Final Report – Graduation Project

Elderly Care Innovation

PHILIPS Consumer Lifestyle BG Television

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PHILIPS
Consumer Lifestyle

GRADUATION PROJECT REPORT

FONTYS UNIVERSITY OF APPLIED SCIENCES
DEPARTMENT OF INFORMATION TECHNOLOGY
HBO-ICT: ENGLISH STREAM

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FOREWORD

As 4th year student Information & Communication Technology (ICT) from Fontys University of Applied Sciences Eindhoven, student taking a double degree program which is 3 year in my own country (Indonesia) and 1 year (final year) in Netherlands. As part of final year program, student is required to undergo an internship within company. This internship is at least 90 working days which my time frame is from February until Augustus 2012.

The thesis is written for Fontys University of Applied Sciences and Philips Consumer Lifestyle Business Group Television. The report reflects to the process I went through during my graduation internship at Philips in Eindhoven. It describes how I managed to accomplish the assignment.

I choose to conduct my graduation internship at Philips because of the challenges I would like to face and the new knowledge I would like to learn.

The project is going to define use cases, scenarios and requirements for further development of the elderly portal, with the vision on the emerging aging. After the use case is defined a prototype portal would be created. The prototype should provide a clear explanation picture of the capabilities of the portal and give companies an early glance of the possibilities of an elderly portal.

To work on the well-established company is very invaluable opportunity. I would like to appreciate my deepest gratitude to Mr. Kees Tuinenbreijer as my company supervisor for his guidance throughout my graduation internship period. Despite his busy schedule, he managed to spare his time to guide and teach me in getting acquaintance to the company environment, the assignment and also his technical advices about my assignment and review of the documents.

I would like to say thank you to Mr. ABH Maas as my university supervisor for his support and feedbacks related to my thesis reports. With his support, it helps to ensure the quality of the reports.

Last, the gratitude is expressed to all of the Fontys and Philips Company colleagues who have given great opportunities and experiences. As well as they have given a nice environment and situation that make me enjoyable working here.

[Date]

Reddy Aldino

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SUMMARY

This thesis described the progress and result of graduation project at Philips Consumer Lifestyle, Business Group Television. This project was carried out by Reddy Aldino an ICT student from Fontys University of Applied Sciences, Eindhoven.

Philips has 3 business sectors, namely Healthcare, Lightning and Consumer Lifestyle. The Goal of Philips Consumer Lifestyle is to fulfill the needs of customers and to improve the lifestyles of customers.

The continuous growth of the older population in Europe and worldwide calls for new applications solutions for improving the health, independent living, quality of life and active ageing of older citizens in the information society.

Recent advances in the smart TV have great potential for meeting the needs of older people and hep them stay healthier, live independently for longer, counteract reduced capabilities due to age and remain active for longer.

These services will make that possible for elderly to live and enjoy at home. Services that would allow elderly to contact their daughter and family, health consultation via the smart TV, remind some things, offer entertainments and connect to the community are core examples of the services Smart TV can offer. The smart TV also offers caretakers to continuously monitor elderly through sensors within their home. Those services includes measurements of their health, reminiscent to some things, presence at home, health consultation, sleep patterns and others good applications which can help them.

Philips is going to define use cases for further development of the elderly portal, with vision on the emerging aging. After the use case is defined a prototype portal would be created. The prototype provides a clear explanation picture of the capabilities of the portal and give companies an early glance of the possibilities of an elderly portal.

Glossary

USEFIL Project	: Unobtrusive Smart Environments for Independent Living.
HTML	: Hyper Text Markup Language
XML	: extensible Programming Interface
GUI	: Graphical User Interface
WAMP	: A form of mini-server that can run on almost any operating system
SDK of Net TV	: Software Development Kit of net TV
GPS	: Global Positioning System.
CSS	: Cascading Style Sheets
Serialization	: Conversion of data/object structure to a certain format that can be stored
Smart TV	: Which is referred to as “connected TV” or “Hybrid TV”

CHAPTER 1. INTRODUCTION

There is an increasing number of elderly and a larger number of them living alone, causing stress on senior care. Children are living further away from their parents, making it difficult to provide care for them. Philips is looking into ways to support elderly to age in place, enhance connectedness and promote "peace of mind" for their children by detecting and using Elderly's activities of daily living.

User studies showed that children want to be more involved in providing care for their aging parent. They want to know about changes in their parent's wellbeing. Thus the aim is to create awareness unobtrusively about these changes and enhance connectedness. Children like the idea of having a Smart TV for high-level awareness of their parent's wellbeing, and like interacting with it to view detailed results.

In other hand, there is also an increasing number of daughter, son or family moving further away fro their parents and becoming more peripherally involved, causing children to lose touch with their parents. They feel guilty of not 'being there' or providing care of them. Children want to be more involved in the care of their aging parents. While in fact, the number of drastic life changers and significant contributors will diminish as people move further away and get busier with their daily routine.

The target users of this project are for elderly who are living alone at home typically in lifeline's user group: in their 80's with some medical history or chronic ailments. According to a segmentation of elderly, the target are ailing outgoes: those who may have some chronic conditions, are quite active in their social lifestyle and are typically open to technology. Daughter and son who are peripherally involved in the care of their aging parents and typically living at a distances.

The specific project objectives are as follows find out how to promote a elderly care innovation for the number of family who are peripherally involved in the care of their aging parent and inform them about their parent's wellbeing. Enhance the connectedness between parent and daughter, by providing awareness of the elder's wellbeing to the daughter. In the long term, support elderly to age in place and maintain independence. Allow them to extend their stay in their own home as long as possible, and delay their move to a care facility.

CHAPTER 2. THE COMPANY

This chapter will provide a general impression of Philips, and then the Department Consumer Lifestyle Business Group TV will be explained.

2.1 Philips History

Philips is a diversified health and well-being company founded in 1981 in the Netherlands; they focus on improving people's lives through innovations. Ever since Philips got funded R&D has been their core business, with innovations like the compact cassette and CD. Philips specialises in both health and well-being and is also world leader in their core businesses healthcare, lifestyle and lighting.

Consumer Lifestyle
Philips Consumer Lifestyle offers new experiences in a wide range of products: From a relaxing wake-up Light, to their Smart TV entertainment platform. Consumer Lifestyle makes home life more enjoyable and helps to maintain a better well - being. All products are designed around the wishes of their users and aim to enhance people's lives.

Philips Healthcare
At Philips Healthcare they provide solutions for the needs of patients and their caretakers. People focused healthcare is the core strategy of their products. Researching the experience of a patient and the complexities their caregivers face. By learning from them Philips Healthcare develops intuitive yet affordable technology solutions that simplify healthcare in a whole.

Philips Lighting
Philips Lighting focuses on both the professional as the consumer market. They provide lighting for indoors (homes, offices and schools), outdoors (sport arenas, residential areas and public places) and traffic (car lighting and street lighting). With the increasing demand for energy efficient solutions, Philips will continue providing groundbreaking lightning solution.

Project
The awareness to social connected supporting elderly and their children project lies within the Smart TV section of Philips Consumer Lifestyle. The project will provide comfort and care for elderly and make it possible for them to continue living at home. Philips wants to create services on their Smart TV platform that will enhance the living conditions for elderly and provide support for their caregivers. They want to accomplish that by using a familiar medium for elderly the TV, which elderly can use to interact with the various services.

Smart TV
Philips Smart TV is a platform that provides Philips TV consumers with 3rd party services like , news, programs and movies. Companies can develop Smart TV apps via de partner program within Philips Smart TV (http://www.yourappontv.com). Here they can find all the documentation needed to develop a Smart TV application.

Control
enables the user to control his TV with various devices. With the My Remote application Smart phones and tablets can be used as the TV remote. It is also possible to use, for example a wireless keyboard with the TV.

Net TV

Net TV offers a wide range of 3rd party applications. Watch a program you missed or rent a movie one of the video store applications. Net TV brings you al your favourite websites and services on your TV.

Experience

Philips has been increasing and working in the field of monitoring the elderly at home. The monitoring elderly involves health care, social connectedness and elderly care. In other hand Philips has been developing the smart TV innovation, which provides applications that can easier to navigate, and interaction by the elderly. There are also devices, which provided by Philips in order to support elderly care at home. Some home care products or devices developed by Philips:

- **Philips Ambient**
  http://www.healthcare.philips.com/main/products/ambient_experience/about/index.wpd
  Dedicated to developing a friendly device, welcoming home environment similar with medical environment. Ambient experience can help the elderly strengthen their organization's commitment to health and well-being. The goal is to comfort both physically and emotionally by designing space around perceived needs, with easier to navigate and interaction using advanced technologies for the elderly.

- **Philips Wi-Fi Photo frame** -
  http://www.ifa.philips.com/pressreleases/Philips_Photoframe/index.html
  Philips Wi-Fi photo frame is latest development in digital photo frames. This device supported many features such as i-fi enable connected photo album. And also from this device can connect easily to other devices such as Smart TV and other devices which can share photo or information by wi-fi.
  Simply share for amazing experience on this device are:

  - The photo files can connect into Facebook and Picassa photo download.
  - Receive photo emails (the user can receive emails if somebody send photo file. it could be called a notification)
  - Definitely can connect to Wi-Fi for sharing files.
  - Navigate and interaction by touch screen with friendly interface.

- **Philips Induction cookers (Electric Stove)** - http://www.philips.com.hk/c/home-cooking/8-menus-8-power-with-touch-sensor-red-hd4922_00/prd/en/

Philips induction cooker is a device that can use to cook. It similar with other stove, but all of panels and information's are electrically. The user can use and set a timer on it to anticipate if they forget to turn off after cooking. It would also be a reminder if the user needs a timer to monitor what they cook. Philips new induction cooker shortens cooking time by 40% and so better seals nutrients into the food. All of the panels navigate by touch screen. This device so easily to use and set because every panel shows an information clearly.

- **Philips Independent Living Assessment** - http://www.lifelinesys.com/content/independent-living-assessment

Philips independent living assessment is a service that develop a plan for the elderly who life at home independently. The expectations of this service are the elderly can get comforts at home and control mental and physical health challenge how well the can live independently. In this case, Philips will support this to help them to control their future and add to peace of mind for both of them and family.

- **Philips Smart TV** - http://www.digitalnewsroom.philips.com/pressreleases/Philips_Smart_TV/index.html

As one of the foremost players in the field of connected TVs, Philips has built on the success of being one of the first to introduce internet services on TVs and has developed this technology into an integrated, connected and simple system- The Smart TV. With smart TV the users can easily access to applications, which already integrated with other devices. The smart TV navigation uses a wireless remote that so easily to operate and use on it.

Consumer Lifestyle Structure

To ignite sustainable growth in Consumer Lifestyle, our organization is built on two pillars, Commercial Organizations (COs) and Business Groups (BGs), supported by the Functions.

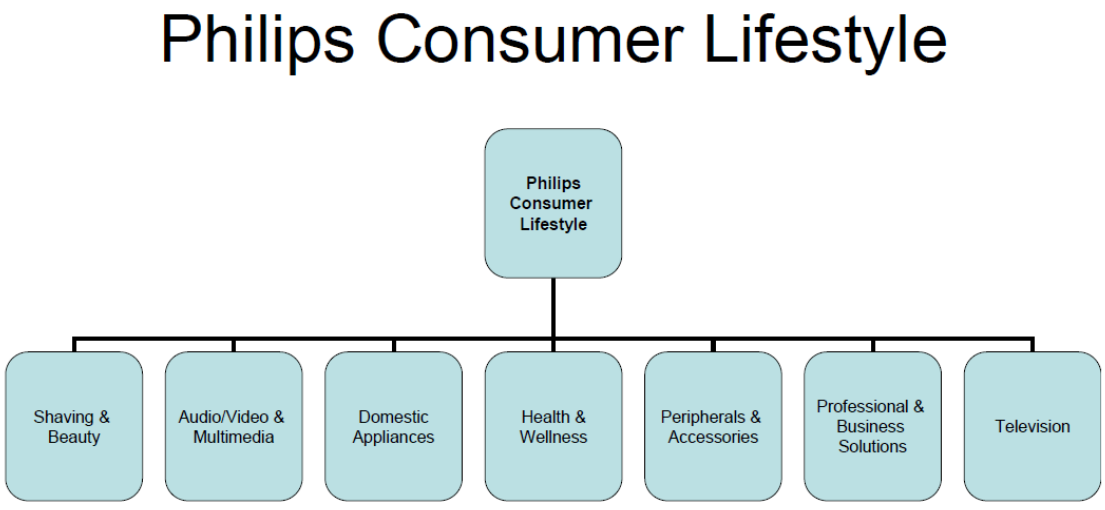

Figure 1 Consumer Lifestyle Structure

2.2 Project Organization

This is the structure organization of the project, which is divided into 3 roles:

1. Company Supervisor: Responsible for supervising the intern to accomplish the project, for the quality of the project's outcome and for the documentation about the project's investigation
2. University Supervisor : Responsible for supervising and ensuring the project is working on the right track and delivers as written in the Project Plan Document and for guiding the intern in term of writing a thesis
3. Intern : Has the authority to run the project on a day-to-day basis on behalf of the School Mentor, subject to the tolerances set within this document

The Details:

Company:

Name : Philips Consumer Lifestyle Business Group TV

Location : Philips High Tech Campus Building 37, 8th Floor Eindhoven

Company Supervisor:

Name : Kees Tuinenbreijer (Kees)

E-mail : Kees.tuinenbreijer@philips.com

Position : Philips TV Innovation Site Eindhoven / Project Manager

University Supervisor:

Name : ABH. Ad Maas

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Position : Fontys University of Applied Science Eindhoven / Teacher

Intern:

Name : Reddy Aldino

E-mail : r.aldino@student.fontys.nl

Position : Fontys University of Applied Science Eindhoven / Student ICT Business Information System

CHAPTER 3. ASSIGMENT OVERVIEW

3.1 Initial Situation

With the aging population it has become increasingly important that the provisions for living at home are being improved. Philips is researching the opportunities of a care at home portal through the smart TV platform. That will improve the elderly home situation. So, they can live at home as long as possible. The services should provide elderly with their necessities and lower the pressure on their caregivers with services that allow remote monitoring..

The elderly care innovation project lies within the Smart TV section of Philips Consumer Lifestyle. The project will provide comfort and care for elderly and make it possible for them to continue living at home. Philips wants to crate services on their Smart TV platform that will enhance the living conditions for elderly and provide support for their caregivers. They want to accomplish that by using a familiar medium for elderly TV, which elderly can use to interact with the various services.

The purpose of this project is defining a use case based on the needs of both elderly and their caregivers or children. The use case will be developed into a prototype portal. The prototype will be designed based on the user interface research result to make the interface easier to use for elderly. The prototype have to provide and offer a clear picture of the capabilities of the portal and give companies an early glance of the possibilities of the elderly needs.

3.2 Objectives

Philips Customer Lifestyle considers this opportunity to develop a new application especially for elderly based on their needs and what they should have for support their living at home. The purpose is to give a prototype simulation that describes how the application and the system work. Moreover, the application and devices should be comfort and save when the elderly uses those apps.

3.3 Methodologies

On this project contains some methodologies that needed in order to support the main problem namely provides elderly care application. In other hand, the applications also should be easier to navigate by the users (elderly). The methodologies are:

- Use case scenario
- System analysis and design
- Design system architecture
- Modeling and prototyping
- Implementation on Smart TV

3.4 Information Gathering

The methods which It will use on this project for analyzing the information, including:

- **Interviews**
  The interview involves two elderly who are living at home independently as well as suffering stroke. The application should be provided to them in order to support their living.

- **Desk research**
  Collecting all of the result of elderly interview into some cases. Afterwards, the use cases divided into the specification based on The USEFIL Project. (www.usefil.eu)

- **Partner meetings**
  The partners of this project are supporting the use cases to be processed into a prototype application. The partners really needed on this project for developing this prototype, there are a lot of perspective regarding the options that should be provided on this prototype. It would be good input to develop this application.

- **User experiences**
  It is important to know about user experiences before develop the prototype application. After the use case made, for the next step was finding some experiences for users (elderly) related what features that should be added on the prototype application.

3.5 Tools

In developing this project, I used some software and applications to develop this prototype application.
The tools that I used are following:

- **Microsoft Visio**
  Design the system architecture.
- **Adobe Photoshop**
  Manipulate picture as texture.
- **GUI Master Design**
  Design the user interface of this application.
- **Adobe Dream Weaver**
  Create code this application.
- **WAMP**
  Virtual domain to upload application code to be shown on Smart TV.
- **SDK Net TV**
  Software Development Kit for Net TV (Smart TV)
  To get and upload the application file into Smart TV. And also for debugging.

- **CE-HTML**
- **Visual Paradigm Enterprise Edition**
  For the diagram modeling.
- **Microsoft Word 2010**
  For Creating the documentation reports.
- **Internet Browser (Firefox and Opera)**
  To test the application viewer display on Smart TV

CHAPTER 4. RESEARCH

The beginning of this project was finding a use scenario regarding what elderly needs based on user experiences, elderly demands and some cases. Here is the use case scenario:

4.1 Use Case Scenario

Scenario title	*Elderly Care Innovation*
Submitted by	Reddy Aldino
Domain	
Picture	
Scene description	Patricia is now 65 years old. And lives alone in the small town of Groningen. She suffers stroke since last year. Lately she has some discomfort with her health and memory. And last month her family just had known that she also suffers from the decrease of memory. Everyday she feels so alone and wants to meet her daughter Kelly and family. Patricia wants to contact or make an appointment to her doctor directly for consulting if her health condition goes down. And also she can contact her daughter Kelly. In other hand, she has a hobby to cook any kind of food but she often forgets about the recipes. Sometimes Patricia forgets to turn off the stove after cooking. And usually she also goes to the living room or bedroom when she cooks, just for take a rest or enjoy something. It would might something happens in the kitchen if she forgets to turn off the stove. In this case, Kelly puts an aura in the bedroom and living room. It could be a reminder when she still cooks or she forgets to turn off the stove after cooking. The reminder like a light, the red light indicates that there is something that is forgotten in the kitchen. And blue light indicates for the right condition. If she sleeps, a message or alert would sent to Kelly's devices or one of Patricia's neighbors.

	Sometimes Patricia forgets to eat regularly. Her health goes down if she doesn't eat regularly. Kelly's family put the photo frame in the living room. It would give an indication and alert to her, in order to be able to remind her to eat regularly. An alert or message would be appearing in the photo frame. Kelly's family gives and installs the smart TV in Patricia's home. The smart TV would give services that help Patricia needs. Such as, if she feels alone and miss her daughter and family, she can open applications in the smart TV which do contains new Kelly family's photos and videos. This device could help her to reduce her lonely feeling. Kelly's family would like to know that her mother goes to outside or at home. She needs a device that indicates where Patricia is. Because of Patricia usually goes outside for some things and in unexpected time. That's why Kelly put two devices in Patricia's home and wallet. It would be send an indication and alert to other devices and Kelly's devices that have already integrated before. Kelly also has some devices, such as a smart TV, tablet pc, smart phone and photo frame. These devices would be integrated to the Patricia devices at home. In order to the reports and alerts could be share and contribute to both of them. Patricia would interact with the smart TV by the remote and other devices.
User benefits	- Health consultation + health report - Reminds to turn off the stove + alert system - Reminds the food recipes + shows the shop - Improve connectivity family - Reminds to eat regularly - The inform if Patricia is outside for too long and not back by an expected time
Assumptions	Smart TV Wireless LAN network Wi-fi The aura photo frame Sensor gateway Presence device
Interactions	Interactions with a smart TV, smart phone, photo frame and tablet pc for Kelly's family. Showing the recipes list. Communicate with a doctor related Patricia's health. Aura-light alert system. Family pictures and videos.

Key HW elements	Smart TV, Smartphone, Tablet pc, Wi-fi network, Aura-light photo frame.
Key SW elements	IP Platform for alerts
Innovation	The platform provides: - Consulting the health directly - Aura-lighting for the stove indicator - Reminds the recipes and get the good recipes suggestion for health - Check and reminds eats regularly - Connectivity family by share photos and videos

4.2 The Use Case Diagram

Based on the first use case scenario, the use case diagram was designed to describe in detail an interaction between a role (actor) and a system to achieve a goal. The actor can be a human or an external system. Use case diagram is a picture of the functionality of a system, so that the users of the system acknowledges and understand the usefulness of the system that will build. In this case, There are four humans who are involved on the scenario, including:

- Patricia (Elderly)
  Patricia is main actor on this scenario. She has a daughter (Kelly)
- The Doctor
  Doctor that always checks Patricia's health.
- Kelly
  Patricia daughter. She is living a little bit far from Patricia home.
- Neighbor
  They will help Patricia if she gets a problem.

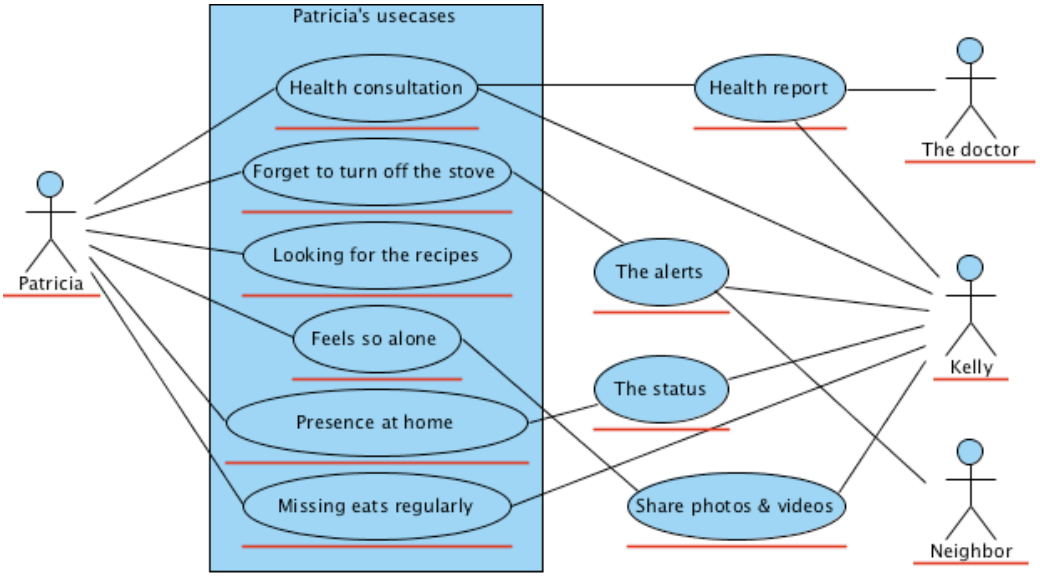


Figure 2. Use Case Diagram

Code	Use Case Name
1A	Health consultation
1B	Health report
2A	Forget to turn off the stove
2B	The stove alerts system
3	Looking for the recipes
4A	Lonely feeling
4B	Sharing photos and videos
5A	Presence at home
5B	The presence status
6	Missing eats regularly

4.3 Choosing two use case

According to the USEFIL Project, Our team should choose two of these cases which most important and needed by Elderly. We was analyzing the data related to elderly needs and also was discussing with our partners. However it was so difficult to determine which use cases that will be built into a prototype application and processed. Moreover, our team is focusing on elderly who are suffering stroke and living independently at home. Therefore we are choosing two cases namely:

4.3.1 Health and Consultation Report

In this case involves all the actors. Health and consultation report application provides several measurements related to Patricia health, the measurements include:

- Blood Pressure
- Cholesterol Level
- Glucose Level
- Weight

There are some devices, which can be used for measuring these measurements. In this case Patricia has to measure manually with these devices. After the all result of measurement will be sent to doctor automatically, in order to be able to analyze by doctor. Afterwards, final health report will be forwarded to other devices. (Patricia smart TV and Kelly devices).

4.3.2 Presence at home

According to what the results of analyzing before, as we know that elderly are suffering stroke. In this case, sometimes they forget what they have to do related to their activities especially when they out of home for some business. Moreover, they should use a device (GPS watch) when they leave the home, in order to her location can be tracked by family devices at home or somewhere else. The following devices, which should be used by elderly, are:

4.3.2.1 GPS Watch

Anytime and everywhere The GPS watch should be used by elderly. It will send a signal into the receiver related the location where she is. Afterwards, the report will be forwarded into smart TV and other devices to inform her location to her daughter family.

4.3.2.2 GPS Receiver

GPS receiver device should be provided at home. It will receive a signal or report from GPS watch. It also be integrated into Satellite. Basically between these always be integrated before.

4.4 Use Case Specifications

The use case specifications provide a means of organizing all of the different scenarios that exist. It will be added in detail what is shown in the use case diagram. This will be a usefully tool in order to describe to project stakeholders, system users, business analyst and developers. These specifications define requirements in a way that all users of the project will be able to figure out, creating a common word for the impacted parties.
In every table describes each use case specification, in order to easier what things that should do in every use case. Here is the tables which are explaining these requirements.

Use Case Code	*1A*
Use Case Title	*Health Consultation*
Use Case Description	Patricia contacts her doctor for controlling or consulting the health regularly by the smart TV.
Primary Actor	Patricia
Secondary Actor(s)	Doctor and Kelly

Precondition	The Smart TV is on The health application has been configured previously
Basic Flow	1. The user switches the smart TV input channel to the one that is connected to the doctor and Kelly's device. 2. Use the device remote, Patricia turns it on 3. The smart TV and application starts up. 4. The application display welcome screen showing the health consultation options. 5. Using the remote, the user acknowledges. 6. Patricia choose one of the health consultation options. (check up regularly, health decrease consultation, make an appointment with the doctor) 7. Using the remote to sets and choose the application. 8. The smart TV connects to the doctor and Kelly devices. 9. The database updates in every Patricia chosen the options. 10. Patricia is waiting process system and feedback from the doctor and Kelly.
Post Conditions	The smart TV is still on. The application system is configured with the doctor and Kelly's devices. The alert and message is updated when the doctor gives a feedback by ambient light TV.
Alternate Flows	If the smart TV turn off accidentally, the alert and message will still be appear directly by sound and ambient lighting of smart TV. Or Patricia can open offline message inbox if she wants to know the feedback.

Use Case Code	1B
Use Case Title	***Health Report***
Use Case Description	The doctor gives a feedback to Patricia by smart TV, and shows her health report regularly.
Primary Actor	Patricia
Secondary Actor(s)	Doctor and Kelly
Precondition	The Patricia's smart TV is on/off

	The Doctor's device has been configured with Patricia's smart TV previously. Both of the devices are connected to the internal database.
Basic Flow	1. The doctor gives and sends a feedback by smart TV or smart phone. 2. The feedback status sent to Patricia's smart TV, Kelly's devices. 3. The internal database updates when the doctor gives a feedback. 4. The feedback status will accepted by an alert, message and ambient-lighting of TV. 5. Her health report appears weekly by health application.
Post Condition	The devices are on/off The latest messages are showed on the smart TV display screen.
Alternate Flows	-

Use Case Code	5A
Use Case Title	***Presence at home***
Use Case Description	Patricia usually goes outside for some things and in unexpected time. In other hand Kelly wants to know that her mother is at home or not.
Primary Actor	Patricia
Secondary Actor(s)	Kelly
Precondition	The smart TV is on. The devices have been configured previously by system.
Basic Flow	1. The presence device puts on the Patricia's wallet and the receiver puts on the living room which has already integrated with the other devices. 2. Using the wi-fi connection, the device turn on automatically 3. The device starts up. 4. The receiver accepts the frequency from the sensitive solution (SS) transmitter. 5. The receiver does not accepted the frequency from SS transmitter if the SS transmitter passes a certain threshold it would be indicate as being out of home. 6. The receiver sends a signal to the system and devices. 7. the internal database updates. 8. The presence device shows the report to the smart TV.

	9. Kelly can check where Patricia is.
Post Condition	The smart TV is on. The presence device always integrate with the system and devices.
Alternate Flows	The presence device can also put on the keychain. The transmitter as much as possible installed in a place that will most likely carry over when Patricia leaves the home.

Use Case Code	5B
Use Case Title	***The location status***
Use Case Description	The location status report from the presence device. It would be give an alert and message that will indicate Patricia at home or not.
Primary Actor	Kelly
Secondary Actor(s)	-
Precondition	The devices are on. The presence has been configured and integrated with devices previously.
Basic Flow	1. The presence device gives a signal/alert to the devices. 2. When the receiver can still accept the frequency from the transmitter, it would be indicate that Patricia at home. 3. The internal database updates. 4. The alert and status will send to Kelly's devices regularly.
Post Condition	The devices should always integrate and configure.
Alternate Flows	-

4.5 Functional Requirements

Functionality requirement describes what the application should do. These requirements depend on the type of application being developed. It may be technical details, data manipulation and processing and other specific functionality that define what a system is supposed to accomplish. Behavioral requirements are describing all the cases where the system uses the functional requirement are captured in use cases.

In this case, the functional requirements of this application are divided into two visualizations to describe what requirements that should be provided on this application. Here is the list of functional requirement of this application.

Objectives:

- Visualizations of primary measurements of the information:
  - Health report
  - Health grievance
  - Health check-up regularly
  - Indication for the presence of user at home

- Visualizations of the reminder.
  - Time measurement
  - Control remotely
  - Estimated of the time
  - Track location
  - Track record
  - Send an alert by message
  - Reminder of health check-up
  - Reminder of health report notification
  - Simply notification on smart phone or tablet

- An indicating system to insert "record" at the internal database, in order to signify use a particular appliance or activity.
- The alerts are integrated in the system and devices.

- The warnings are sent when the user forgets some things.
- The alerts will indicate for eating regularly. The alerts will keep providing an alert if the user does not provide a feedback by the system or application.

4.6 Non-functional requirements.

Non-functional requirement is a requirement that describes criteria that be able to used to judge the operation system. It should be contrasted with functional requirements that define specific functions. The plans for implementing functional requirements are detailed in the system design.

Our team was analyzing regarding non-functional requirements of this application. Based on the results, out team decided to take decision what requirements are should have in this application

- The application is not distracting, annoying nor disturbing.
- The option of application should match with the function.
- Easy to access the function. → The function should be easily to be accessed by the users.

4.7 Moscow Model

Moscow model describes the functionalities priority (Functionality Classification). Moscow is abbreviation of Must have - Should Have - Could have and Wont have. Based on four criterions, every requirement can be classified according to what the project is.

Moreover, every requirement should be matched with USEFIL project, which is being done by participants. All requirements are not on the must have column, because according to the analyze result there are some requirements that must be placed on another column. Here is the table which is showing what requirements that should have on right column based on the analyze report before.

Functionality / Non-functionality	Objectives	Must Have	Should Have	Could Have	Wont Have	USEFIL
Functionality Requirements	Provide health report					
	Provide health grievance					
	Provide health check-up report regularly					
	Indication for the presence of user at home					
	Time measurement					
	Indication of the stove condition					
	Control remotely					
	List recipes & ingredients					
	Store information about ingredients in the recipe					
	Showing the share files (photos & videos)					

	Send a request to share files					
	Eat alerts					
	The internal database updated					
Non-Functionality Requirements	Pleasant application					
	The systems always integrated					
	Proper label application					
	Easy to Access					

4.8 Hardware Requirements Specifications

Hardware requirement specification describes what devices that should be installed and provided for supporting this application and system. All hardware requirements should be installed at home, there are seven hardware in this project. In the table describes each function on the system.

Moreover, the user can configure some functions in each of the hardware (Connect to each user, Request report, connect to GPS to track the locations quickly). The user can also connect hardware to some kinds of internal database.

Hardware	Overview
Ambient Lighting of Smart TV	The alerts will indicate by ambient lighting of smart TV. The ambient lighting alert appears if there is something happen.
Weight patterns	This device will measure user's weight automatically.
Photo-Frame	The users shouldn't have navigated from the smart TV. They can navigate by photo frame where there are photo frames in some area in the home. It will also provide the options, which similar with the elderly care applications in smart TV.
Smart Phone	The smart phone receives a message status when these devices used by the users.
Tablet PC	Similar with photo-frame functions.
Wi-fi Connection	Wi-fi should be provided in the elderly home. Because some devices need wi-fi connection to integrate and configure into the system.
Presence Indicator (GPS Watch)	One of the indicators that indicate the elderly at home or not. This indicator needs wi-fi connection because that device divides into 2 parts (receiver & transmitter). These parts always should be connected by wi-fi.

4.9 Information Architecture Diagram

Information architecture diagram describes how the system works. There are some people and devices that be involved in this diagram. Describing how to process and integration between the devices and system in some areas as well.

In each of the arrow describe what process that should be processed on the system. This architecture is rather complex because every user and device is not only having an arrow in this system. It means that an entity could be accessed by other entities, as well as vice versa.

Within the system, the important actor is the main user (elderly). If elderly does not follow the rule of this system then the system will not process anything. The second entity that most important is configuration and integration system entity, as the diagram described, the main process is on that entity. Philips offers a service portal in order to manage and support what elderly needs on this application, especially for this case.

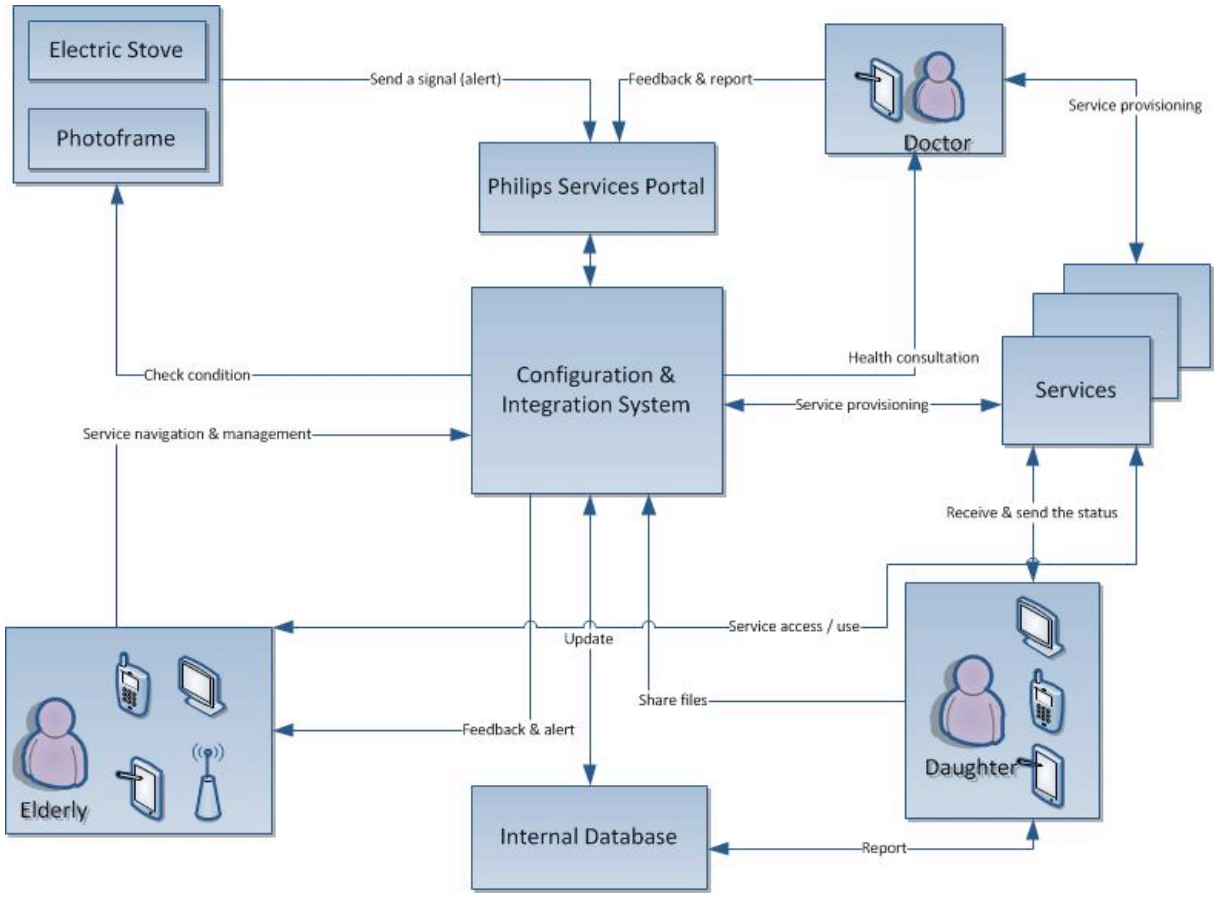


Figure 3. Architecture Diagram of the system (First Investigation)

4.10 The Architecture System of Presence Indicator

The second architecture system is for presence indicator at home. It seems a complex diagram as well. There are some devices that should be integrated before the devices are being used.

The main device in this diagram is the GPS watch (GPS antenna & transmitter). It does not mean that device is too large to be used by elderly. The watch should be comfortable when It is being used by the user (elderly). The watch will always send a signal into the receiver automatically, in order to inform to the system where the user is.

The GPS watch should always be integrated into the satellite in order to provide the GPS maps and showing the location of the user when the user leaves the home using the GPS watch.

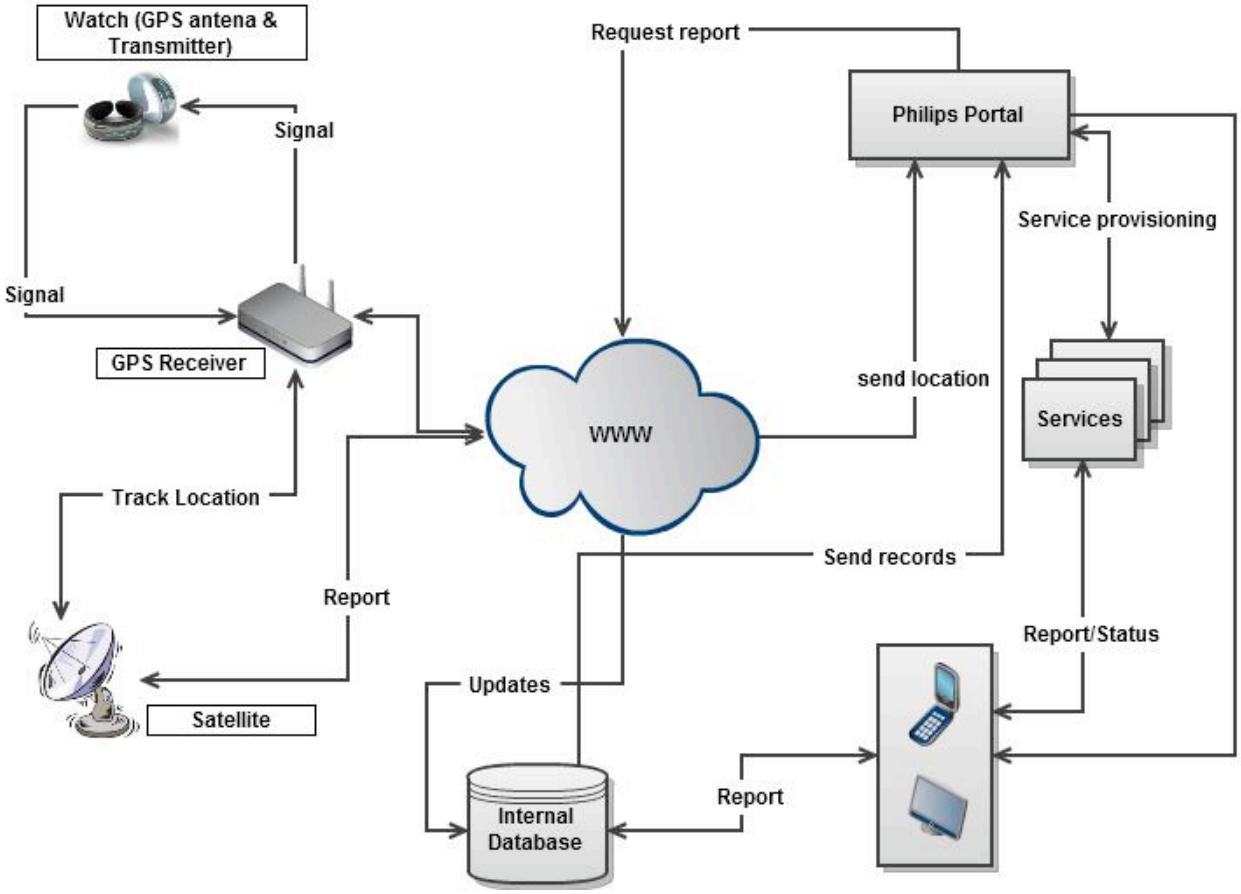


Figure 4. Architecture Diagram of Presence at home

4.11 Home Architecture System

It also important to know which areas that should have provided wi-fi connection at home, in order to all devices can be integrated and connected into the system. This diagram describes the areas of Wi-Fi connection at home.

There are some devices at home, especially for processing and connecting the system, include:

- Wi-Fi device
  At least there is a Wi-Fi device at home that can include several rooms at home.
- GPS receiver
  For receiving the signal or report from satellite that indicate the position of the user when leave the home by The GPS Watch which be used by the user (elderly).
- Smart TV
  The main application will be putted on Smart TV. That is why all devices should be connected into Smart TV. Afterwards all reports will appears on Elderly care of smart TV application.
- Tablet PC and Smart Phone
  These devices also be connected into Wi-Fi connection. It anticipates if the user does not turn on the Smart TV, then the user can change the function application on smart TV to these devices. The user will also be able to navigate and use by tablet PC and Smart phone.

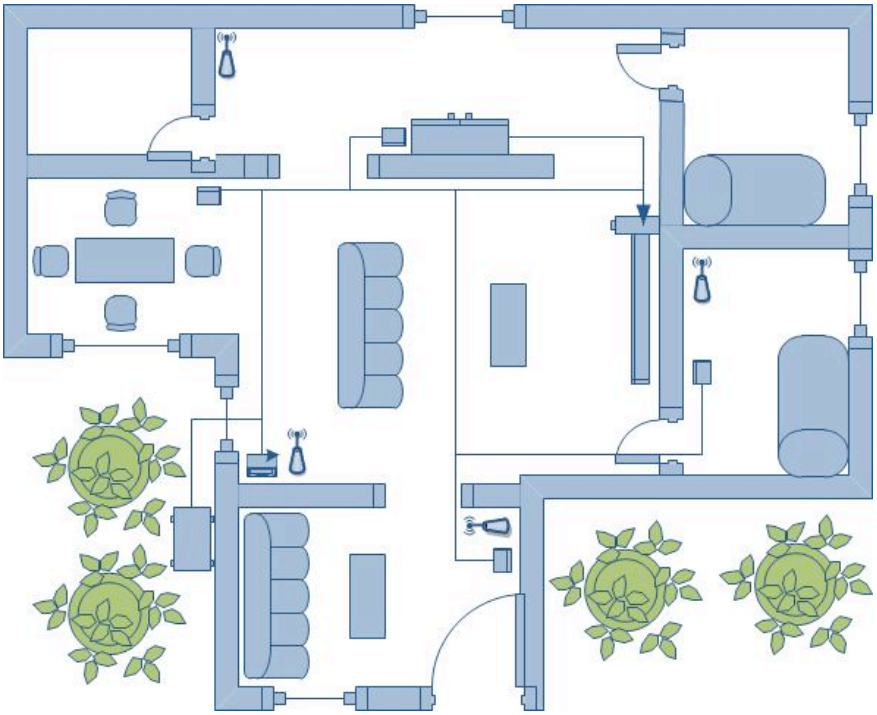


Figure 5. Wi – Fi Architecture System at Home

CHAPTER 5. DESIGN USER INTERFACE

Based on the user studies a concept design is put forward. The aim is to design, implement and test an unobtrusive awareness system with the aim of conducting field trials. Certain wellbeing information of the elderly is to be sensed and interpreted and through a display it can be shared with their children. The key design choices are outlined. Low and high fidelity prototype of the user interface were designed and tested with elderly and their children.

5.1 Concept Design

Use studies have shown that a report and notification is the preferred interface display to be placed at the elderly home. The following information is chosen for the scope of this project: Weight patterns, Health consultation and report and presence at home. Sensors would be placed at the elder's home to sense and detect theses parameters unobtrusively.

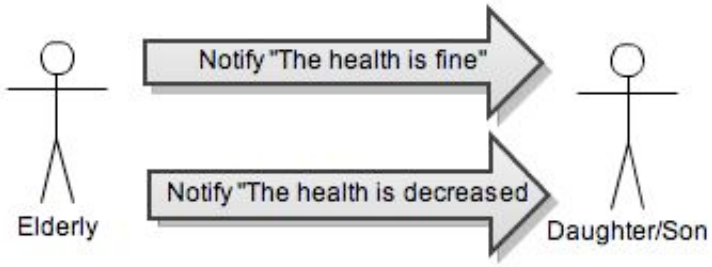


Figure 6. The main concept of the health report and consultation

5.2 Concept of receiving or accessing detailed information

The users want to be notified when the system detects the abnormal change and not wait for a daily or weekly report. Participants pointed out that the system should not give a binary value, but rather show gradual changes, since a 'not ok' message/report could cause panic.

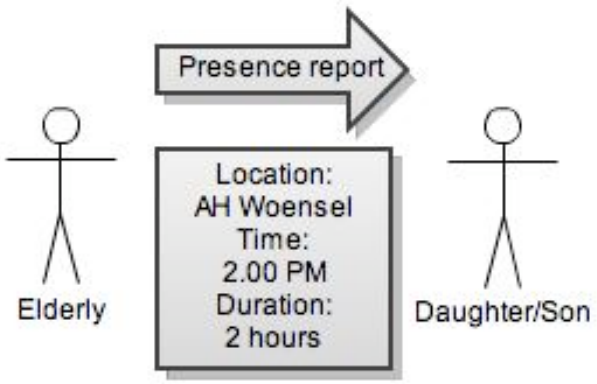


Figure 7. Concept of receiving detailed information for presence report

5.3 Iterative User Interface Design

the user interface (UI) was designed with the following goal: the amount of text should be kept to a minimum such that visualizing the information should support interpretation at a glance. Different concepts were made for each type of information. The UI was mainly prototyped using several web-based tools. Dream Weaver and Action Script were used together with other application to build this user interface.

Figure 8. The main menu screen. (Preliminary UI Design)

Figure 8. The main menu screen was made as simple as possible in order to easier to navigate and figure out what kind of options in the main menu. There are two options on it, namely Presence report and Health report. If the user wants to navigate, they only point the cursor into one of these options, then click on it.

This main screen will also appear on daughter's smart TV. It is mean that another person can also access into the system. Especially they who get elderly care innovation application on their smart TV and have been integrated and connected to the same system with the main user (elderly).

It can be an advantage for the elderly related to how to navigate the application, because there will be manual book include on this app. Moreover, without reading the manual book they would be easier to understand how the application works. But it keep anticipate if the user confused related to the role of operation the application.

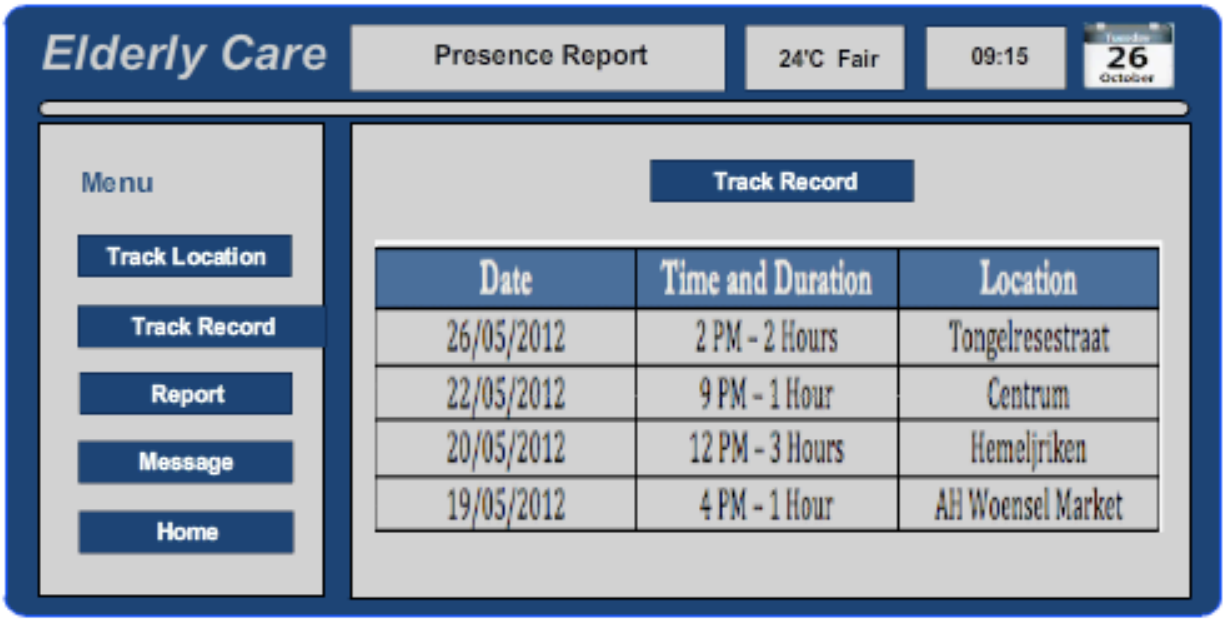


Figure 9. Presence report main screen

Figure 9. Track record screen on the presence report will show the user track record in every leave the home. The table will indicate when the user going is, how long the user leaving is, and the location will be tracked as well.

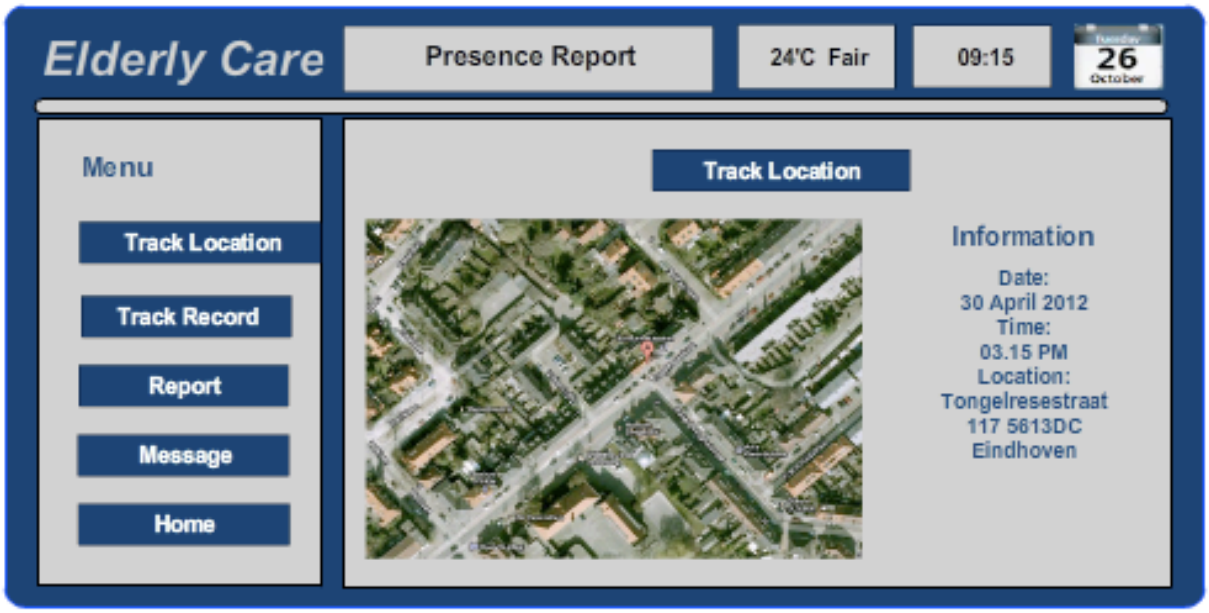


Figure 10. Track Location of Presence report screen.

Figure 10. The track location of presence report screen is showing where the user (elderly) is, by maps which is integrated to satellite in order to provide the maps clearly.
The information of the maps will be very clear to read and understand. The following information includes date, time and location in detail. As the explanation before that the information can be received because of the GPS watch that be used by the user (elderly) has been connected into the system and certainly into the satellite. After that, the satellite will send a signal/report to the receiver at home. then, the information will appear on smart TV especially on Elderly Care Application.

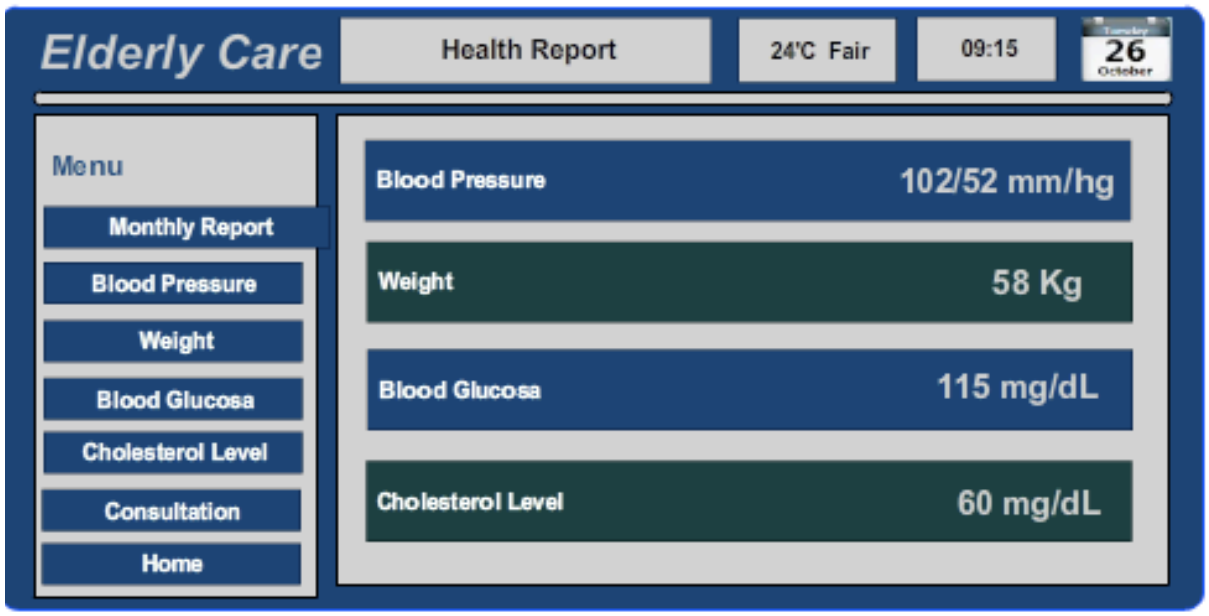


Figure 11. Health monthly report screen

Figure 11. Health monthly report screen provides four measurements report of the user's health. Namely Blood Pressure, Weight, Blood Glucose and Cholesterol Level. The result of measurement will be gotten after the user (elderly) measure manually by some devices.
From the devices, the results will be sent to Doctor in order to be analyzed.
Afterwards, the report will be forwarded to Elderly care application on Smart TV.

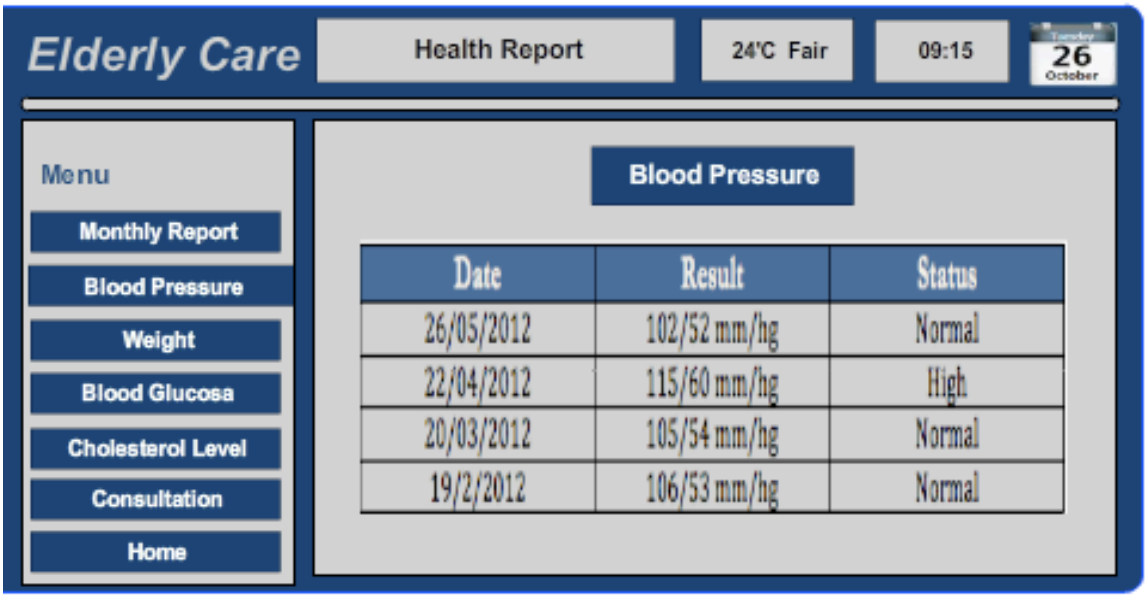


Figure 12. The list result of blood pressure

Figure 12. Blood pressure screen shows list result of blood pressure, which have already analyzed by doctor. The status indicates that the blood pressure is normal, high or low. It is important for the user (elderly), as the research related to this before, we have to know and check it, and especially the user who can be said the elderly. Because the body's blood pressure will affect the existing system in the body as well, therefore it would be nice if we know in advance.

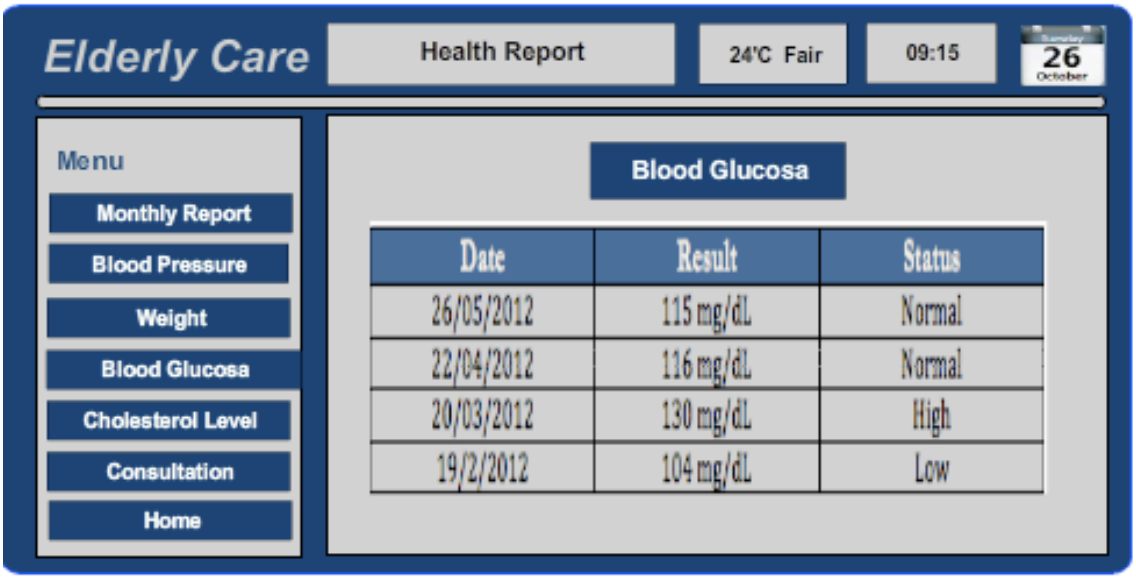


Figure 13. The list report of blood glucosa

Figure 13. The list report of blood glucose shows the result measurement of blood glucose. It is similar with blood pressure. But, in this case the user uses another device to measure blood glucose in their body. Performance of this tool is also similar with other devices that can measure those measurements. All devices which can be a tool to measure will be connected and integrated into the system, even though the user has to check regularly that the system is on right condition or not.

5.4 User Interface Overview

The user interface is to be displayed on the elderly care of smart TV application. The elderly and user can navigate by choosing a particular option. This application is made possible by using the devices and application which already integrated and configured before.

The devices and application will take and receive a report or alert from the internal database. the output from the internal database will be appears by graph form. The application will be developed for interpreting this information and make it in a simple graph form report for the users to figure out the reports.

The requirements for the user interface are following below:

- The selection of easy words for the users.
- The display should be user-friendly.
- The display shows for health consultation, Kitchen, eats regularly and presence at home.
- The display information from the sensor (stove, presence indicator)
- Provide an advice and alert on the routine.
- The display shows the routine of health consultation, eats regularly, the stove and attendance at home.
- The graph report shows the level of frequency of the user to consult the health , attendance at home and eating regularly.
- Provide ability for user to adjust basic settings such as which utilities they want to know.

Overall there should be a balance between providing information but not crowding the screens. Make sure that the best possible solution PCL put together some screen designs and presented other ideas to the users.

5.5 User Interface Design

The following are the screen design with descriptions of the functionality.

Description

The main interface consist out of four options:

- Health consultation, this is one of the options, which is offers to the elderly for consulting concerning the health regularly. This panel also integrates to the doctor's device directly. Health consultation panel contains some options, such as check-up, consultation, health complain, appointment, feedback/message and health report.

- The kitchen, this option contains an indicator that will show the stove condition. The panel-stove indicator will indicate the stove condition is still on or off automatically. And also in this option the elderly can find more information about the food recipes and store information, which offers the ingredients of foods in recipes.

- Photos and Video, this option contains photos and videos, which have already shared by both of them. The elderly also can send a request if they want to get other new photo or video from their daughter.

- Eats regularly, on this option contains the food menus and reminder for eating. The alerts for eating will appear based on time eating that already set before. The elderly should have gave an indication if they have already eaten by choosing 'eat report' panel.

Health Consultation

The users indicated the measurement of different utilities. These are:

- Blood pressure
- Weight
- Cholesterol level
- Blood Glucose

	Blood Pressure	**Weight**	**Cholesterol level**	**Blood Glucose**
Male	X	X	X	X
Female	X	X	X	X

CHAPTER 6. IMPLEMENTATION

Once there was a clear idea of what information to sense and detect related the elderly care, a brainstorm was conducted on the technology required. Different attempts to link to existing projects were made for each type of information. The system architecture and infrastructure was implemented by a developer that be involved in the USEFIL project as well.

6.6 Technology

6.6.1 Weight Patterns

There are existing projects within Philips Research that measure weight unobtrusively. One of them is the smart floor (pressure sensitive floor mat) from Philips, but it is not accurate enough. The wireless weight scale from the Motiva (tele-monitoring services) project would be a good choice but there are several functionality issues with the way weight is measured.

Figure 14. Load cell placed under a chair that the user used

In this case, load sensor (figure 14) were chosen. These were placed under a chair that the user is being used. The weight was measured unobtrusively. When the user sits above this device, automatically the device measure the user's weight. Moreover, because of this device is using wi-fi connection to transfer the result, then the result can be seen on Elderly Care Application and send to Doctor as well.

6.6.2 Presence Report

A wireless watch by sensitive solutions transmits signals at a particular frequency and a receiver by the same provider detects these signals and assesses their strength. The further away the watch is from the receiver the weaker the signal is, and if it passes a certain threshold it would be considered as being out of home.

Figure 15. GPS watch transmitter

Figure 16. Receiver

Figure 15 and 16. These devices are connected by Wi-Fi Connection, Bluetooth and GPS (Satellite). The GPS watch should always be used the user in order to they can be monitored daughter or their family remotely. It will send a report when the user (elderly) leaves the home. The report contains date, time and location where the user goes in detail. It can also helps the user for remaindering by vibrating notifications, messages and alerts if the user too longer to leave the home.

6.6.3 Health Measurement

There are four devices for measuring the measurement (Blood pressure, Weight, Blood Glucose and Cholesterol level). These devices should be provided in the user home (elderly). In the beginning of devices installation, the user makes sure where the devices placed. In order to easier to be used as well as choose the place for some devices, which need to be connected with other devices.

In that case, the user (elderly) measures those measurements by their self manually. Because of the devices are using wi-fi connection, the user does not need to transfer the result of that measurement into smart TV. It will automatically send to doctor and smart TV just by click in one option on it.

Figure 17. Cholesterol level tool

Figure 18. Blood glucose tool

Figure 19. Blood pressure tool

The concept of an awareness system was then introduced to them and feedback was obtained on the concept of sharing wellbeing information with the number of their family. The aim was to assess any privacy concerns or other issues. With those devices (figure 17, 18, 19) the user can measure their health measurement.

There are also manual books for guiding the user how to use those devices. The device was designed as simple as possible to be used and measured by the user (elderly). As the survey before that our team did, that most of the elderly want to use and navigate the devices as easy as the user wants.

For the accuracy of these devices, Doctor has ensured that the tools have a standardization of the doctors associated with the accuracy of the results obtained after the user take measurements manually with these devices.

6.6.4 Implementation on Smart TV by SDK (Software Development Kits) of Net TV

In the beginning of this step, the SDK of Net TV was downloaded on the Net TV portal. The portal provides several file types based on what operating system that will be used to build and develop the application in Smart TV. There are four file types, which are provided by the Net TV portal including for Windows OS, Mac OS X and Linux.

The SDK software runs on a number of platforms. The platform has to conform to the following requirements:

- Operating system Windows XP, Vista, Mac OS X or Linux Ubuntu.
- Minimum memory 512 MB
- 2Ghz processor (AMD 64X2, Pentium IV, Core 2 Duo), dual core preferred.
- Minimum resolution of 1280X1024 @ 16bits.
- Keyboard and mouse
- 1.5 GB free disk space
- Network connection (wireless or wired)

Those manuals are divided into separate parts for each supported operating system. For windows, the windows XP installation is explained, with notes pertaining to installation on windows vista or windows 7.

The SDK of Net TV was chosen for the Windows OS. After that, the SDK was installed on the PC. After the installation completed, there are some configurations that should be completed before the SDK can run on the PC perfectly.

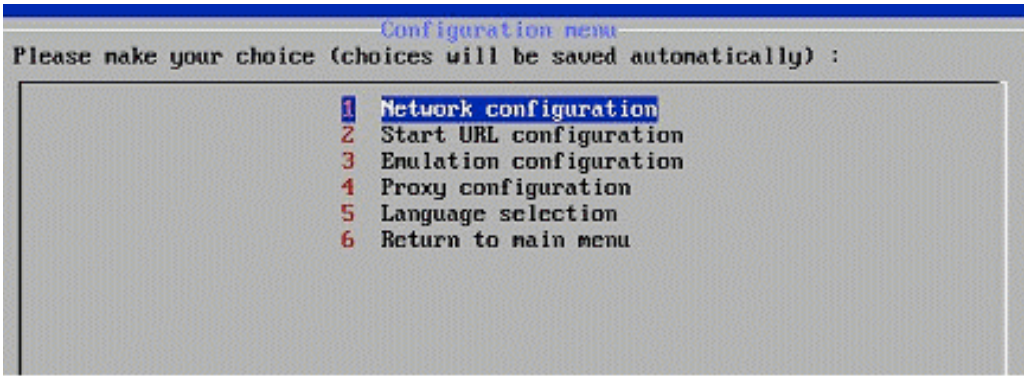


Figure 20. Configuration menu on SDK Net TV

- **Start URL Configuration** – allows the user to edit the start URL.
- **Emulation Configuration** – allows the user to enable or disable the platform performance mimicking.
- **Proxy Configuration** – allows the user to setup a proxy server to browse the apps. Only HTTP proxies are supported, without authentication.
- **Reconfigure Keyboard** – allows the user to reconfigure the keyboard to match the user physical keyboard layout.
- **Select browser/platform version** – an important option that allows the user to select the Net TV platform that the user would like to test using SDK.
- **Configure HBBTV** – Only applicable if you do HBBTV development.

After the configuration menu was completed, the user needs to install Opera for Desktop version 10.10 on the host machine. Then, the user can startup the app inside opera for desktop.

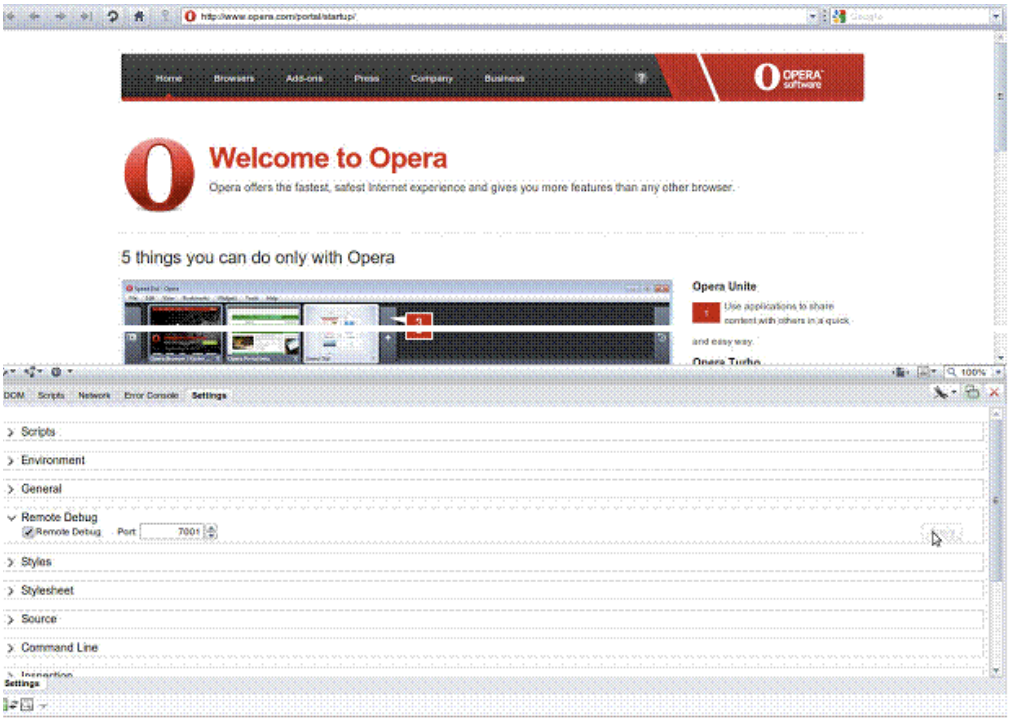


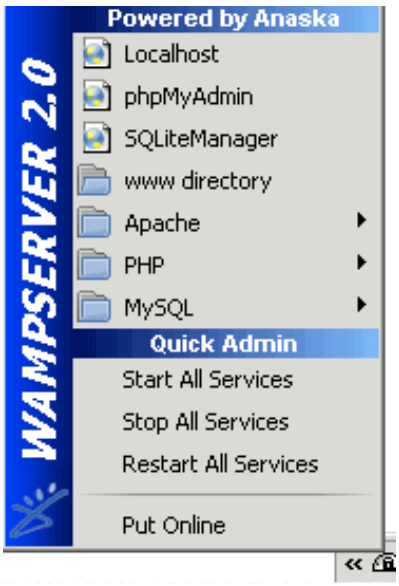
Figure 21. Opera for the desktop

Then, the user needs to start up the Net TV SDK. Make sure that the user should configure the platform to be CE-HTML/1.0. First, as the application only works with the 2010 Net TV platform browser and later Opera versions.

6.6.5 Using WAMP server

After the installation of SDK Net TV and Opera web browser was completed, the next step that we have to do is installing WAMP Server on PC. WAMP server is a windows web development environment application. It allows the user to create web applications with Apache2, PHP and MySQL Database. Moreover, PhpMyAdmin allows the user to manage easily the database.

WAMP server is important to use it on this application for displaying the elderly application to Smart TV. There are some configurations that should be completed on WAMP configuration.



There are three advances settings on WAMP configuration, include:

- PHP Customization
  In this configuration, we need to make sure that what type of program will we use for displaying the application to the Smart TV. We also extend PHP and also can load that come built in, but disabled. Moreover, the user can also edit the configuration file .php. Edit anything the user needs, and upload the file on it.
- Apache Customization
  In this part, the user can also tweak the apache configuration files to the user's content.
- MySQL Customization
  If the application needs to create a database, the user can add a database by MySQL. It also is provided WAMP Server in order to the application that has already the user made. phpMyAdmin can also be reached vie the WAMP menu, or via the url http://localhost/phpmyadmin/

After the installation and configuration completed, then the next step after that is upload the code of my user interface and application which was designed before by uploading to the WAMP server.
The application user interface was designed by using Adobe Photoshop for the first and second version. After that the code was built by using Adobe Dream Weaver to get code in order to the code can be uploaded on the WAMP server to display on smart TV.

CHAPTER 7. RESULT

This chapter describes the end-result of this project including the features and the result of elderly test.

- ***The contents of service***
  The service contents help the user to know their health is in good condition or not. In addition, the consultation with a doctor would be easier for the user to consult related to their health without having to coma to the doctor. This service is required for user who is living at home independently. Some report measurements can be added on it but in other hand the development of applications will always be conducted along with the user demands.

- ***The User Interface of Application***
  Based on the analytical of user interface that I made, I showed it to the colleagues in order to get some advices and feedbacks related to the user interface of my application. From these results, I was able to conclude that there were some features that cannot be easily understood for the user when they are navigating on it. After this, the user interface was edited to make it easier than before for the user to navigate and read it.

- ***The measurement devices***
  The comfort and ease of use are very important to be remembered that the user may not be as much trouble to use it. Therefore all of devices are included in this application was design as well as possible, to following the user needs. It was clear that the user feels enjoy when they use or navigate the devices. Moreover, the user's family happy to see detailed information about the user's health and presence report at home. The reports always to be informed after those devices were used. They appreciate the idea of having the balance screen and if everything is under control, they would prefer to keep the information to that high-level. The user's family is happy to get alert or notification about the report of the user's well being.

CHAPTER 8. CONCLUSION

This paper describes the design and evaluation of an awareness system that supports elderly and their children. The system is aimed the elderly that are living alone and at a distance from their family, thus those who are peripherally involved in the care of their aging parent. By providing awareness information of the elderly wellbeing, their family feels more involved in their care and connectedness is enhanced.

The Elderly Care Innovation is one of the services that is intended for the elderly, the services are display two types of services namely Health Consulting Report and Presence Hoe Report. Philips, especially Customer Lifestyle Department, is developing the project. The function of theses services are to present a report related to the elderly health and the presence home.

This Smart TV service application is able to display information related to the result and analysis of some health measurement taken by the user (elderly) and the Doctor. In addition, the reports display related to the presence of the user (elderly) at its home and when the user leaves home will be presented in this application. In this case, there are some tools that should be used by elderly to measure and monitor when they out of home. That is why those tools should be connected by Wi-FI connection and GPS satellite. All the basic functions performed by these connections. Therefore, As to integrate and connect all tools, it needs WI-Fi Connection to be provided in the user area. Some of these tools should be presented as comfortable and as easy as possible for users to navigate or in terms of its use.

The main purpose of this Smart TV Application (Elderly Care Innovation) is to make easy for the user to consult their health with Doctor and is also to manage and know their health measurement independently, without having to seek assistance from their daughter. Moreover, the number of the user's family also feels comfortable user associated with this application, because of it will make it easier to access where the user is and how the user health condition, certainly without having to come to the user home. Their family can also control anytime by way of receiving notifications on Smart TV or Smart Phone.

The methodology of this project that I used was very useful for developing and managing the project well and composed. Not only the scope of ICT, but also the communication skills and practical-working skills were needed to work on this project. It was a very great experience to be able to contribute to the big company namely Philips Company. It will be very useful for me in the future.

EVALUATION

The graduation project internship was a good chance to get a lot of experiences in ICT fields that I am taking during study in bachelor degree of ICT at Fontys University and Tenth of November Institute of Technology (My home country), moreover it would be able to be a good preparation for the future careers. The knowledge learned to the final semester before the graduation project can be implemented in a great project. The project was useful to learn analyzing skill, communication skill, design skill and project management skills. The project was very interesting, because it was emphasized for analyzing the cases related to the elderly needs. In the beginning of this project, we were be able to find the use case scenarios related to the elderly who is suffering stroke and living at home independently.

Furthermore, after the use case scenarios was decided to build and process. The analyzing of the user requirements and specifications were analyzed to make sure that this application really matches with the elderly needs. The architecture system was started to design in order to clear to describe how the system works well on this application. In this case, it were needed an analyzing to know that what kind of devices and tools that should be provided on the system. After the architecture system was done, the user interface was created as simple as the user wants. Afterwards, the analysis is continued by analyzing the user interface to the number colleagues to get some advises and feedbacks in order to improve the performance of this application to can be useful for them. The SDK functionality of Net TV was also provided in order to build and implement this application into Smart TV. The knowledge acquired was not just a little but also a lot. The discussion and meeting were a great step to monitor and manage the project and increasing the sharing gathering skills.

The Philips Company, where I was completing my thesis project was providing an extraordinary experience. They were providing the comfortable atmosphere to complete the project as well as colleagues and supervisors who are so friendly and very helpful if I get difficulties associated with the project I was working on. There are also many students who are doing the internship to finish their thesis there. They were also so helpful related to give some suggestions for the application that I made. From this, I can improve my application performance.

In the end, all of knowledge, experiences, skill that I got were very helpful for the careers future. In the other hand I wish that someday I will back give some contributions to Philips Company in the near future.

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4. http://voices.yahoo.com/zocor-80-mg-effective-tool-aid-bad-cholesterol-37801.html?cat=5
5. http://www.medhelp.org/medical-information/show/1749/Monitor-blood-glucose---series
6. http://www.cardinal.com/us/en/distributedproducts/ASP/B5370-6.asp?cat=laboratory

Appendices

Appendix A. Project Plan

Project Plan

Project:

ELDERLY CARE INNOVATION

Supervisor : Kees Tuinenbreijer

Student : Reddy Aldino

1. Project Introduction and Definition

1.1 Introduction

The continuous growth of the older population in Europe and worldwide calls for new applications solutions for improving the health, independent living, quality of life and active ageing of older citizens in the information society.

Recent advances in the smart TV have great potential for meeting the needs of older people and hep them stay healthier, live independently for longer, counteract reduced capabilities due to age and remain active for longer. These services will make that possible for elderly to live and enjoy at home. Services that would allow elderly to contact their daughter and family, health consultation via the smart TV, remind some things, offer entertainments and connect to the community are core examples of the services Smart TV can offer.

The smart TV also offers caretakers to continuously monitor elderly through sensors within their home. Those services includes measurements of their health, reminiscent to some things, presence at home, health consultation, sleep patterns and others good applications which can help them.

Philips is going to define use cases for further development of the elderly portal, with vision on the emerging aging. After the use case is defined a prototype portal would be created. The prototype should provide a clear explanation picture of the capabilities of the portal and give companies an early glance of the possibilities of an elderly portal.

1.2 Background

Philips is a diversified health and well-being company founded in 1981 in the Netherlands; they focus improving people's lives through innovations. Ever since Philips got funded R&D has been their core business, with innovations like the compact cassette and CD. Philips specialises in both health and well-being and is also world leader in their core businesses healthcare, lifestyle and lighting.

Consumer Lifestyle

Philips Consumer Lifestyle offers new experiences in a wide range of products: From a relaxing wake-up Light, to their Smart TV entertainment platform. Consumer Lifestyle makes home life more enjoyable and helps to maintain a better well-being. All products are designed around the wishes of their users and aim to enhance people's lives.

Philips Healthcare

At Philips Healthcare they provide solutions for the needs of patients and their caretakers. People healthcare is the core strategy of their products. Researching the experience of a

patient and the complexities their caregivers face. By learning from them Philips Healthcare develops intuitive yet affordable technology solutions that simplify healthcare in a whole.

Philips Lighting

Philips Lighting focuses on both the professional as the consumer market. They provide lighting for indoors (homes, offices and schools), outdoors (sport arenas, residential areas and public places) and traffic (car lighting and street lighting). With the increasing demand for energy efficient solutions, Philips will continue providing groundbreaking lightning solution.

Project

The awareness to social connetedness supporting elderly and their children project lies within the Smart TV section of Philips Consumer Lifestyle. The project will provide comfort and care for elderly and make it possible for them to continue living at home. Philips wants to create services on their Smart TV platform that will enhance the living conditions for elderly and provide support for their caregivers. They want to accomplish that by using a familiar medium for elderly the TV, which elderly can use to interact with the various services.

SmartTV

Philips Smart TV is a platform that provides Philips TV consumers with 3rd party services like , news, programs and movies. Companies can develop Smart TV apps via de partner program within Philips Smart TV (http://www.yourappontv.com). Here they can find all the documentation needed to develop a Smart TV application.

Control

enables the user to control his TV with various devices. With the My Remote application Smart phones and tablets can be used as the TV remote. It is also possible to use, for example a wireless keyboard with the TV.

Net TV

Net TV offers a wide range of 3rd party applications. Watch a program you missed or rent a movie one of the video store applications. Net TV brings you al your favourite websites and services on your TV.

1.3 Project Objective

With the aging population it has become increasingly important that the provisions for living at home are being improved. Philips is researching the opportunities of a care at home portal through the smart TV platform. That will improve the elderly home situation. So, they can live at home as long as possible. The services should provide elderly with their necessities and lower the pressure on their caregivers with services that allow remote monitoring..

1.4 Specific Goals and Conditions

The purpose of this project is defining a use case based on the needs of both elderly and their caregivers or children. The use case will be developed into a prototype portal. The prototype will be designed based on the user interface research result to make the interface easier to use for elderly.

The prototype have to provide and offer a clear picture of the capabilities of the portal and give companies an early glance of the possibilities of the elderly needs.

1.5 Starting Date

Based on the contract, The project starts in February 24th, 2012 and terminates in August 23th, 2012. Duration of the project will be approximately 6 months.

1.6 Defined Responsibilities

	Name	Phone Number	E-mail
Mentor	**Kees Tuinenbreijer**	**+31 651426993**	Kees.tuinenbreijer@philips.com
Student	**Reddy Aldino**	**+31 648599699**	r.aldino@student.fontys.nl

1.7 Project Phase

The project consists of the following phases:

Phase	Activities
Orientation Phase	- Starting up the project - External orientation (Brach & company analysis) - Interview with the mentor - Make a project plan - Intake (Problem description) - Orienting interviews (Gather
Orientation Phase	- Starting up the project - External orientation (Brach & company analysis) - Interview with the mentor - Make a project plan - Intake (Problem description) - Orienting interviews (Gather

Research and solution phase	- Work planning and project organization - In depth study - solution - Make a report
Implementation phase	- Implementation - Graduation

1.8 Project Plan and Schedule

ID	Activity	Duration	Start at	Finish at
Orientation Phase		**22 days**	**24-02-12**	**16-03-12**
1	Instalation the workspace	1 day	24-02-12	25-02-12
2	Meeting with mentor to discuss the Project	1 day	24-02-12	25-02-12
3	Self-work - Writing a draft of a Project Plan	2 days	30-02-12	01-03-12
4	Formal meeting - Discussing the Project Plan	1 day	02-03-12	03-03-12
5	Self study – Finding a use case scanario	3 days	31-02-12	03-03-12
6	Formal meeting – First version the use case scenario	2 days	06-03-12	07-03-12
7	Formal meeting – Second version the use case scenario	1 day	07-03-12	08-03-12
8	Delivery of the final version of the use case scenario	1 day	07-03-12	08-03-12
9	Self-work - Explaining the use case specification	1 day	08-03-12	09-03-12
10	Delivery of the final version of the use case specification	1 day	08-03-12	08-03-12
11	Formal meeting – Discuss the next steps	1 day	08-03-12	08-03-12
12	Self-study – Specifying the functional requirement	4 days	09-03-12	14-03-12
13	Formal meeting – Discuss the functional requirement	1 day	14-03-12	14-03-12
14	Delivery of the functional requirement draft	2 days	14-03-12	16-03-12
Research and Solution Phase		**60 days**	**16-02-12**	**18-05-12**
10	Self-work – Research requirement	2 days	19-03-12	21-04-12
11	formal meeting - requirement the user	1 day	21-03-12	21-03-12
12	Self- work for the requirements generated	3 days	22-03-12	25-03-12
13	formal meeting – discuss the functions	1 day	25-03-12	25-03-12
14	Self-work – report updated	2 days	26-03-12	28-03-12

15	Self-work – Wireframe	3 days	01-04-12	04-04-12
16	Formal meeting – Overview report	1 day	05-04-12	05-04-12
17	Self-work – User Interface	20 days	07-04-12	28-04-12
18	Self work – User test	6 days	29-04-12	05-05-12
19	Formal meeting – Report reviewing	2 days	08-05-12	10-05-12
20	Self-work – Test analysis	8 days	07-05-12	16-05-12
21	Formal meeting – Report reviewing	2 days	17-05-12	18-05-12
22	Self-work – report updated	4 days	28-05-12	31-05-12
Implementation Phase		**30days**	**24-05-12**	**29-06-12**
16	Self- work –select and determine the implementable functions	2 days	24-05-12	26-05-12
17	Self-work - Specifying data and functions in report	3 days	27-05-12	30-05-12
18	Self-work – draft the user interface	3 days	31-05-12	03-06-12
19	Formal meeting - Specifications reviewing	1 day	03-06-12	03-06-12
20	Self- work – Specifying interface feedback	2 days	04-06-12	07-06-12
21	Formal meeting - Documents reviewing	1 day	08-06-12	08-06-12
22	Self-work – Prototype development	7 days	09-06-12	16-06-12
23	Self-work – fixing possible problems.	4 days	17-06-12	21-06-12
24	Formal meeting – Discuss the prototype problem	2 days	22-06-12	24-06-12
25	Formal meeting – Discuss the final prototype	1 day	26-06-12	27-06-12
26	Self-work – write the fina report and prepare the presentation	2 days	27-06-12	29-06-12

1.9 Project Product

- The prototype of the smart TV applications and sensors.
- The Documentation of the research.
- Final report and presentation (PPT).

1.10 Project Deliverable and non-Deliverable

Deliverable:

Deliverable Documents or Application	Deliverable Date
Final project plan	9th March
Weekly report	At the end of each week
Prototype choice and design	14th May
Application and User Manual	20th June
Final report and presentation	28th June

Non-deliverable:

- Basic knowledge and general concepts for Smart TV
- Informational description on Smart TV applications
- Informational description and selection of new functionality features
- Functional and UI requirements specification (not important)
- Training for the application
- Minutes
- Draft documents
- Learning materials for the new techniques

1.11 Project Risks

There is no major risks associated with this project.

1.12 Resources

- User experiences
- User test
- Reference documents
- Interviews
- Partner
- Smart TV Website

Analysis Document

Elderly Care Innovation

	Name	Phone Number	E-mail
Supervisor	**Kees Tuinenbreijer**	**+31 651426993**	Kees.tuinenbreijer@philips.com
Student	**Reddy Aldino**	**+31 648599699**	r.aldino@student.fontys.nl

Background

The elderly care innovation project lies within the Smart TV section of Philips Consumer Lifestyle. The project will provide comfort and care for elderly and make it possible for them to continue living at home. Philips wants to create services on their Smart TV platform that will enhance the living conditions for elderly and provide support for their caregivers. They want to accomplish that by using a familiar medium for elderly the TV, which elderly can use to interact with the various services.

The purpose of this project is defining a use case based on the needs of both elderly and their caregivers or children. The use case will be developed into a prototype portal. The prototype will be designed based on the user interface research result to make the interface easier to use for elderly.

The prototype have to provide and offer a clear picture of the capabilities of the portal and give companies an early glance of the possibilities of the elderly needs.

Experience

Philips has been increasing and working in the field of monitoring the elderly at home. The monitoring elderly involves health care, social connectedness and elderly care. In other hand Philips has been developing the smart TV innovation which provides applications that can easier to navigate and interaction by the elderly. There are also devices which provided by Philips in order to support elderly care at home. Some home care products or devices developed by Philips:

- **Philips Ambient** -
  http://www.healthcare.philips.com/main/products/ambient_experience/about/index.wpd

  Dedicated to developing a friendly device, welcoming home environment similar with medical environment. Ambient experience can help the elderly strengthen their organization's commitment to health and well-being. The goal is to comfort both physically and emotionally by designing space around perceived needs, with easier to navigate and interaction using advanced technologies for the elderly.

- **Philips Wi-Fi Photo frame** -
  http://www.ifa.philips.com/pressreleases/Philips_Photoframe/index.html

  Philips wi-fi photo frame is latest development in digital photo frames. This device supported many features such as wi-fi enable connected photo album. And also from this device can connect easily to other devices such as Smart TV and other devices which can share photo or information by wi-fi.

Simply share for amazing experience on this device are:

- the photo files can connect into Facebook and Piccasa photo download.
- Receive photo emails (the user can receive emails if somebody send photo file , it could be called a notification)
- Definitely can connect to Wi-Fi for sharing files.
- Navigate and interaction by touch screen with friendly interface.

- **Philips Induction cookers (Electric Stove)** - http://www.philips.com.hk/c/home-cooking/8-menus-8-power-with-touch-sensor-red-hd4922_00/prd/en/

Philips induction cooker is a device that can use to cook. It similar with other stove, but all of panels and information's are electrically. The user can use and set a timer on it to anticipate if they forget to turn off after cooking. It would also be a reminder if the user need a timer to monitor what they cook. Philips new induction cooker shortens cooking time by 40% and so better seals nutrients into the food. All of the panels navigate by touch screen. This device so easily to use and set because every panel shows an information clearly.

- **Philips Independent Living Assessment** - http://www.lifelinesys.com/content/independent-living-assessment

Philips independent living assessment is a service that develop a plan for the elderly who life at home independently. The expectations of this service are the elderly can get comforts at home and control mental and physical health challenge how well the can live independently. In this case, Philips will support this to help them to control their future and add to peace of mind for both of them and family.

- **Philips Smart TV** - http://www.digitalnewsroom.philips.com/pressreleases/Philips_Smart_TV/index.html

As one of the foremost players in the field of connected TVs, Philips has built on the success of being one of the first to introduce internet services on TVs and has developed this technology into an integrated, connected and simple system- Smart TV. With smart TV the users can easily access to applications which already integrated with other devices. The smart TV navigation uses a wireless remote that so easily to operate and use on it

SmartTV platform

Philips SmartTV is divided into 4 pillars:

1. Control

Control enables the user to control his TV with various devices. With the MyRemote application Smartphones and tablets can be used as the TV remote. It is also possible to use, for example a wireless keyboard with the TV.

2. Net TV

Net TV offers a wide range of 3rd party applications. Watch a program you missed or rent a movie from one of the video store applications. Net TV brings you al your favourite websites and services on your TV.

3. Simply Share

Simply Share makes viewing photos o n your TV a lot easier. Your tablet, Smartphone or computer can be connected to the TV at any time and display all of your pictures.

4. Program

Program has an intuitive interface that allows you to record a program with just one-touch. Use your remote to pause the program at any time. When you return, press the play button and continue to watch the program from where you left off.

Developing

Philips Net TV is the platform that provides Philips TV consumers with 3rd party services like Youtube, news, programs and movies. Partners can develop Smart TV apps via de partner program within Philips Smart TV (http://www.yourappontv.com). Here they can find all the documentation needed to develop a Smart TV application.

Philips Smart TV 2011

The developed app will appear on the Net TV portal in the form of an app icon. The app icon will link you to a CE-HTML website optimized for Net TV platform. The partner can purchase banner space to promote their new application. Apps can be funded by in-app advertisements free of charge. Consumer payment services are not yet supported on the Smart TV platform.

Requirements

Developers want to make sure regarding the technical and user experience requirements. These will be explaining how the partner portal could provide a high performance of Net TV and giving other values for the customer. Before new applications are published the Net TV validation and developers team will check to make sure these requirements.

Technical	Description
CE-HTML Compliance	All of Net TV Apps need to fulfill with the CE-HTML requirements. ▪ All App content must comply with the ANSI/CEA-2014 Standard. ▪ App content should not link to content that does not meet CE-HTML requirement. ▪ Server should comply with CE-HTML standard
Platform Capabilities	▪ App content may use only supported specification. ▪ App content should not link to content that does not meet Net TV platform. ▪ No App may store more than 20 cookies at the same time. ▪ Multi-language App shall use accept language header. ▪ App content should not use unsupported CE-HTML features. ▪ No App may store than 20kb of cookies at the same time.
Portal	▪ Provide an App screenshot in the right format and size. ▪ Provide an App description, which is max. 255 characters long. ▪ Provide an App icon in the right format and size. ▪ Always use smart TV in URL or within App ▪ Provide an App subtitle, which is max. 150 characters long. ▪ Provide an App name, which is max. 20 characters long. ▪ Provide URL to (production) landing page.

User Experience	Description
Performance	The Net TV platform's performance is limited. The users need to take this into account when developing their App. ▪ All navigation on the page should be visible within 0.8 seconds. ▪ Every action within an App page should respond within 4 seconds. ▪ Every App should load within 8 seconds. ▪ The App must deliver responsive performance. ▪ A loading icon should be shown before the start of a video.
Interaction	The users interact with the App on the Net TV platform using a regular remote control. It is different from PC-based web services,

	where users have a mouse and keyboard. ▪ Pointing devices support. ▪ Key codes should not be used. ▪ The font size used should be at least 18px. ▪ All text should be entered in the correct way. ▪ The back button should not be prevented on the landing page of the App. ▪ If content is GEO-Blocked an indication is required. ▪ On initial load of the App the element in focus should be clearly highlighted. ▪ The selected element should be clearly highlighted. ▪ All App pages should support pointer navigation. ▪ All App pages should provide logical spatial navigation. ▪ All App pages should provide simple and logical interaction.
Visibility	▪ The App should show content only within the safe area. ▪ Content must have enough contrast to be 'readable'
Media	Many Apps provide content with the use of media. These media Apps should be judged from a user's point of view. ▪ All used media in an App shall play fluently. ▪ Playback options in an App are obligatory. ▪ Full Screen mode is visualized by the full screen butoon in the App.

Design how-to

The user interface of a Net TV app will have to be optimized for use on the Smart TV platform. Some things to keep in mind when designing the App:

- User needs to be able to control the application with a regular remote control
- The user will typically be sitting 10 feet away from the screen
- The user will typically be browsing passively in comparison to interacting/searching on like a pc
- Light conditions in a living room may be different to a desk situation

Browsing on a TV can be compared with the controls on a phone without touch screen. Using a four directional cursor to interact with the user interface.

Net TV can be controlled by a regular remote control; a pointer device will also be compatible with the newer Smart TV models.

Competition

Within the Netherlands we can distinguish 3 competitors who are already active in the home monitoring field. We also see a Dutch health insurance company called VGZ who developed different mobile apps that provide help for Elderly. Some bigger competition arrived in America where Microsoft launched their Health vault service.

Zuidzorg - http://www.zuidzorg.nl/Zorg-thuis/
Zuidzorg provides care at a home in special homes for elderly. These homes include home automation, which make it possible for devices to be remotely turned off. A device on which video contact can be made with the patient is also available. They also provide for example a "good morning" service that will contact them every morning and ask about their condition. The device aroused a lot of suspicion at start because elderly thought people would watch them through the webcam. Zuidzorg is expanding their service with measurement equipment.

PAL4 - http://www.pal4.nl/website/home/
PAL4 offers a wide range of services for care at home. The elderly can add additional services to the basic package. The basic package includes a video contact feature that can be used to video call family or caregivers. Elderly can also add the following packages:

PAL4-eHealth
Patients with a specific syndrome get extra medical support. The patient will get devices based on his condition for measuring important data. The measurement results can be moderated by the caregiver and discussed with the patient through the video call service.

PAL4 Welfare
With this package elderly get access to social environment within PAL4. On this platform elderly can access services like games, news and church services.

Mobihealth BP@Home - http://www.mobihealth.com/services/nl/mh_mobile.php
Mobihealth's blood pressure meter can measure the daily blood pressure of a patient at home. A specialist from the hospital will receive those results in the form of clear graphs and contact the patient by phone if needed. This will prevent false blood pressure results of people getting nervous when treated at a hospital. It can also give specialists more contact moments with their patients then once every two weeks.

VGZ
The Dutch health insurer VGZ has a number of apps designed to assist their target audience. The following apps are currently available on IOS and Android devices.

VGZ Care Assistance
VGZ Care Assistance helps the elderly with weekly appointments. The application makes it possible to add care-related appointments and will send a reminder if needed. Within the application there is also room to leave small reminders with a notepad or voice recorder. It is also possible to rate different health care institutions.

VGZ Medication
VGZ Medication helps you remember your daily medication intake. Medicines can be added to a list with the intake time. The application will then send a reminder to take the medication. Within the application information is available about the various medication effects and side effects

Microsoft Healthvault - http://www.microsoft.com/en-us/healthvault/
The biggest and most similar competitor within the care at home branch is Microsoft. Microsoft has launched their Healthvault service in the United States and is expanding to the United Kingdom. Healthvault is a platform that provides a safe environment for external healthcare companies to develop their applications on. Microsoft also co-operates with different hardware companies, which provide different measurement devices. Healthvault focuses exclusively on the monitor

Business benefits
Internet television will make it possible for production companies, television broadcasters and film producers to publish all of their content. They don't have to worry about capacity limits because there is none. This will dramatically increase the amount of content available, which will boost the amount of hours people watch television. Which will result in better service revenues and more viewer engagement.

Internet TV can also be beneficial for advertisers, currently advertisement are based on the target audience of a program. Cable operators sell advertisement spaces based on the content but also on the geographic location of a household. Through the cable operator's network they can define their audience based on states, cities, towns and even neighbourhoods. Internet TV will be able to go even further than that, by defining individual households. Internet TV will also be able to advert like Google, based on the search/watch results specific advertisement will be displayed.

Appendix C. Story board of The Implementation Concept

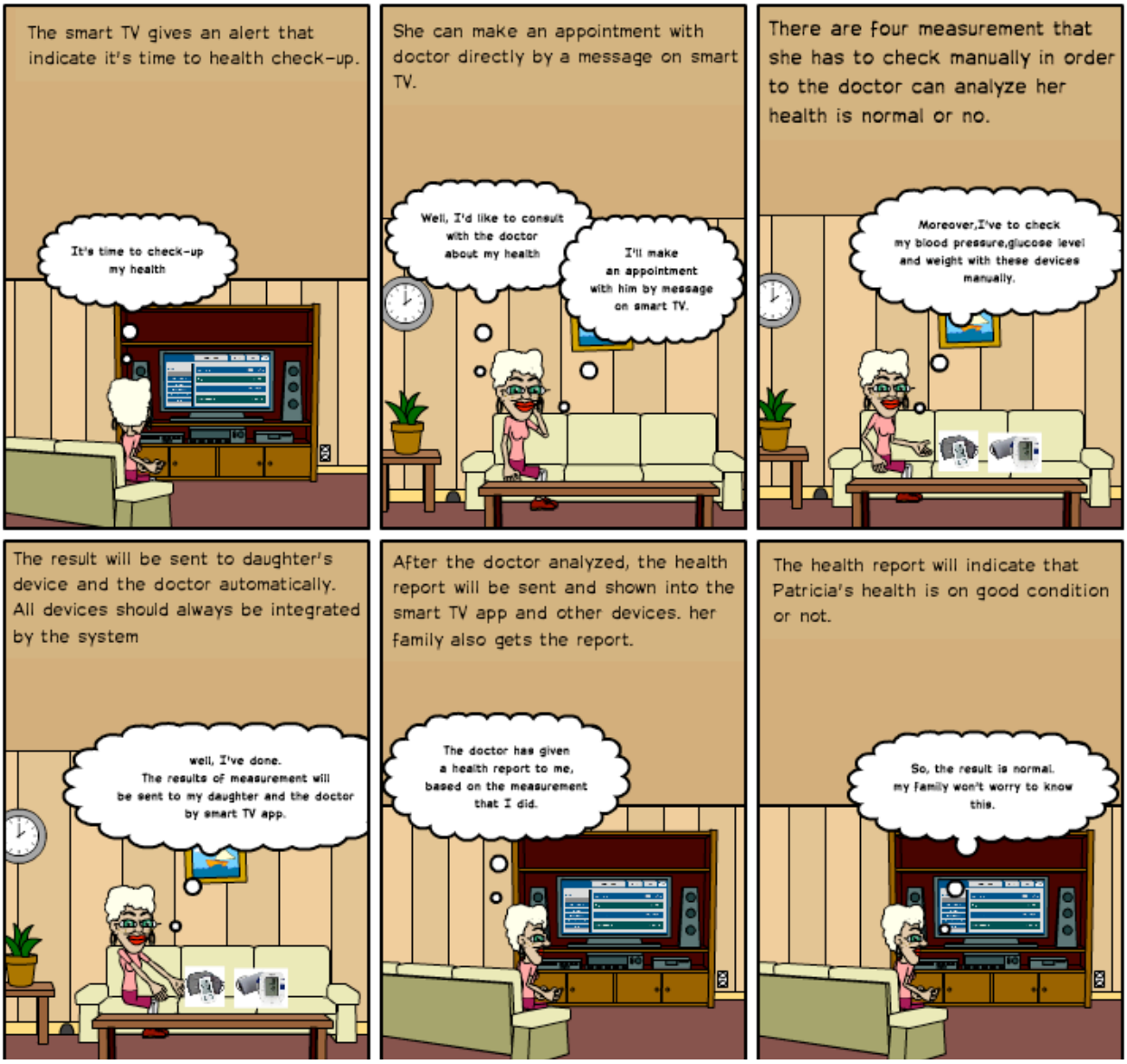


Figure 23. The user at Home (Health Check-up and Consultation)

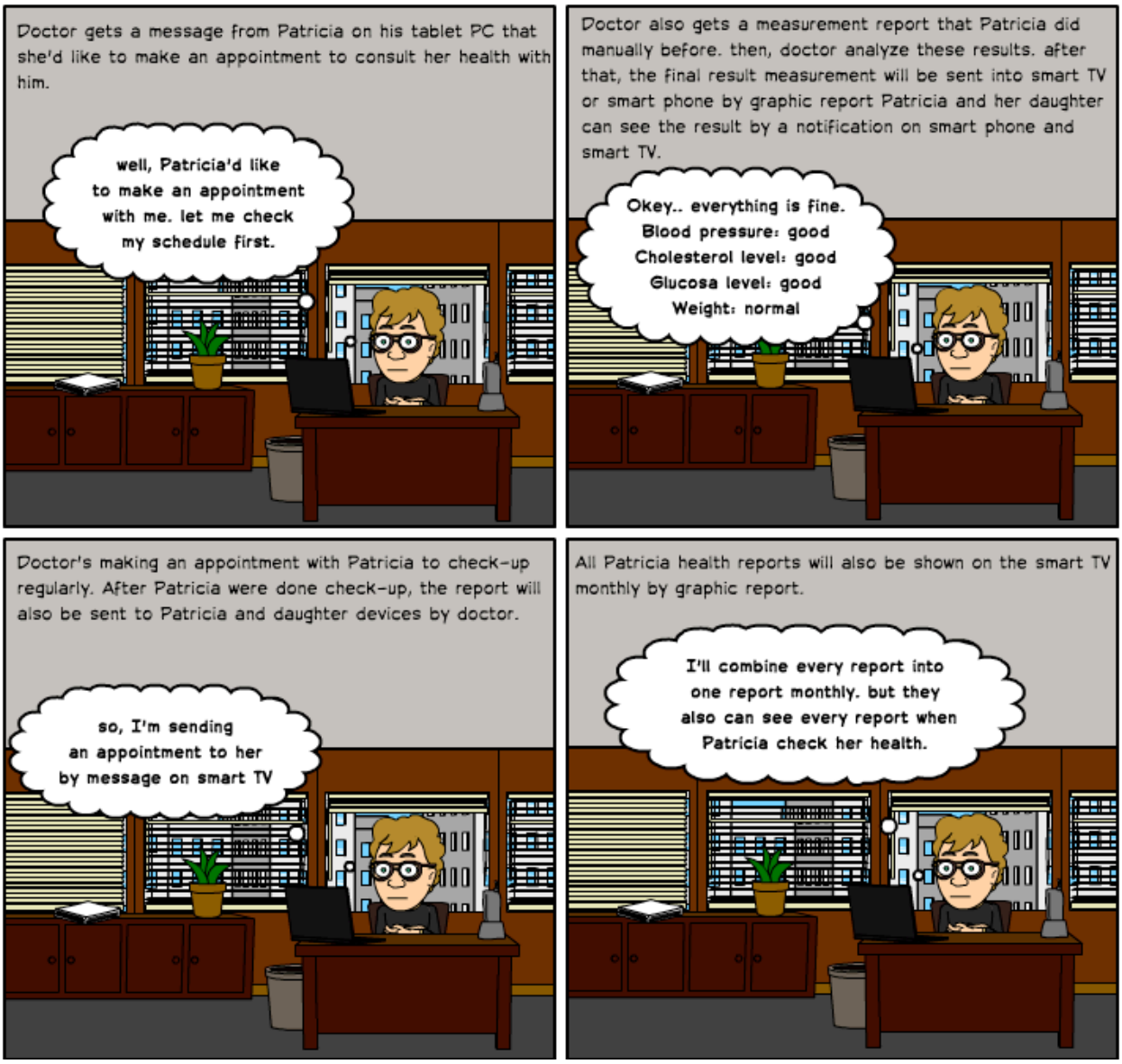


Figure 24. The Doctor Office (The doctor analyzes the user's health)

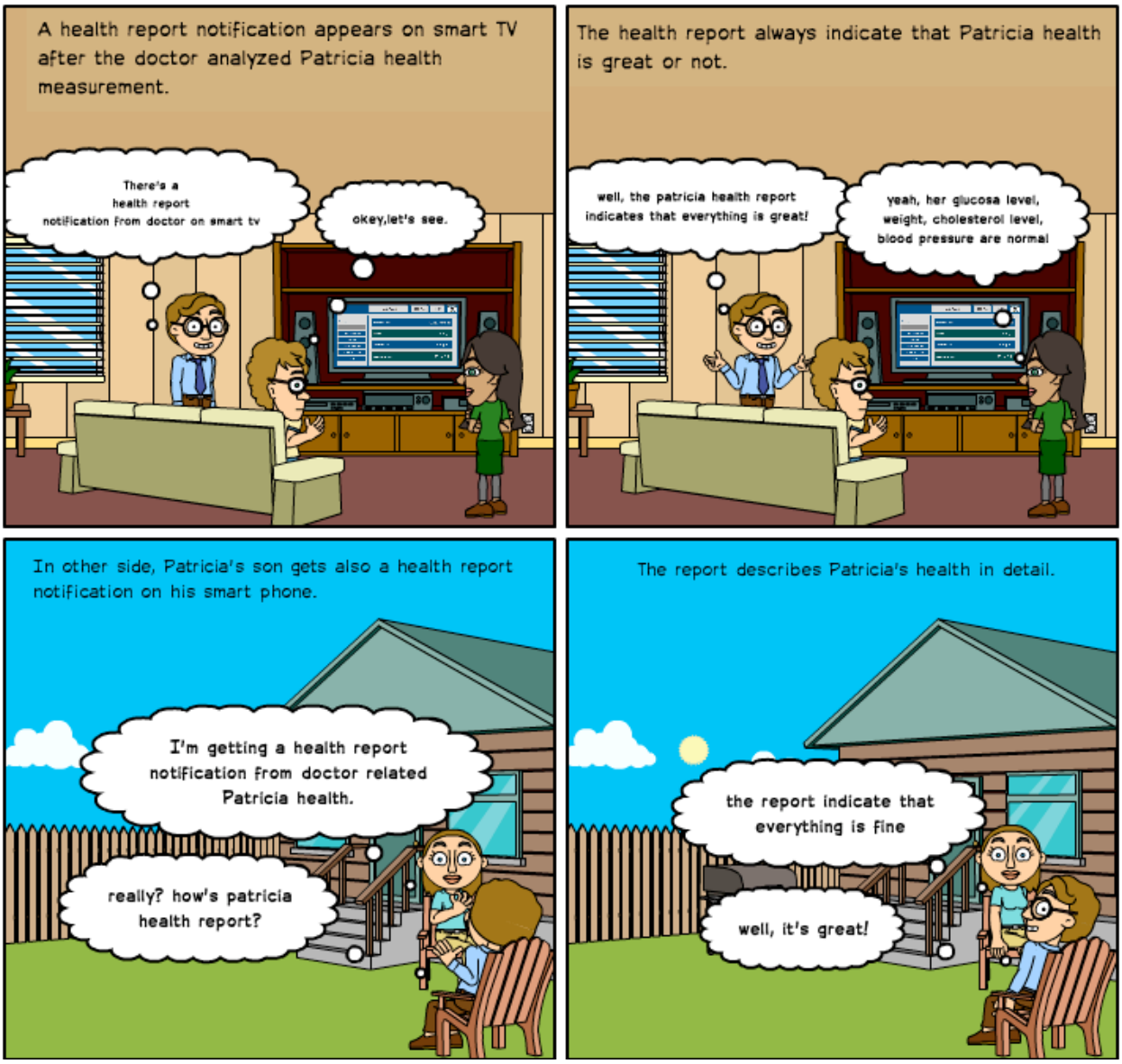


Figure 25. Daughter Home (They get a report of the user health)

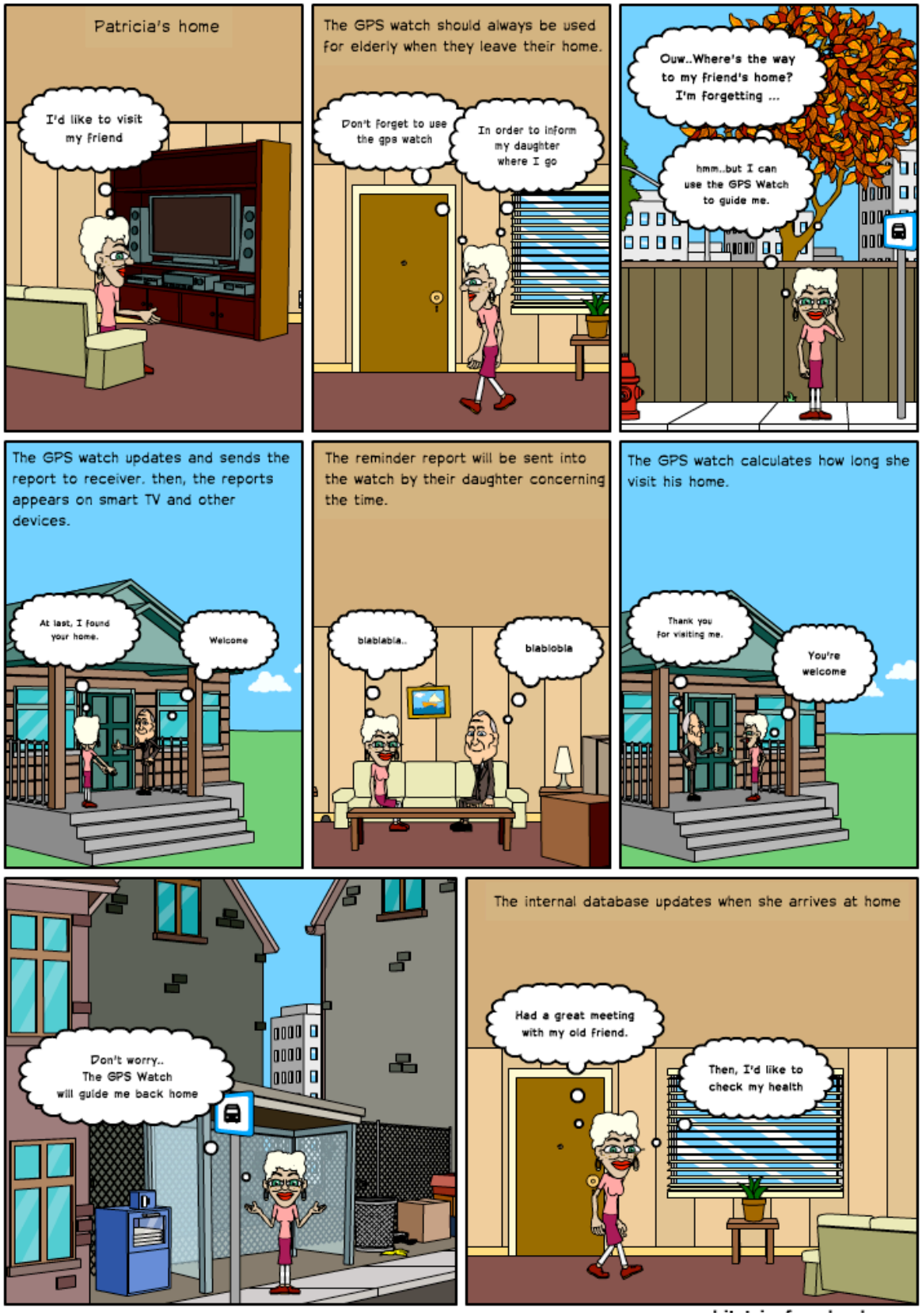
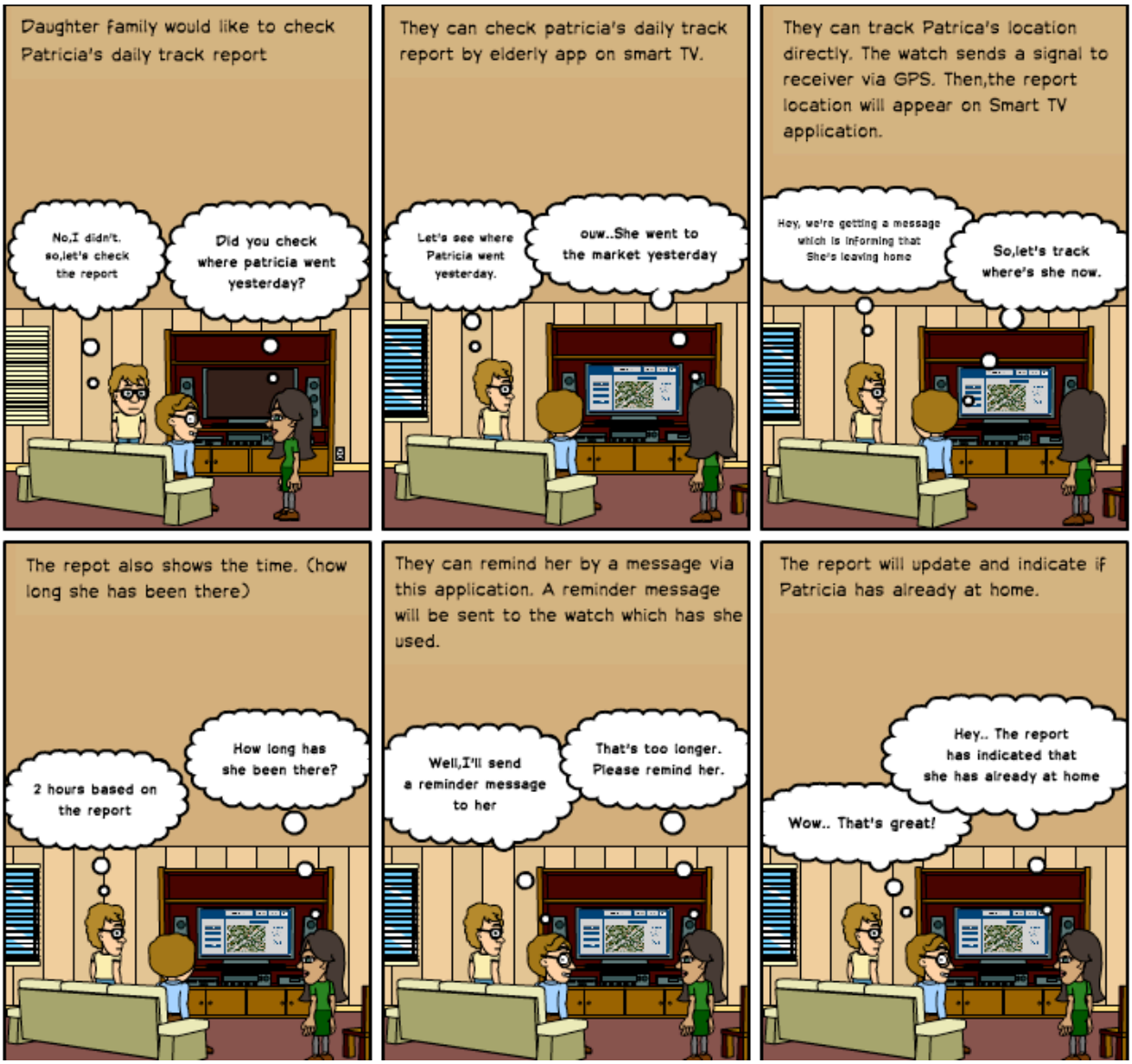


Figure 26. When the user leaves home, The GPS Watch should be used.


Daughter family would like to check Patricia's daily track report
No,I didn't. so,let's check the report
Did you check where patricia went yesterday?
They can check patricia's daily track report by elderly app on smart TV.
Let's see where Patricia went yesterday.
ouw..She went to the market yesterday
They can track Patrica's location directly. The watch sends a signal to receiver via GPS. Then,the report location will appear on Smart TV application.
Hey, we're getting a message which is informing that She's leaving home
So,let's track where's she now.
The repot also shows the time. (how long she has been there)
2 hours based on the report
How long has she been there?
They can remind her by a message via this application. A reminder message will be sent to the watch which has she used.
Well,I'll send a reminder message to her
That's too longer. Please remind her.
The report will update and indicate if Patricia has already at home.
Wow.. That's great!
Hey.. The report has indicated that she has already at home