

safemove

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Other Contributors	Netural / Neusta
Author	Ralf Borchers
AAL Project Officer	Jerome de Barros

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1 Executive summary

Aim of the deliverable
The aim is to present the first outcomes of all SafeMove components' conceptual and development process by demonstrating a first impression. This report is part 1/3 and as such the basis for the further development of the SafeMove system and its integration.
Brief description of the sections of the document
Brief description of each component of the SafeMove basic pilot and an outlook on next steps.
Mayor achievements
A first pilot of each component is available and ready to be adjusted according to the consortium's feedback, the user's needs and to be integrated within the SafeMove system.
Summary of the conclusions obtained
Not applicable – report on practical output.

2 Output on the creation of the SafeMove system's components

2.1 SafeMove on tour

2.1.1 Overview

The goal of the onTour component is to encourage clients by taking part in various activities and preserving a sense of social connectedness and belonging. To achieve these goals onTour assist clients during the typical strategies of the everyday life of elderly people: Selection, optimisation and compensation. For the selection strategy onTour offers the opportunity to take advantage of existing potential. For example achieved through reducing burden, by avoiding challenging social situations and focusing on personal meaningful activities. Furthermore clients could obtain and improve their agency with onTour. For that, onTour assist clients to facing their challenges head on to working harder at things. This is a common optimisation strategy of elderly people. If familiar means of a client will become unreliable and unstable elderly people typically tend to use the compensation strategy seeking and accepting help from others. For this onTour offers assistance to still the need nevertheless.

2.1.2 Focus for this development phase

The focus during the development of the enhanced onTour pilot was integration and accessibility. Essential for both goals is a robust data synchronisation mechanism between onTour and Assist. Typically the synchronisation mechanism from mobile applications is depended from the network status. If the network connection is unavailable or unstable some of functionality may be unavailable or unreliable. Usually in such a situation the user is responsible to establish a stable network connection. The recognition and handling of such a situation is a challenging task for the target group of SafeMove. As a consequence, the accessibility of the application becomes limited.

Other rather typically accessibility topics like font size, wording, symbols, colours, multimodal feedback and navigation hierarchy are also tackled during the development of the enhanced onTour pilot. Some of these points are closely linked to the hardware requirements of a smartphone like screen size, contrast ratio in the sunshine and sensitivity of the touchscreen.

To achieve a robust data synchronisation mechanism the onTour application based on an on-device database. This is charged with all necessary data for the application. In this way, even without or an unstable network connection to Assist is the functionality of the application guaranteed. Technically this database is a snapshot of a part of the Assist database. A replication service from onTour listens on the network connection and uses every possible moment to synchronise as much as possible data with the Assist database. This approach constitutes a good compromise between availability of the application functionality and actuality of the data.

To conserve network and memory capacity the database snapshot contains only a part of the whole Assist database. This is realised through a subscription principle. The data in the Assist database is partitioned in channels, which can be subscribed by the replication service of the onTour application. In this way, only the necessary data for the mobile application can be synchronised. Relevant data channels for onTour are for example the contacts, appointments and reminders of a client. Unsubscribed channels are for example the pictures of the gallery or the data of the serious games.

2.1.3 Call for Help Assistance

To assist clients in the process of applying the compensation strategy seeking and accepting help from others onTour offers a call for help assistance. The interface of this functionality is very minimised to ensure the accessibility and usability of this component also under stressful panic situations. The navigation hierarchy consists of one level. The number of contact items cannot become bigger than the available space on the screen to prevent scrolling.

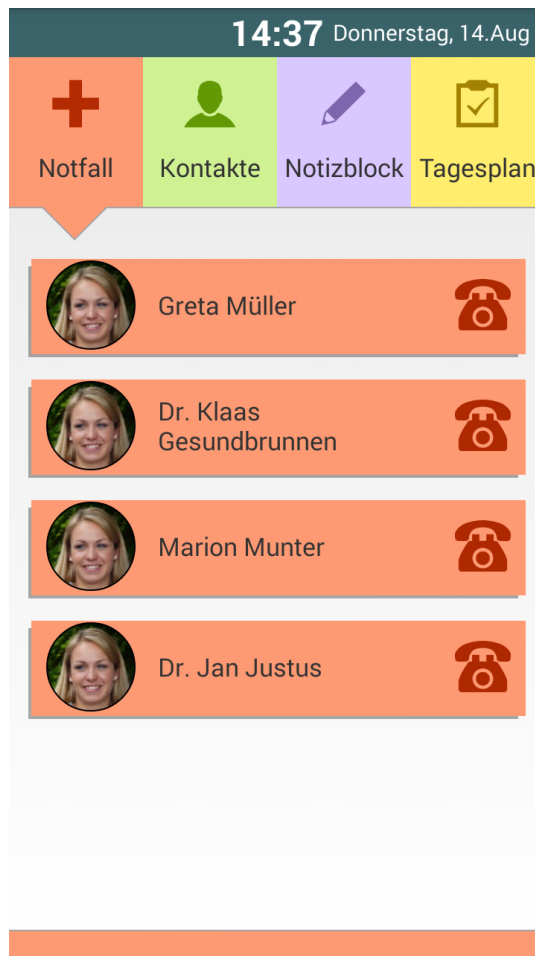


Figure 1 Call for help screen

2.1.4 Contact Assistance

The selection strategy of elderly people is supported by onTour through a list of contacts. In comparison with the call for help assistant is scrolling available and the navigation hierarchy has two levels. Besides the obvious goal “stay in contact” helps this list under the use with pictures and roles to identify personal meaningful persons.



Figure 2 Contact list on mobile device

2.1.5 Daily's Schedule Assistance

The Daily's Schedule Assistance is another possibility to support the application of the selection strategy of elderly people. A list of upcoming or past appointments of the current day gives the user temporal orientation. In this way it decreases the burden of planning appointments and reduces the risk of challenging social situations like being late or forgetfulness. Additionally this encouraged the user to become more active by getting a feedback about the activities. A status bar with the current date and time supports the daily's schedule.



Figure 3: Scheduled activities on mobile device

2.1.6 Reminding Assistance

Reminders suddenly pop up on the device whenever an appointment or task is due. The pop up is supported by tactile and acoustic signal of the smartphone. They remind the client to do something. This supports the optimising strategy of elderly people to work harder on challenging issues like forgetfulness.

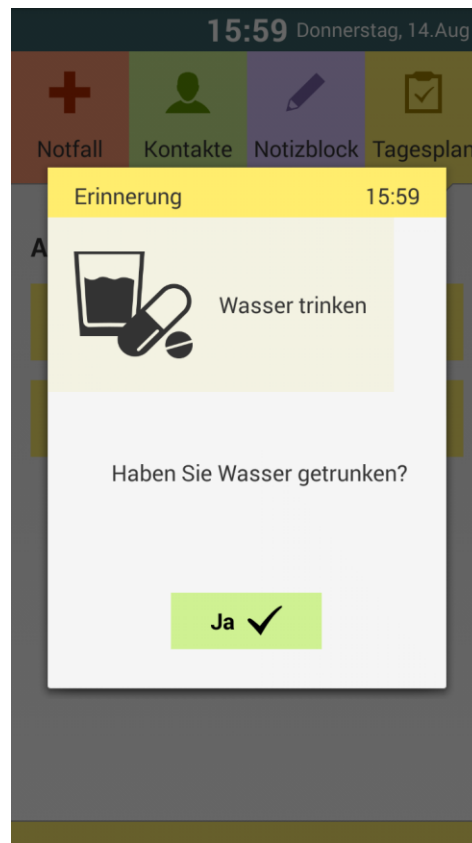


Figure 4: Confirming an activity on the mobile device

2.1.7 Remote Management

The interaction design of onTour is minimal and straightforward to achieve an easily understandable interaction between user and application. For this it was necessary to abandon any direct configuration functionality. Maintaining the contacts, appointments and reminder will be controlled completely from SafeMove Assist. A positive effect of this is the relationship development between client and caregiver during the common management of contacts, appointments and reminders.

The replication service of onTour is responsible to synchronise automatically inputs from Assist to onTour.

2.1.8 General Interface Design

The functionalities of the onTour application are distinguishable by colour to achieve an easily understandable interaction. The font size is customisable to each client's requirements.

2.1.9 Smartphone Requirements

Besides the common features of typical smartphones (wireless network, touchscreen, speaker....) the ageing of the sensomotoric system sets special requirements. Due to the usage of onTour in an outdoor environment the contrast of the screen needs to be also in bright sunlight high enough. For the same reason the battery runtime needs to be high enough to span a whole day without recharging. Due to the low skin moisture of elderly people the sensitivity of the touchscreen is another typical problem during the interaction. To avoid this the smartphone needs to offer digitizer pen. Capacitive, so called active digitizer, would be preferred to improve the reliability of the touch recognition. On the one hand the screen size needs to be big to reduce scrolling and to facilitate big buttons and fonts. On the other hand the device size is dependent on the screen size. And a big device is hard to hold from a person with an aged sensomotoric system, low skin moisture and stiff fingers. Five till six inches diagonal is a good compromise. Also the speaker of the smartphone needs to be loud and clear. A recommendation from the Safemove Project, which meets all these requirements, is the Samsung Galaxy Note 3 (Model Number: N9002, N9005, N9006, N900W8, N9009).

2.2 SafeMove Assist

2.2.1 Overview

The SafeMove assist component is the part which is meant to be used by formal and informal caregivers (professional caregivers and/or family members etc.) The functionality focus lies on supervision, statistics and patient details so the core features of SafeMove assist are a detailed overview, monitoring and managing the clients and their activities.

Caregivers with more than one client are provided with a clear overview that communicates the current status and well-being of all of their clients. If a client needs their attention they should instantly respond via messaging or voice (and maybe video) -calling services.

In the current version of SafeMove solution (the enhanced pilot), only one client can be monitored and managed by a care giver. So every "SafeMove At Home" is a stand alone unit. Kitting together all SafeMove At Home units is part of the last implementation step (the final pilot). However, the function e.g. to manage clients activities, to setup its contacts and so

on, can be done with the enhanced pilot already, because the personal data are stored and managed in the SafeMove At Home unit. The implemented dialogs to operate with that data are also implemented in the SafeMove At Home unit.

A detailed description of the output on SafeMove assist is included in D2.4b Report on personalised user-environment interaction.

2.2.2 Visual Impressions

2.2.2.1 Managing and Planning Routes

In section “Routen” the care giver can manage (select or delete routes) as well as plan or edit a route for a client. Waypoints, guidance information and landmarks can be added to route.

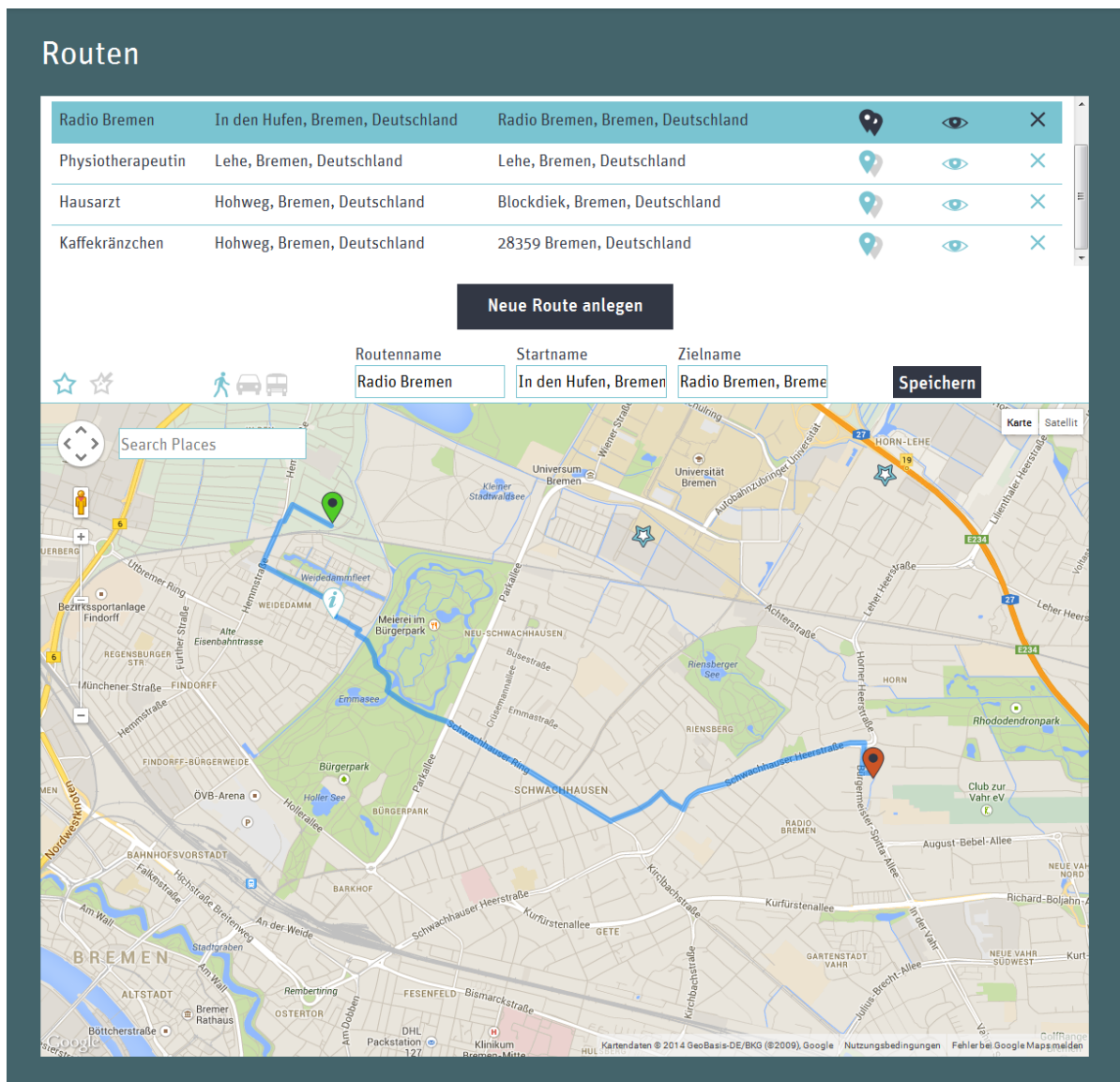


Figure 5: Routes on the Assist screen

2.2.2.2 Managing and Setup Reminder

Reminder are pushed information to inform the client frequently to “don’t forget” things to do. Reminder is given to client via pop-up dialogs, sounds or vibrations through SafeMove OnTour and SafeMove At Home.

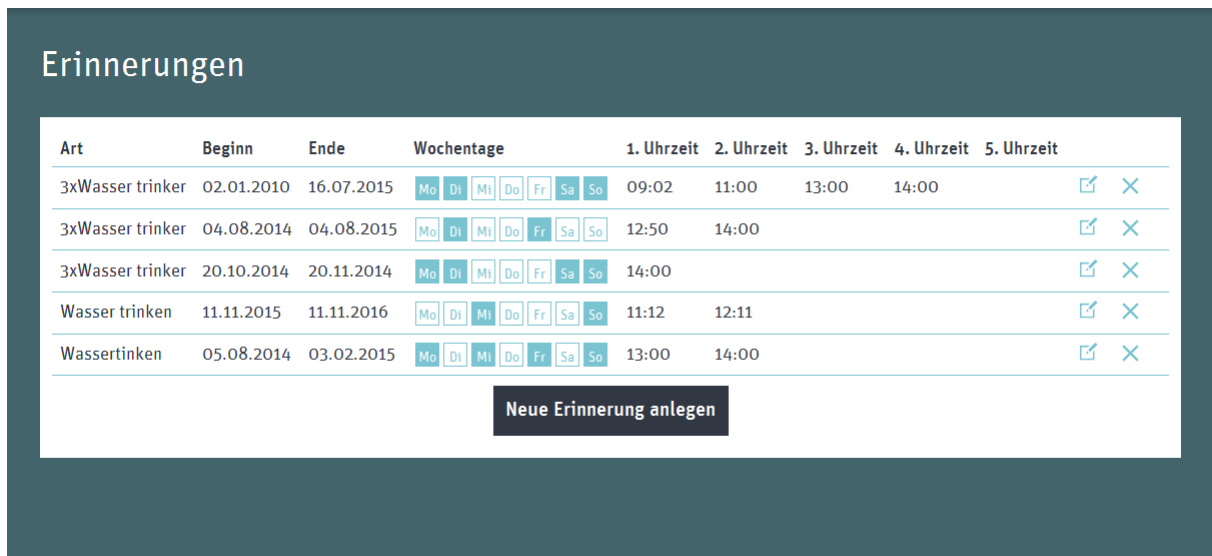


Figure 6: Reminders in Assist

2.2.2.3 Setup Contacts

Kontakte

Name	Straße	Ort	Telefonnummer	Rolle	Bearbeiten	Löschen
Doris Danke	Lise-Meitner-Str. 2	28359 Bremen	0421 22095 37	Kusine		
Johannes Baier	Lise-Meitner-Str. 2	28359 Bremen	0421 22095 37	Schwager		
Maureen Mikel	Lise-Meitner-Str. 2	28359 Bremen	0421 22095 37	Nichte		

Kontakt hinzufügen

Figure 7: Contacts shown on the Assist display

2.2.2.4 Setup Emergency Contacts

In urgent (medical) emergency cases up to six contacts can be setup as an Emergency contact. These six contacts are shown in SafeMove OnTour in the separat section “Notfall”.

Kontakte Claus Petersens



Notfallkontakte

Diese Kontakte kann Claus Petersens in No...

ste gespeichert werden.

Name	Straße
Marion Munter	Wachm...
Greta Müller	Musters...
Dr. Klaas Gesundbrunnen	Lise-Me...
Dr. Jan Justus	Lise-Me...

Notfallkontakt hinzufügen/bearbeiten X

Vorname

Name

Straße und Hausnummer

PLZ und Ort

Telefonnummer

Beziehung

Speichern

Rolle	Bearbeiten	Löschen
Tochter	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Tochter	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Arzt	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Arzt	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Kontakte

Name	Straße	Ort	Telefonnummer	Rolle	Bearbeiten	Löschen
Doris Danke	Lise-Meitner-Str. 2	28359 Bremen	0421 22095 37	Kusine	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Johannes Baier	Lise-Meitner-Str. 2	28359 Bremen	0421 22095 37	Schwager	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Maureen Mikel	Lise-Meitner-Str. 2	28359 Bremen	0421 22095 37	Nichte	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Kontakt hinzufügen

Figure 8: Entering an emergency contact

2.2.2.5 Manage Picture Gallery

In SafeMove At Home the clients can view picture in gallery prepared in SafeMove Assist. Each picture can be setup with a subtitle.

Bildergalerie

Alben

Titel	Angelegt von	Angelegt am		
Familie	Hans Müller	01.01.2001		
Enkelkinder	Greta Müller	02.02.2003		
USA Reise 1970	Hans Müller	12.05.2012		
Goldene Hochzeit	Greta Müller	23.08.2011		
Familienmitglieder	Gerda	04.08.2014		

Neues Album anlegen

Bilder

Album auswählen

Titel	Untertitel	Bild	Nach oben	Nach unten		
Nick	Am ersten Schultag					
Grete und Karl	Geburtstag					
Hans	Wanderung im Schwarzwald					

Neues Bild hochladen

Figure 9: Image of the Picture Gallery

2.3 SafeMove At Home

The SafeMove Assist component is related to the SafeMove At Home unit. On that unit or via the Internet and knowing the IP address of the specific SafeMove At Home unit it can be opened with a internet web browser (e.g. Firefox, google Chrome):

- localhost/HTML_Assist/overview.html or
- <ip address>//HTML Assist/overview.html

2.3.1 Overview

2.3.1.1 Main menu



Figure 10: Main menu of atHome

2.3.1.2 Activities



Figure 11: Activities on the atHome screen

2.3.1.3 Contacts



Figure 12: Overview of contacts



Figure 13: Contact on the atHome screen

2.3.1.4 Exercises



Figure 14: Exercises overview on the atHome screen

2.3.1.5 Media

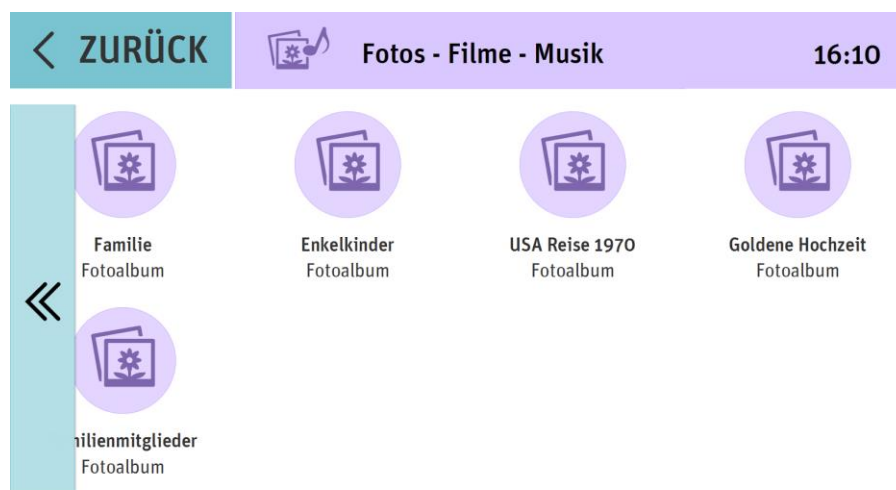


Figure 15: Media overview, e.g. photos or music

2.3.2 Serious Games

2.3.2.1 Overview

The Motivational Training Game is designed to support the overall SafeMove project and will address the following goals;

1. To inspire confidence in users that they are able to achieve and manage limited physical movement: we will achieve this by asking them to perform simple movements and providing positive reinforcement via verbal and visual feedback.

2. To inspire confidence in the users mental ability: we will achieve this by asking them to perform cognitive agility activities and providing positive reinforcement via verbal and visual feedback.
3. To inspire social confidence to encourage users to go outside their home and interact with other people within and outside of their social circle. We will do this by providing exercises around social intelligence, emotional intelligence and attempting to reduce the fear associated with some elements of modern living (for example seemingly threatening hoodies).

The game is all set in one environment, a park, where the user will be able to explore and launch 'mini games' which are each designed around the Physical, Cognitive and Social elements.

Physical, Cognitive and Social elements are not mutually exclusive and we expect a significant amount of cross over in the mini games.

Behind that background the games "golf", "walk in a virtual park", "hoop-la" and "find all smiling faces" were developed. In the following section some visual impressions of the game are given. The games are implemented in SafeMove At Home and can be select via the following dialog.



Figure 16: Serious games overview

2.3.2.2 Visual Impression

2.3.2.2.1 Golf

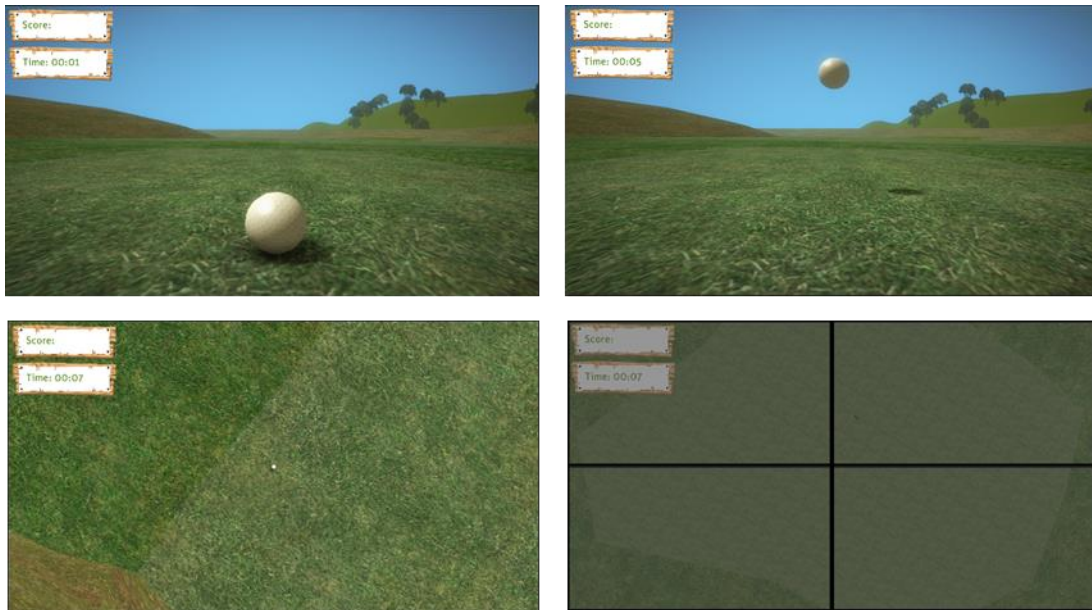


Figure 17: The Golf game

The game is based on a spatial span task exercise, your visuospatial working memory; the component of working memory that allows you to temporarily hold and manipulate information about places. Many everyday activities involve visuospatial working memory, including finding your way around your environment, judging the position of other motorists while you are driving and searching for your keys.

2.3.2.2.2 Walk in a Virtual Park



Figure 18: Virtual Park on the atHome screen

This game is designed to give the users gentle and guided exercise.

2.3.2.2.3 Hoop-la



Figure 19: Hoop la game

This is a variant of the classic Stroop Test. The user is faced with 3 colour posts in the ground at the same distance away. The colours are Red, Blue and Yellow. The user will be given hoops to throw to these posts

There will be a tombola sign which spins around and will have one of the 3 colours written on it but it may be displayed in a different colour. For example, the word says **RED** but it is written in blue. The user must then throw the hoop to the blue post. So the user must throw the hoop at the correct post according to the colour of the word and not the word itself.

2.3.2.2.4 Find All Smiling Faces



Figure 20: Smiling Faces screen

The idea of the game is that each time the user drags their attention away from one of the frowning faces in order to find a smiling, accepting face, it helps to build a mental habit. The next time they are reminded of a rejection or criticism from someone else, rather than dwelling on it, they may be able to 'let it go'.

It also can help users feel accepted and supported by others this and in turn can help them feel more confident in dealing with daily challenges.

2.3.3 Download of demonstration software

To try out the first pilot of the motivational training game [click here](#) to download. This will download a ZIP file. You will need to unpack this and launch the file named **SafeMoveVer3.exe**.

You will need a Windows Kinect device attached to your Windows PC (Windows 7 or 8).

You will also need to download the Kinect SDK. [Click here](#) to launch the website.

3 Integration Infrastructure

The SafeMove solution combines four components: SafeMove Cloud, SafeMove At Home, SafeMove Assist, and SafeMove On Tour. In figure below an overview of the architecture of these components in SafeMove solution is given. Contextual all components of one client are connected to, and via a small SafeMove Cloud. All data and information are stored in it, and are distributed (controlled by several permission checks) on demand. Technical the data are transferred using internet technologies, wired (Assist, At Home) and mobile data (On Tour).

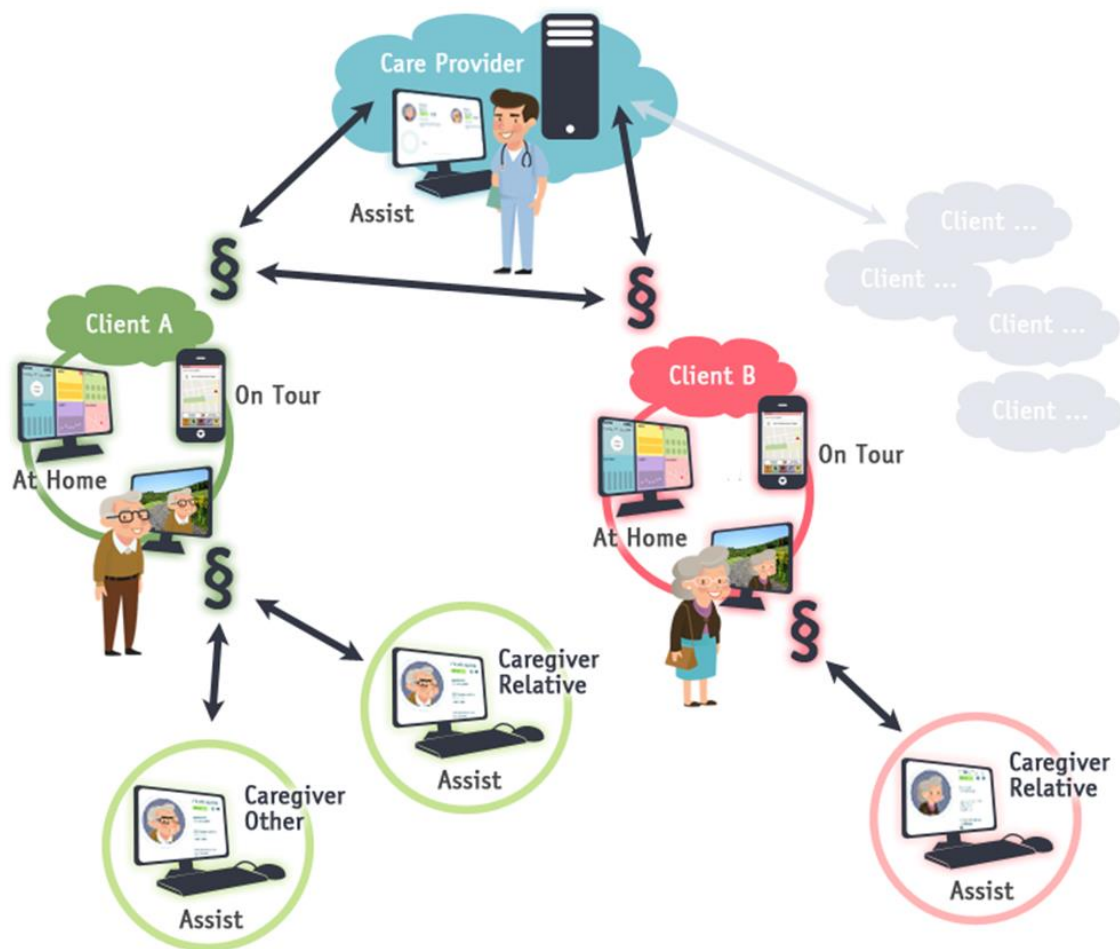


Figure 21: Overview of the architecture of SafeMove solution

In enhanced pilot of the SafeMove solution the implementations of all components based on the implementations of the basic pilot were reviewed and focused on the use cases and its requirements of deliverable D1.2b. Actually the SafeMove solution unit is working alone, as a stand alone system, but the architecture is designed to be a part of a multi user system. All

components are part of the SafeMove atHome hardware that is a barebone computer GIGABYTE GB-BXi5-4200, see a picture below, with the following criteria:

- Supports dual display video output via HDMI and mini DisplayPort
- Includes IEEE 802.11b/g/n Wi-Fi / Bluetooth 4.0/3.0 Combo Mini PCIe module
- Includes VESA bracket for discreet display and wall mounting
- Dimensions: 29.9 mm x 107.6 mm x 114.4 mm



Figure 22: Hardware of SafeMove AtHome Computer

In the next step, the final pilot, these AtHome units will be combined, so that a care provider person can setup and overview one or more clients.

4 Next steps

To proceed and reach the second stage of the SafeMove system's prototype the following procedure will take place:

- Adjust each component based on the feedback on usability and look and feel
- Adjust each component based on user trials.
- Create necessary gateways to combine the components and link them to each other and the cloud.

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