me by name. Computer should repeat commands.
Too simplistic for the preservation of various brain functions, immature!
other applications e.g. everyday life activities of seniors
The robot could be smaller, otherwise visually well. Screen should be extendable to serve him better.
too big, control panel should be able to pull up and to be fixed at the operating height
ALIAS must also react to weak voice
It would be good for me if it could read reactions by the eyes. The tone with which you need to talk to the robot is too harsh (commanding).
The robot is too huge to be used in all homes – e.g. living room is only 16m2
Speech recognition, size of the robot must be variable in height (sitting position)
Touch screen should be portable, e.g. to make it possible to take him on the lap. Touch screen should be attached to the "front side" of the robot.
Lots! 1. to see the world/launch, 2. to speed up reaction time, expand telephone support

functions, 3 Games via Mobile Phone or Tablet PC

In conclusion, it should be mentioned that the AAL products are being judged ambivalently by the users. On one hand they are apprehensive of job elimination in the field of caregivers and cuts of costs, on the other hand they see ALIAS as a help for everyday life.

7 Conclusion

In this Deliverable we described the development, implementation and evaluation of the first field trials, conducted at pme Familienservice GmbH in Berlin on 29th and 30th September 2011. The three scenarios (telephone, games and ticket scenario) were tested with ten test pairs. The results show, that the test persons needed several attempts to be understood by the robot, but most functions could be initialized without using the touch screen. Persons with higher voices were harder to recognize. The quality of the Skype connection was predominantly fine. Starting the games menu worked quite well. Also the navigation works good. Some difficulties occurred since ALIAS functions were not limited to a specific context – so it happened, that the robot misunderstood something during a phone call and e.g. left its position then. The e-tickets-application was more difficult to test. The state of implementation did not allow to go through the scenario as defined. Also just playing around with it to test its functionality was a bit tricky, since keywords and event descriptions have been mostly in English language (which most elderly test persons were not used to) and it was not possible to type a keyword due to a not implemented onscreen keyboard. Referring to functionality, it would be important to include search options (type of event, distance from home, age group etc.) and to search events in the future, not (only) in the past.

8 Appendix

8.1 Scenarios

In the appendix you will find a brief overview of the scenarios covered in the report. Steps marked in red were not part of the present field trials because of technical problems; those marked in yellow show alternative steps offered in this test.

8.1.1 Alarm Call Scenario

		Affected Functions										
Step Number	Step Description (First word indicates the main actor of the step)	Speech recognition; Speech systhesis	Tracking; e.g. with Laser	Motion; Navigation	Telephone; Skype	E-Mail	Calendar	Physiological Monitoring	Graphical User Interface	Games	Browser	tification; Detection via Kinect
1	Senior comes into test room											
2	Senior puts on headset for speech control											

3	Senior asks ALIAS to come over	x											
4	ALIAS comes to Senior		x	x									
5	Senior asks ALIAS to initiate a telephone call to pme Familienservice; Felicitas Kohl; Tel.:+49 30 263957853 (via speech)	x											
6	ALIAS identifies User and understands the request	x											x
7	ALIAS initiates the call				x								
8	Felicitas is not responding, only the answering machine responds.				x								

9	ALIAS leaves a message on the answering machine: "A test person was calling and will try again later."	x														
10	ALIAS tells the senior, that only the answering machine was reponding. He asks if he should try again later.	x														
11	Senior replies positively to that question.	x														
12	ALIAS moves back and waits in a corner of the test room.			x												
13	Felicitas picks up her phone, to make sure it will be "busy".															
14	ALIAS asks the senior (after waiting for 1 minute), if he should try to call again.	x	?													?

#	Description												
15	Senior replies positively to that question.	x											
16	ALIAS initiates the call				x								
17	ALIAS tells the senior, that Felicitas is busy. Afterwards he asks the senior, if he should let him know, when Felicitas is available again.	x			x								
18	Felicitas hangs up.												
19	ALIAS notices that Felicitas is now available and tells the senior. He moves to the senior, shows a picture of Felicitas on the screen and asks the senior, if he wants to call again now.	x		x	x				x				
20	Senior agrees.												
21	Felicitas responds to the call and talks to the senior (e.g. about the quality of the connection).				x								

22	ALIAS checks medical parameters of the senior during the call			?				x					
23	ALIAS notes, that medical parameters reach a critical level							x					
24	ALIAS interrupts the telephone call and makes an emergency call; (which goes to another connection at pme Familienservice)	?			x								
25	Senior ends the call.												

8.1.2 Games Scenario

Step Number	Step Description (First word indicates the main actor of the step)	Affected Functions										
		Speech recognition; Speech systhesis	Tracking; e.g. with Laser	Motion; Navigation	Telephone; Skype	E-Mail	Calendar	Physiological Monitoring	Graphical User Interface	Games	Browser	Face Detection and Identification; Detection via Kinect
1	Senior is in the room, watching TV or reading a book.											
2	ALIAS stands ready for orders in a corner of the room.											
3	ALIAS stands ready for orders inside his charging station.											
4	Senior decides he or she wants to play a game.											
5	Senior calls ALIAS to come over.	x										

#	Description	1	2	3	4	5	6	7	8	9	10	11
6	ALIAS comes over.		x									x
7	Senior tells ALIAS that he or she wishes to play a game.	x										
8	ALIAS responds: "Ok."	x										
9	ALIAS activates GUI.								x			
10	ALIAS activates games.								x	x		
13A	Senior decides to play a game and tells ALIAS which one.	x										
14A	ALIAS responds: "Ok."	x										
15A	ALIAS activates game menu.								x	x	x	
24A	Senior plays game.									x		
26A	Senior stops playing.	x										
28A	ALIAS informs Gertrud that Senior wishes to stop playing.				?	?					x	
29A	ALIAS deactivates multiplayer mode.											
30A	ALIAS deactivates game.								x	x		

ID	Description													
31A	ALIAS deactivates GUI.									x				
32A	ALIAS waits for orders.													
12B	Senior decides to play a disc game and tells ALIAS he or she wants to play a Disc Game	x												
13B	Senior tells ALIAS which disc game.	x												
14B	ALIAS selects disc from his disc store.													
15B	ALIAS activates game.									x	x			
16B	ALIAS responds: "Ok. Please take console."	x												
17B	ALIAS activates console.													
18B	Senior takes controller of console.													
19B	Senior plays game.									x	x			

ID	Description														
20B	ALIAS checks medical parameters of the senior during the game.								x						
21B	Senior says that he or she would like to stop playing.	x													
22B	ALIAS says: "Okay."	x													
23B	ALIAS deactivates the console.										x	x			
24B	ALIAS says: "Okay. Please put the controller of the console back into my console store."	x													
25B	Senior puts controller back into ALIAS' console store.														

		1	2	3	4	5	6	7	8	9	10	11	12	13
26B	ALIAS' sensors monitor that the controller is back in place.													
27B	ALIAS deactivates console.								x	x				
28B	ALIAS moves back into charging station.			x										

8.1.3 E-Ticket Scenario

Step Number	Step Description (First word indicates the main actor of the step)	Affected Functions											
		Speech recognition; Speech systhesis	Tracking; e.g. with Laser	Motion; Navigation	Telephone; Skype	E-Mail	Calendar	Physiological Monitoring	Graphical User Interface	Games	Browser	tification; Detection via Kinect	Scheduler (search)
1	ALIAS monitors current events such as exhibitions, movies, theatres, concerts on a regular basis.												x
2	ALIAS finds several events that suit the senior's interests.												

#														
3	ALIAS comes to the Senior and tells "I have selected some events suggestion for you."	x	?	x										
4	Senior responds that he or she would like to hear about it.	x	x											
5	ALIAS activates his GUI and displays the events in question.									x				
6	ALIAS asks the user, if he wants ALIAS to read out or to display information on events.													
7	Senior replies eigther that he wants ALIAS to read it out or that he wants ALIAS to display it..													
8	ALIAS reads event description, information and further details, like other friends attending, out loud.	x								x				
9	Senior interacts with the interface as he likes - e.g. checking the place and public transport to the event location, checking weather forecast; checking price and	x								x				

No	Description													
	availability of tickets etc.													
10	Senior chooses to make a note about the event into his calendar.											x		
11	ALIAS makes a note into his calendar.						x					x		
17	ALIAS asks the senior whether he should inform other persons of senior's attendance and if he should ask them to accompany senior.	x										x		
18	Senior replies positively and specifies whose persons, like for example Felicitas Kohl (pme Familienservice).	x								x		x		
19	ALIAS informs Felicitas and waits for response.				?	?						?		
20	ALIAS reports to senior: "Event is scheduled and Felicitas is informed."	x	x							x				
21	Senior expresses, that he likes to finish the interaction.													
22	ALIAS turns off GUI.													

| 23 | ALIAS moves back to the corner of the room. | | | x | | | | | | | | | |

8.1.4 Physiological Monitoring Scenario

Step Number	Step Description (First word indicates the main actor of the step)	Affected Functions										
		Speech recognition; Speech sythesis	Tracking; e.g. with Laser	Motion; Navigation	Telephone; Skype	E-Mail	Calendar	Physiological Monitoring	Graphical User Interface	Games	Browser	Face Detection and Identification; Detection via Kinect
1	ALIAS keeps Senior's diary of vital functions.			x			?	x				
2	ALIAS keeps Senior's appointments with the doctor in a calendar.						x	x				
3	ALIAS notices unusually high vital functions.							x				
4	ALIAS tells Senior: "I see your (e.g.) blood pressure is higher than usual."	x						x	x			

5	ALIAS asks Senior: "Would you like to call your doctor?"	x										
6	Senior replies positively.	x										
7	ALIAS activates telephone.				x				x			
8	ALIAS opens telephone book.				x				x			
9	ALIAS selects doctor's phone number. (in this case: telephone call to pme Familienservice; Felicitas Kohl; Tel.:+49 30 263957853 (via speech))				x				x			
10	ALIAS dials doctor's phone number (in this case: telephone call to pme Familienservice; Felicitas Kohl; Tel.:+49 30 263957853 (via speech))				x				x			
11	Doctor (Felicitas Kohl) picks up phone.				x				x			
12	ALIAS records conversation.	x			x							

13	Senior speaks to doctor (Felicitas Kohl).	x			x							
14	Senior hangs up the phone.	x			x							
15	ALIAS stays with Senior.							x				
16	ALIAS waits for orders.							x				

8.2 Questionnaire I

GENDER STUDIES
in Ingenieurwissenschaften

aLIaS

ALIAS Field Trials I
29th/30th of September 2011

1. What is interesting for with the robot project ALIAS?

    _____

    _____

    _____

    _____

2. Why do you want to participate at today's test?

    _____

    _____

    _____

    _____

3. What are your expectations regarding the robot platform ALIAS for today's test?

    _____

    _____

    _____

    _____

4. What are your attitudes towards technological developments in general?

    _____

    _____

    _____

    _____

5. What are your attitudes towards technological developments in the field of assistance systems?

    _____

    _____

    _____

6. If you have further remarks, we would be glad if you would let us know:

    _____

    _____

    _____

8.3 Observation sheet

GENDER STUDIES
in Ingenieurwissenschaften

aLia5

ALIAS Field Trials I
29th/30th of September 2011

General				
Name of observer				
Number of observers				
Date				
Location	☐ testing room		☐ interrogation room	
Start of observation				
End of observation				
Duration of observation	hour(s)		minute(s)	

Test subject						
Number	☐	one person	☐	two persons	☐	more: _____
Sex	☐	female	☐	male		
Age						
Interest in technolgy	☐	high	☐	medium	☐	small
Physical fitness	☐	good	☐	medium	☐	bad
Specifics						

Other attendants			
Number	_____ women	_____ men	
Sex	☐ female	☐ male	
Behaviour	☐ passive listeners	☐ active participants	
Specifics			

Formal procedure		
According to the script	☐ yes	☐ no
Deviations		
Specifics		

GENDER STUDIES
in Ingenieurwissenschaften

aLia5

Time	Observations	Interpretation

8.4 Questionnaire II

GENDER STUDIES
in Ingenieurwissenschaften

aLiaS

Dear Sirs or Madam,

We want to find out if robots have the potential to support and enrich the life of elderly people. The aim of the project ALIAS is the development of a mobile robot system for an older user group, to support the daily life and promote communication and social integration. It will take approximately 10 to 15 minutes processing this questionnaire.
Thank you for your support!

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.

Questions about the telephone-scenario

1. Would you frequently use the telephone function?

   in **no** case   ☐ ☐ ☐ ☐ ☐ ☐   in **any** case

2. How do you assess the operating characteristics of the telephone function?

   easy   ☐ ☐ ☐ ☐ ☐ ☐   difficult

3. Would you need training or other forms of support to use the telephone function?

   in **no** case   ☐ ☐ ☐ ☐ ☐ ☐   in **any** case

4. Are the various functions of the telephone system well integrated?

   in **no** case   ☐ ☐ ☐ ☐ ☐ ☐   in **any** case

5. Do the functions work very well together?

   in **no** case   ☐ ☐ ☐ ☐ ☐ ☐   in **any** case

6. Could you imagine that most seniors will learn to use the telephone function quickly?

   in **no** case   ☐ ☐ ☐ ☐ ☐ ☐   in **any** case

7. Is the system comfortable to use?

   in **no** case   ☐ ☐ ☐ ☐ ☐ ☐   in **any** case

8. Would you have to learn many things before using the telephone function?

   ☐ no → **please jump to question 10**   ☐ yes → **please jump to question 9**

9. How did you handle this task?

   _____

   _____

GENDER STUDIES
in Ingenieurwissenschaften

aLias

10. What did you particular like about the telephone-scenario?

_____

_____

_____

11. What suggestions do you have?

_____

_____

_____

Questions about the games-scenario

12. Would you frequently use the robot playing games?

in **no** case ☐ ☐ ☐ ☐ ☐ ☐ in **any** case

13. How do you assess the operating characteristics of the games?

easy ☐ ☐ ☐ ☐ ☐ ☐ difficult

14. Would you need training or other forms of support to use the games?

in **no** case ☐ ☐ ☐ ☐ ☐ ☐ in **any** case

15. Are the various functions of the games well integrated?

in **no** case ☐ ☐ ☐ ☐ ☐ ☐ in **any** case

16. Do the functions work very well together?

in **no** case ☐ ☐ ☐ ☐ ☐ ☐ in **any** case

17. Could you imagine that most seniors will learn to use the games quickly?

in **no** case ☐ ☐ ☐ ☐ ☐ ☐ in **any** case

18. Did you find the usage of the games comfortable?

in **no** case ☐ ☐ ☐ ☐ ☐ ☐ in **any** case

19. Do you need to learn a lot of things before using the games?

☐ no → **please jump to question 21**   ☐ yes → **please jump to question 20**

20. How do you handle this task?

_____

_____

GENDER STUDIES
in Ingenieurwissenschaften

ALIAS

21. What did you like particularly about the game-scenario?

_____

_____

_____

22. Which suggestions do you have?

_____

_____

_____

Socio-demographic data

23. Sex: ☐ female ☐ male

24. Date of Birth: Year: 19 [____]

25. What school did you attend?

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

26. What professional background do you have?

_____

27. How many people live in your household?

☐ I'm living alone ☐ two persons
☐ three persons ☐ more than three persons

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

_____

_____

_____

Thank you for your cooperation.

Contact:

Technische Universität München
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Arcisstraße 21
80290 München

Contact partners:

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9.2 List of Figures

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