EASYREACH is a Project of the
AAL Program (Call 2009-2)

FOSTERING SOCIAL INTERACTION OF HOME-BOUND AND
LESS EDUCATED ELDERLY PEOPLE

EasyReach International Workshop

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Contents

INTRODUCTION

The EASYREACH International Conference was held on September 23, 2013 as a side event of the 2013 AAL Forum 2that was organized in Norrkoping, Sweden (September 24-26, 2013).

In parallel the EasyReach project was represented in the AAL event with a stand in the Exhibition Area and with a poster presented by Amedeo Cesta of CNR.

This deliverable is split into three chapters:

- The Chapter 1 gives information on the AAL FORUM;
- The Chapter 2 includes the papers presented at the EasyReach Session and an overview of the themes discussed during the Round Table organized as part of the session's program;
- The Chapter 3 reports on the EasyReach demos presented in the Exhibition area of the AAL Forum and on the EasyReach poster included in the Scientific Program of the event.

1. The 2013 AAL Forum

The 5th edition of the Ambient Assisted Living annual event, the AAL Forum, was held on September 24-26, 2013 in Norrkoping, Sweden.

The forum took place on 24th -26th September 2013 in the Louis De Geer Consert & Congress, Norrköping, Sweden.

The AAL Forum is the annual platform for the increasing European AAL community to meet and discuss several topics, relevant for improving the AAL JP as well as the adoption of AAL solutions in the market. The 4 main themes for this year's forum were:

A – Autonomy, choice and control – AAL solutions impact on individuals – autonomy and ability to choose how to spend their days and live their lives.
B – The ageing society – end-user studies and inclusion – Older adults as a collective and integrated part of the society.
C – AAL and the economy – Economic aspects of AAL solutions – economic growth through new ideas, a new branch and new solutions
D – Programmes and policies in Europe – AAL on the European level – implementation and policy strategies.

Furthermore a Young Researchers Workshop was organized; it explored how technology and social innovation can be used to support elderly in maintaining a meaningful occupation after their retirement and to help elderly engage, communicate and develop new social contacts and networks.

Also this year the AAL Award 2013 (in its third edition) nominated the best project of the AAL joint programme. This award is intended to recognize the most promising project that demonstrates great promise in terms of innovation, human-centric approaches to development and market potential. Nineteen projects participated to the eliminatory

phase and presented their peculiarities to a panel of experts. The finalists of the 2013 edition were: iWalkActive, Mobile Sage and Connected Vitality.

Track A – Autonomy, choice and control

This track is intended to reflect the (potential) impact of AAL solutions on individuals in terms of autonomy and of choice how to spend their days and live their lives. Important issues are social inclusion, both in terms of prevention of loneliness and participation in the e-service society, as well as physical mobility. Attention will also be given to the autonomy aspects when living with one or several chronic conditions. A specific session will be devoted to the impact of ICT based solutions on informal carers, such as partners (often seniors themselves) and family.

Track B – The ageing society

In this track, older adults will be reflected as a collective and integrated part of the society with space for outcomes of end-user studies, aspects of how new solutions may aid and impact work at high age and may help overcome language barriers. Furthermore, living labs and future smart housing will be reflected as integrated parts of the society, in order to create sustainable solutions with great impact on the society.

Track C – AAL and the economy

The AAL Joint Programme has been initiated by the EU and 23 European countries 6 years ago and has financed so far 131 R&D&I projects with a supporting sum of approximately Euro 250 Mio. At the time when the AAL JP was launched the AAL market was hardly recognizable in Europe. Has this changed since then? Has the AAL JP made a measureable impact on the European market and if what factors promoted this? These and other questions will lead the track "AAL and the economy".

Track D – Programmes and policies in Europe

This track is devoted to AAL policy on the European level, both in terms of implementation policy and strategy – with the European Innovation Partnership on Active Healthy Ageing as a core activity – and future funding possibilities and call themes. Specific attention will be put on Europe in a global context, but also on national programmes reflecting European policy and the regional approach of European cohesion policy.

During the Closure Cerimony it was observed that "more and more products are beginning to emerge from the projects funded by the joint programme and there is a real sense that we are beginning to get a real return on the significant investment into AAL over the past few years".

Furthermore it was announced that the next edition of the AAL Forum will be organized in Bucharest.

The AAL Forum was concluded by **an interview with 101-year-old Dagny Carlsson, a woman who picked up a PC in her 90s and is now a prolific blogger. "E**veryone should keep trying new things in life and not be afraid by change"; it was an inspiring message for all the Research community.

2. THE EASYREACH SESSION

2.1 INTRODUCTION

A "society of all ages": reshaping the role of the elderly citizens and valuing them as an asset for the new, ageing society.

The session – organized by the EASYREACH Project - intended to propose new scenarios for ageing population; the promoted approach is in line with the WHO definition of "active ageing" as *" the process of optimizing opportunities for health, participation and security in order to enhance quality of life as people age"* where activity implies a *"continuing participation of older people in social, economic, cultural, spiritual and civic affairs and not just the ability to be physically active or to participate in the labour force"* and "health" refers to physical, mental and social wellbeing.

Society needs to value and promote the potential coming from "active ageing", both to improve the quality of life and dignity of older people, but also to provide new forms of growth opportunity and mitigate the anticipated negative effects of the demographic change. Finding innovative ways to encourage healthy and active ageing and intergenerational solidarity can thus make a genuine impact on creating modern 'societies of all ages'.

Currently active ageing is not only related to a mere extension of the working life of the older citizens, but is mainly linked with the "social ageing" phenomenon in which (differently than in "chronological ageing") older people are expected not only to continue to participate longer in the formal labour market but also to contribute with unpaid activities such as volunteering after the retirement. The life post-retirement is seen increasingly by many as the "third active stage", i.e. a period of relative good health and social participation, in citizens life course, after education and work.
This new approach matches perfectly with a growing need of the persons directly involved: they want to live longer but at the same time to live their third age in a better, more participative way and continue to represent a resource for the community rather than a problem.

The theme of the session was in line with the focus of the AAL Call 6 aiming at *"the development of ICT-based solutions which enable older adults to continue managing their occupation – at work in an office, a factory or any working environment; in a first or subsequent career, in paid or voluntary occupation including local social activities – while preserving health and motivation to remain active".*

2.2 THE PROGRAM

PROGRAM

Time	*Title*	*Speaker*
13:30	Introduction and objectives of the session	S. Bonfiglio
13:45	Gently ageing …. a technology-enabled inclusive society	M. Dominoni, University Bicocca - Milano
14:05	A mobile solution for the senior citizen of the today's interconnected world	S. Pinardi, University Bicocca - Milano
14:25	Acceptance of technology-enabled solutions by elderly people: a field investigation	F. Papa – Fondazione Ugo Bordoni, Roma
14:45	*Coffee Break*	
15:00	The values of "reminescing" in the older adults: socializing and bridging the gap with younger generations	L. Morganti, Istituto Auxologico Italiano, Milano
15:20	The new role of the User Associations and the Senior Centers : reshaping how to design and deliver social care to the citizens	S. Bonfiglio – FIMI BARCO, Saronno
15:40	Removing digital barriers…. The EasyReach case: technology as a value	A. Cesta – ISTC CNR, National Research Council, Rome
16:00	ROUND TABLE- The new frontiere of Active Ageing	
16:50-17:00	Conclusions	M. Dominioni, EASYREACH Project Coordinator

2.3 THE PRESENTED PAPERS

M. Dominoni University Bicocca - Milano	Gently ageing .... a technology-enabled inclusive society	1

Gently ageing ....

a technology-enabled inclusive society

M.Dominoni

University of Milano Bicocca

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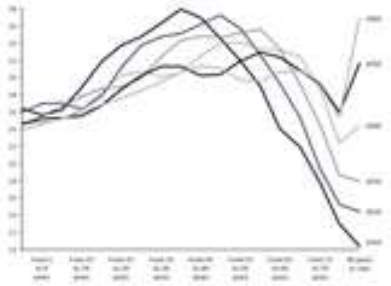
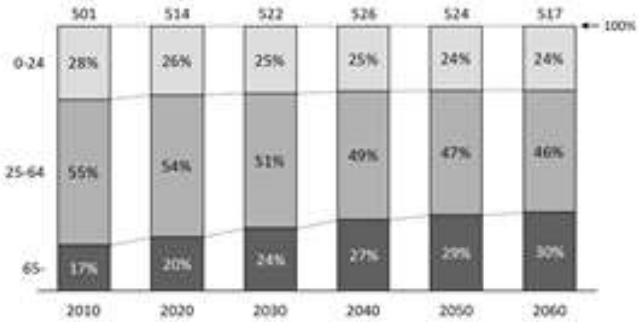
EU27 trends in ageing





number of people aged 65+ will almost double over the next 50 years, from 85 million in 2008 to 151 million in 2060 (font: Strategic Implementation Plan of the EIP-AHA)

M. Dominoni 2

The frame work

- To maintain a good quality of life it is important to have an active, affectively reach life
  - People must be genuinely curious and socially dynamic
  - Elder people must be able to share their experiences with the younger ones
    - Some elders are still active after retirement, and want to continue their job
- **Socially isolated elders** and people affected by early stage of **Neurodegenerative deaseas (ND)** related to ageing ***tend to isolate themselves***
  - They retire from society and progressively have less interests in their personal care, and in any kind of social activity
- In the **very near future** senior citizens will be requested to stay active at work, even after their retirement for economic reasons, and they will be pushed to take care of each other, at least partially, while the young and middle aged portion of the population will be required to help them with their lives and activities, gently sustaining their healthy aging.

Technology driven solutions

- The first problem to prevent and help elders and people at risk of ND - to slow or partially stop their decline - is to find a viable measure of mental decline **applicable in large part of the population at low cost.**
  - We would like to understand the status of people that are forced to stay at home or that could not aware of their decaying mental/physical situation.
  - We would like to intervene quickly in case of decline, but social care and social control is costly.
- More generally, is it possible **to build a bridge to fully integrate elders with younger generations**?
- Is **Information and Communication Technology** offering solutions suited for these kind of problems?

Sensors for the Quality of Life

- Our approach is to **indirectly measure quality of life**
  - To act in case of problem
- We could invest time, money, research efforts in order to create a robot able to take care of people
  - Even if this is probably fascinating it appears to be still far the day when a robot could take care, and help elders like human nannies!
- The EU way is to "put intelligence" around the person
  - in the environment (Smart City)
  - at home (Domotic, Smart Houses)
  - in mobile devices (smartphone, tablet)
  - on the body (clothes' accessories).
- using a number of small, low cost, sensor placed in the environment,
  - Thin, lightweight, low costs, respectful of the privacy, non invasive sensors

Measuring human activities

- Through sensors it is possible to understand what people are doing in their daily activities.
- How?
  - Machine Learning (a branch of artificial intelligence) applied to sensor signal analysis, big data analysis, to classify **movements**, **gestures**, and **activities**, done by a person of a set of people present in the environment, usually **not** using a videocamera.
- What we can measure?
  - Movements , Actions
    - Activity of Daily Living [Sindi, 2010]
  - Gestures [AAL call 2, EasyReach, 2008-2013]
  - Quality of Actions [AAL call 6, GAP, proposal, 2013-?]

Activities of Daily Living (ADLs)

- ADLs are generally considered a measure of quality of life.
  - **Understanding movements and activities is important to understand quality of ADLs.**
- Measuring the quality of gesture, and of body movements is a measure of ageing, mental decay, early signs of ND
- Some measure can be used also to prevent falls, that is generally a major issue for elderly

- How is it actually possible to obtain these measures?
- How affordable they are?

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Single Sensor

Recognition of Daily Activities

- Project SINDI (Nomadis)
- Intelligent Feature Selection: domain specific approach
- Overall performance: accuracy 88.5 % (89-95% for Daily Activities)
- Seven specific actions executed by 20 different people aging from 21 to 55.
- Published in (Computer Journal, 2009)

	a	b	c	d	e	f	g	h	i	z
a	102	–	–	–	–	–	–	–	–	7
b	6	83	–	–	–	–	–	–	–	–
c	–	–	40	1	–	–	–	–	–	–
d	–	–	1	38	3	–	–	–	–	–
e	–	–	–	2	41	–	–	–	–	–
f	–	–	–	–	–	82	–	–	–	2
g	–	–	–	–	–	–	53	–	–	1
h	–	–	–	–	–	–	–	74	–	3
i	–	–	–	–	–	–	–	–	16	4

(a) Walking, (b) staying, (c) lying, (d) sitting, (e) standing, (f) turning right, (g) turning left, (h) turning back, (i) fall on a sit (z) others.

seven actions - confusion matrix

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Multiple Sensors

•NIDA 1.0 (**20 type of actions** 13 M/F people ranging from 19 to 44 years-old 2 repetions, 273 acquisitions. *)

•WARD 1.0 (**13 types of actions** performed by 20 people (7 women and 13 men) ranging from 20 to 79 years-old with 5 repetition per action, 1200 actions**)

Instrumentation NIDA

5 MTx Xsens sensors:

- 3 axis accelerometer
- 3 axis gyroscope
- 3 axis magnetometer

Intrumentation WARD

5 Tmote Sky boards sensors:

- 3 axis accelerometer
- 2 axis gyroscope

#	Sensors	NIDA accuracy	WARD accuracy
5	hip, left/right wrist, left/right ankle	97. 43 %	98.43 %
5	hip, right wrist, rightanke	94.87 %	98.26 %

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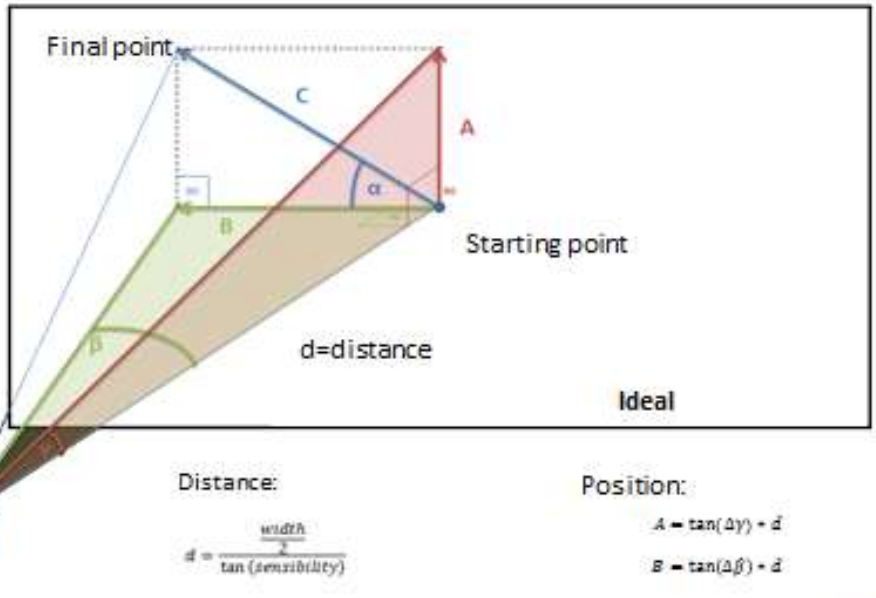
Sensor as a Pointer



Distance:

$$d = \frac{\frac{width}{2}}{\tan(sensibility)}$$

Position:

$$A = \tan(\Delta\gamma) \cdot d$$

$$B = \tan(\Delta\beta) \cdot d$$

Sensor

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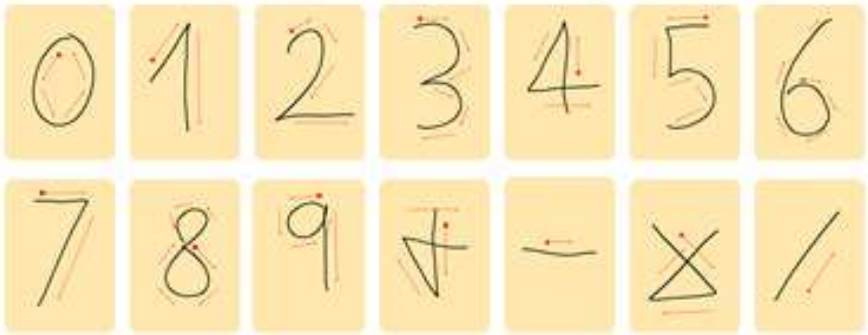
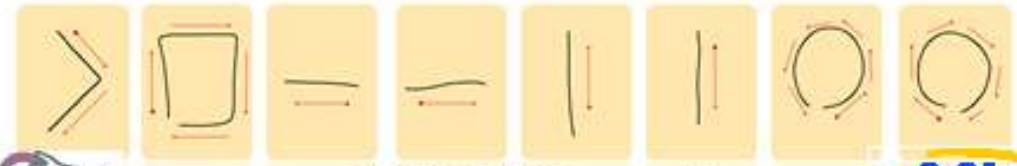
Gestures

Set 1



Set 2



Analysis Results

Matrix confusion data set 2 (Simple User Interface)*

Pearson Correlation + Centroids

Data stretching using Adaptive Linear Algorithm

without a rejection treshold

	1	2	3	4	5	6	7	8
1	88	0	0	0	0	0	0	0
2	0	85	0	0	0	0	0	3
3	0	0	87	0	1	0	0	0
4	0	0	0	84	1	0	0	0
5	0	0	0	3	85	0	0	0
6	1	0	0	1	0	86	0	0
7	0	1	0	0	0	1	86	0
8	0	13	0	0	0	0	0	75

Accuracy = 676/704 = 96.02%

w/ rejection threshold

	1	2	3	4	5	6	7	8
1	88	0	0	0	0	0	0	0
2	0	85	0	0	0	0	0	3
3	0	0	87	0	0	0	0	0
4	0	0	0	84	0	0	0	0
5	0	0	0	0	85	0	0	0
6	0	0	0	0	0	86	0	0
7	0	0	0	0	0	0	86	0
8	0	3	0	0	0	0	0	75

Accuracy = 676/682 = 99.12%

*S.Pinardi, M.Bresciani - May 2012

The future – Standards

- The research in this area is an open field.
  - Results have been presented in literature, and many application has been developed
    - But to create real time applications that work with different people with different attitudes, ability, body shapes, need the creation of well assessed standards.
- **First**: best practices.
  - How to put sensors in the ambient, in the body, which sensors and why?
    - What we have to measure (dementia vs elders vs normal activity vs disabilities etc) and how and why.
  - How interact with subject and with specialists?
  - How to interact with stakeholders.
- **Second**: public databases.
  - Public databases of activities, movements and gestures, labeled and well described, and culturally contextualized, should be created, to help researcher, to have common patterns for measures, and researches results.
  - Confrontation is a key to competition that drive to best practices and research / business improvements.

The future - Standards

- **Third.** Protocols
  - How we can know if and when a test or a measure is taken in good way, conditions and situations are very different
    - We need protocols and contextualized data.
- **Fourth.** Sharing
  - Solutions should be "open", or "semi-open" and applications exchangeable.
  - Social growth and code reuse, help to increase the rate and quality of results.
- **Fifth:** Infrastructures
  - We need standard infrastructures, standard sensors, standard applications, standard libraries, that must be easy to use, and to run in easy way
    - It is still very difficult to create an ambient where to develop a solution and to test it in an easy way.

The future - Standards

- **Sixth:** (Medical) Ontological representations.
  - What we do is to recognize human acts, human diseases or at last the early stage of them.
  - Data are interesting per se in most of the cases, but a structured and coherent set of meaningful rich data can help to improve solutions, to extract further meaning and connect given information with others, to exchange it, to grow.
  - Also we had to have a way to represent information both valid in medicine and in the Computer Science / Engineer fields if we want that our "techs" results will be useful and used by other specialists.
- **Finally:** Cultural breach and disseminations.
  - Conference Specialized on both Techs and Health problems are the bed for cultural and technological exchange. And are not be the exception, but the rule.

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EasyReach Project

Nothing is beyond your reach...
www.easyreach-project.eu

EasyReach

- Keep people socially active, increasing the number and quality of the contacts;
- manage the interaction between real communities and people who are part of, but which, for physical reasons, can no longer participate;
- help older people to become a guide for a group of people on the basis of past work experience;
- help a user to remember and organize their own activities...

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Easy Reach – remote control

EasyReach *Mobile Live City*

- EasyReach - Mobile Live City also seeks to "unload" the design complexity in favor of a re-use of existing technologies to focus innovation efforts on truly critical aspects such as interfacing and use
  - It aims to provide a set of interfaces which are ergonomically easy to use and understand
- The perspective is to develop innovative services, such as services geo-localized information retrieval, customized services.
  - Last but not least detect ergonomic information that allow us to measure the quality of use, and possibly raise alarms for the intervention in case of critical situations.

Easy Reach *Mobile:* Some Evolutions

- The remote control vs Android smartphone touch
  - which contains many sensor devices similar to that of the Remote Control, but appears more versatile on many purposes
    - Input/output
    - Applications

- Touch interface seems more appropriate for both the elderly users and for users with certain disabilities congenital or induced, but without introducing elements of 'specialty' related to disability or age, decreasing the feeling of "difference" social.
  - It is a consumer device: use of hardware and software technologies of widespread diffusion
    - Tested and validated on a broad spectrum of users
    - Reduced costs

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Gently Ageing Project

- The **goal** is to create a smart city project for senior citizens with their active involvement.
  - It focuses on connecting people of all ages, but is designed around the needs and abilities of senior citizens.
  - It is strongly centered on the idea of creating a "gentle" environment that would take into account the ergonomic capacity of elders and their means, in particular of
    - their **physical** abilities
    - their **cognitive** capacities and abilities.
- The goal is to first offer a "gentle" instrument for **socialization**, then to give seniors access to a set of **City Services** and finally to give to them the possibility to **offer** their **abilities** and capacities to the general population
  - easy way for elders to live the city in order to help them remain **active** and **healthy** and to generate a new segment of happy citizens, taking into **account** their age, interests and abilities.

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Q&A

Think to...

... the importance of a simple gesture

Movement Recognition

Spinnet Lab

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S. Pinardi University Bicocca - Milano	A mobile solution for the senior citizen of the today's interconnected world	2

Mobile for very Elderly: Myth or Possibility?

- Goal:
  - explore the possibilities given by mobile devices to Elderly for ER (EasyReach) project expecially from the ergonomic point of view
  - cognitive and physical ergonomy
- Questions:
  - Are elderly open to Mobile Technology solutions?
  - Can mobile REALLY help elderly?
  - Can bring the ER project to the outdoor?
  - Can an off-the-shelf "innovative" technology *help* Seniors *to* connect to or to relate to the young and middle-age segments of population?
- Which are the limitations of a "mobile for very elderly" for ER?
  - Cultural or technological?

ER Mobile for Elderly: Design

- Elderly are different from any segment of users (as we know)
  - Physical and psicological limitations
  - Progressive mental decay, cognitive impairments due to ageing
- Digital divide
  - Psychological differences
  - Cultural limitations
  - «Irrational» fears
  - Inabilities
- Many mobile solutions do not take into account the cognitive, cultural, and physical differences of Elderly.
  - They tend to give too many/not enough informations
  - Not proper use of human interface
  - Do not take into account of physical difficulties and diversity

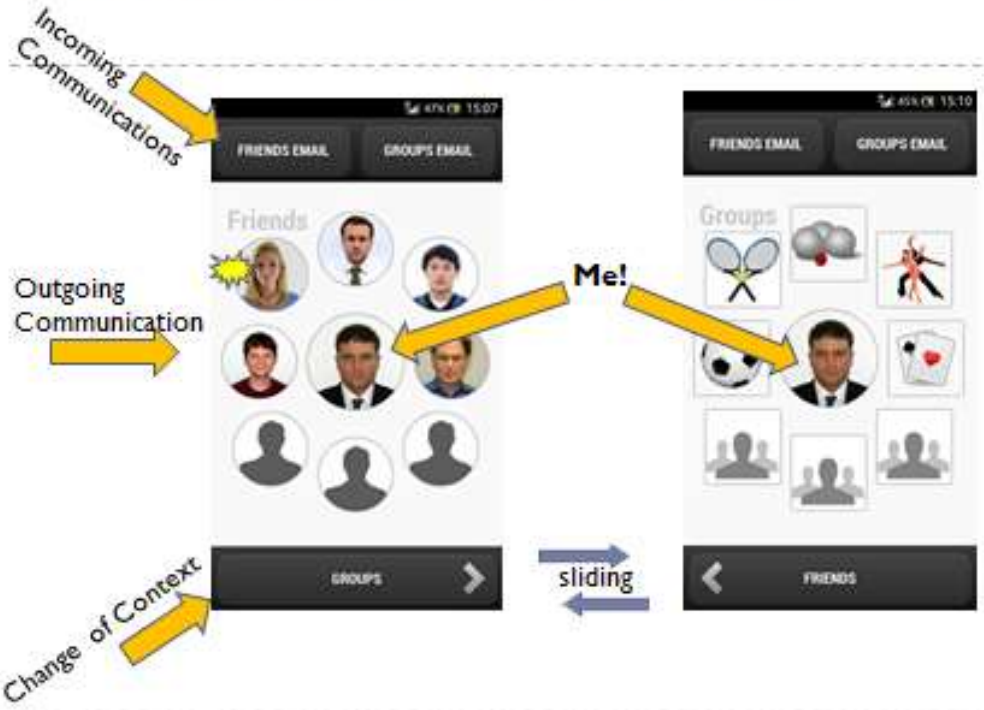
Mobile for Eldelry: Interface Design

- Keep it simple!
  - Simple is better, conceptually economic
- User Interface: simple to use and understand
  - Put the user at the center
  - Use a Fixed Image frame with repetitive pattern
    - Use icons
  - No more than 3 level of indirection
  - No keyboard.
- Interaction : the airpointer®
  - Try to use a smartphone as a backup «copycat» of the ER Remote controller (in order not to multiplicate devices and costs)
    - Some aspects still in test
  - Gaming?
- Validation
  - Tested in 2 different pilot in june and july : user interface and airpointer
  - No long term test at this stage.

The architecture!

- Open
  - Mobile: Android OS, but not only…
    - Nexus 4 and Nexus 7 has been used for the test with users.
  - Server: Linux , Apache, etc, everything in the cloud
- The solution is both a web solution (two tier) and an APK mobile package.
  - The package is downloadable from a web link (in future from a store) and is installable using just a simple click.
  - Reduced setup time
  - Adaptable to different screen ratios (with some limitations)
  - High fidelity mockup
- Communication
  - WIFI (for indoor) and WIMAX and 3G (outdoor)
- Costs < 150 - 200 euros for the final users
  - No need of any additional hardware
- Benefits
  - Use of open software and of widely diffused and tested technology
    - Integration
- Cons
  - Elderly Acceptance? (HSL)

The Mobile Interface: User is at the Center



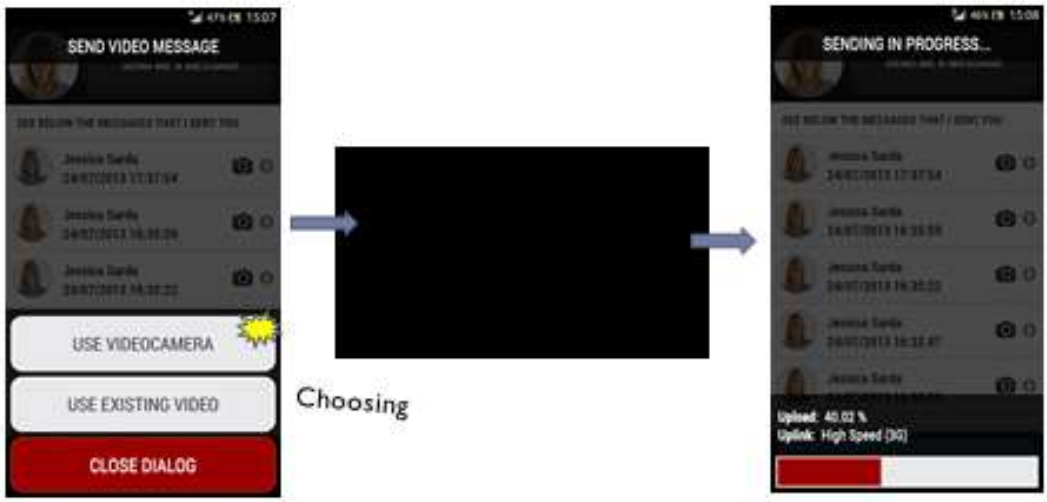
- Test the high fidelity mockup at: spincity.disco.unimib.it/dev

The interface: sending a message

Note: no keyboard

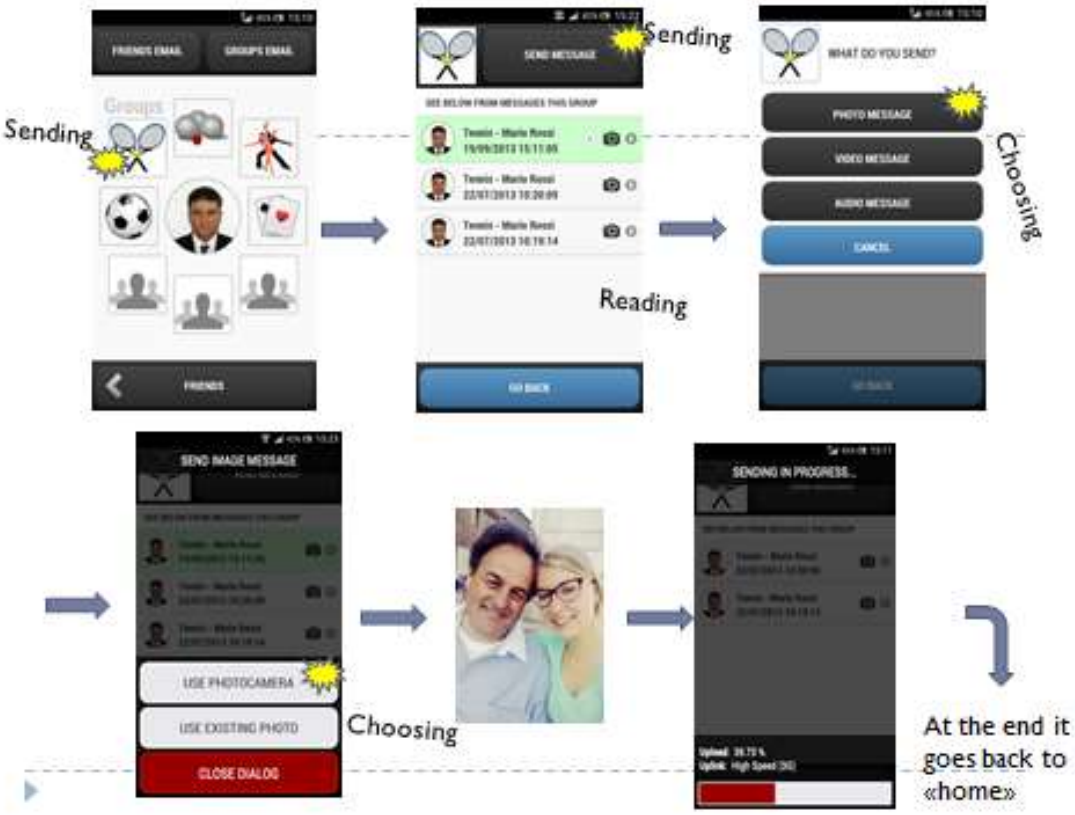
See the high fidelity mockup at: spincity.disco.unimib.it/dev

Sending an a-synch Msg (video)

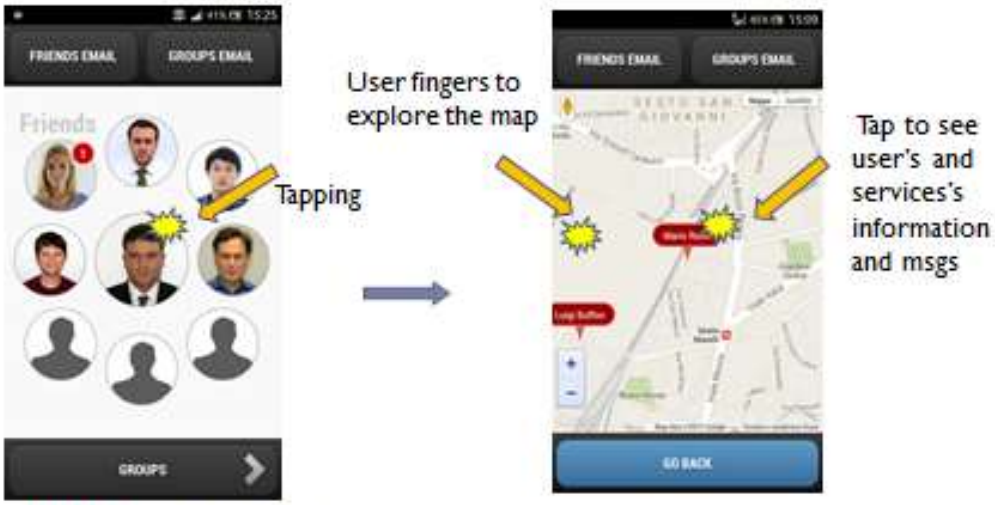


Here the web interface stops, we use the exposed OS API to exploit local hardware functionalities

At the end it goes back to «home»

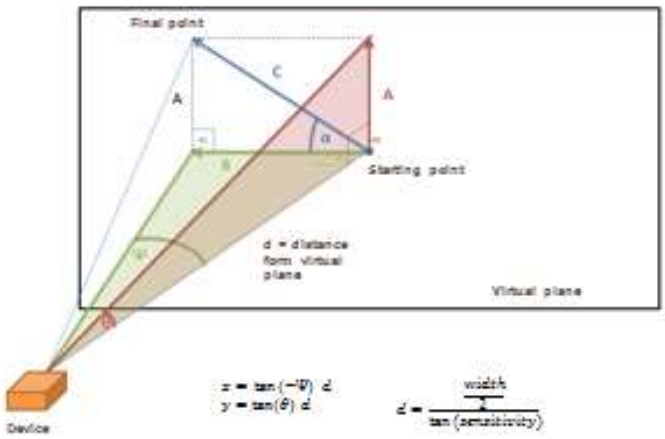


The Geo-localization of my friends



See the high fidelity mockup at: spincity.disco.unimib.it/dev

The Airpointer device



$$x = \tan(-\theta)\, d$$
$$y = \tan(\theta)\, d$$

$$d = \frac{\text{width}}{\tan(\text{sensitivity})}$$

Device with
- Accelerometer 3D
- Magnetometer 3D
- Gyroscope 3D

- Rotational movements only
- No external devices (IR, WebCam, ecc..)

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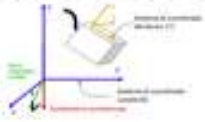
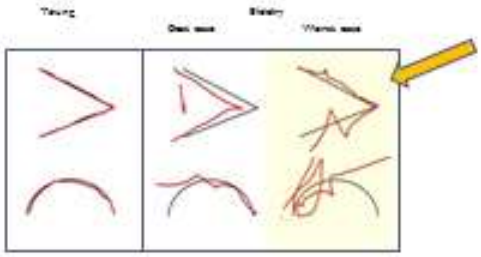
Our First Lab Test

Airpointer Issues and Matters

1. **Reconstruction of an orthonormal inertial reference system**
   - Gravity vector g parallel to Z reference
   - Earth magnetic vector not ortogonal to g



2. **«Model» noise**
   - Neuro-Physiological differences
   - Digital-divide (untrained people)
   - Decay due to ageing



3. **Sensor noise**
   - Signal noise
   - Gyroscope Bias (drifting) : unpredictable in time

4. **User independent approach**
   - We do not want to burden the user with prone training sessions

5. **Real-Time Constraints**
   - We must act in < 0.1 sec *

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Sensor Fusion

Tested sensor fusion algorithms:

Particle Filter:
Pros: non linear models, easy to parametrized
Cons: high omputational costs, quantization

Kalman filter:
Pros: low computation costs, continuos,
Cons: only linear model (trembling)

Complementary Filter:
Pros: Simple to implement
Cons: non dinamic parametrization, non optimal

Extended Kalman Filter
Pros: non linear filter, low computation costs, continuos,
Cons: non optimal, difficult to parametrized

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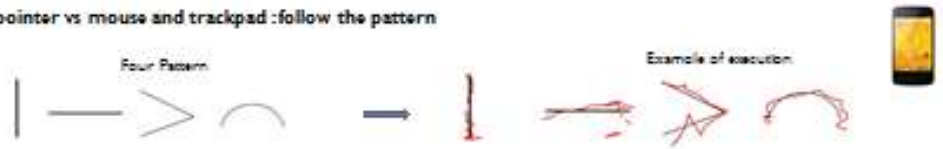
Pilot Tests

Two Groups, eleven subjects

- ✓ 7 elderly form 67 to 85 years old with very-low or no digital experience
- ✓ 4 young (control group)

1. **Preliminary examination**
   - I. Motricity of hands and digits tests
   - II. MMSE (Mini-Mental Sate Examination)
   - III. Computer abilities exams
2. **Mobile interface**
   - 1. Free use (3 minutes)
   - 2. Execute three given tasks
3. **At the the end**
   - I. QUIS (Questionnaire for User Interface Satisfaction)
   - II. SUMI (Software Usability Measurement Inventory)

4. **Airpointer vs mouse and trackpad :follow the pattern**



Executed gesture is compared with pattern using: P-to-P Distance Similarity, Pearson, Centroid difference, Variance

5. **Airpointer vs mouse: click on moving squared figures with increasing lower dimensions**

We measure time of tasks execution and number of errors and compare elderly with young

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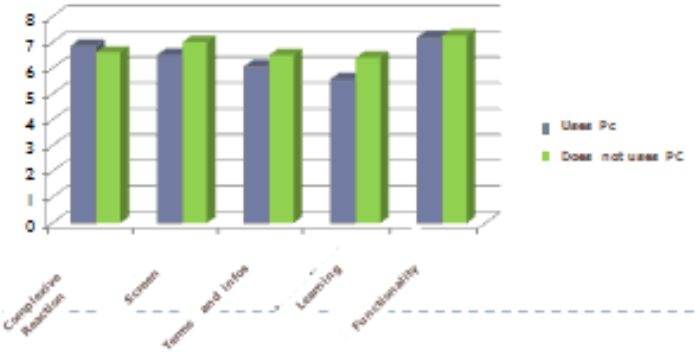
QUIS (Question.User Interface Satisfaction)

	Type	N	Mean	Std. Dev	Std. Error
Complexive Acceptance	1.Uses pc	4	6,88	0,66081	0,3304
	2.Does not	3	6,6	0,91652	0,52915
Screen	1.Uses pc	4	6,5	1,42887	0,71443
	2.Does not	3	7	0,86603	0,5
Terms and information	1.Uses pc	4	6,05	0,67027	0,33514
	2.Does not	3	6,5	0,43301	0,25
Learning	1.Uses pc	4	5,55	1,907	0,9535
	2.Does not	3	6,4	0,2	0,11547
Functionality	1.Uses pc	4	7,175	0,3304	0,1652
	2.Does not	3	7,25	0,25	0,14434



Interface test results: SUMI

Results of the *Software Usability Measurement Inventory (SUMI)*
The 100% of users **agree** about the following aspects

- *"I work with this software with satisfaction"*
- *"the way information are presented is very clear and comprehensible"*
- *"To work with this software is mentally stimulating"*
- *"This software is quick"*
- *"It allows the user to complete his tasks in a few seconds"*
- *"Its interface is pleasant"*
- *"It is easy to see in a glance the different functionalities"*

More than 50% of the users **disagree** about the follwing aspects:

- *"Start to learn this software was difficult"*
- *"Sometimes I do not know what to do with this software"*
- *"Using this software is frustrating"*
- *"Sometimes I felt stress using this software"*

- 66% of the user answering to the SUMI belongs to the group of people that have never used a PC.

Airpointer: PC vs Non PC users

- **The mean values for the 8 gestures:**
  - The lower mean values are in correspondence of *EKF*
  - there are not significative differences between the two group of pc users and non-pc users

	Type	N	Mean	Dev Std.	Mean Std.Error
Particle	1.Users pc	3	34.6042	7.507 90	4.334 69
	2.Users not	4	59.0104	28.655 11	14.344 05
Kalman	1.Users pc	3	28.2500	13.502 31	7.795 56
	2.Users not	4	45.6979	21.382 12	10.691 06
Ekf	1.Users pc	3	26.5622	15.487 05	8.939 91
	2.Users not	4	36.5594	20.304 22	10.152 11
Complem.	1.Users pc	3	24.7053	8.409 75	4.855 37
	2.Users not	4	43.5751	19.516 43	9.908 22

Airpointer vs Trackpad (P-to-P distance)

TOTAL

%	particle	kalman	EKF	comple
Vertical	0,000	0,000	81,818	18,182
Horizontal	0,000	9,091	54,545	36,364
Angle	18,182	9,091	54,545	9,091
Curve	18,182	0,000	63,636	18,182
Mean	9,091	4,545	63,636	20,455

%	mouse	track
Vertical	55,555	55,555
Horizontal	55,556	55,556
Angolo	55,555	66,667
Curve	44,444	44,444
Mean	41,667	50,000

- Left Table : best filter for airpointer.
  - EKF has the best accuracy as filter
    - Note: higher values means the filter is more efficient
- RighTable : Mouse and Trackpad vs Airpointer
  - Mouse is worst then the EKF-airpointer the 41.667% of the times
    - Slightly more efficient (firmly placed on a table)
  - Trackpad is close to the EKF-airpointer accuracy (in 50.0% of cases is worst)

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Airpointer: Young vs Elderly (P-to-P)

Elderly

	particle	kalman	EKF	comple
Vertical	0,000	0,000	85,714	14,286
Horizontal	0,000	14,286	28,571	57,143
Angle	14,286	14,286	42,857	14,286
Curve	14,286	0,000	57,143	28,571
mean	7,143	7,143	55,571	28,571

%	Mouse	track
Vertical	60,000	40,000
horizontal	100,000	40,000
angolo	60,000	60,000
curve	60,000	40,000
mean	70,000	45,000

Young

%	particle	kalman	EKF	Comple
Vertical	0,000	0,000	75,000	25,000
Horizontal	0,000	0,000	100,000	0,000
Angolo	25,000	0,000	75,000	0,000
Curve	25,000	0,000	75,000	0,000
Mean	12,500	0,000	81,250	6,250

%	mouse	track
Vertical	0,000	25,000
Horizontal	0,000	75,000
Angolo	0,000	75,000
Curve	25,000	50,000
Mean	6,250	56,250

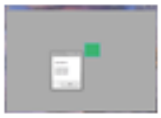
- Left Table
  - EKF has the best accuracy both for young and eldelry
- RighTable :
  - Eldelry have more problems with the mouse than with the airpointer
  - Trackpad works poorly both for young and elderly

Airpointer vs Mouse:Seek and Click Test

- Here the results of the two tests.
- Test 1: one moving square reducing in dimension
- Test 2: six static square reducing in dimensions

TEST.1– Airpointer		TEST.1 –Mouse	
Time (s)	Errors	Time (s)	Errors #
1,75	0	1,25	0
1,35	0	1,05	0
1,68	0,5	1,22	0

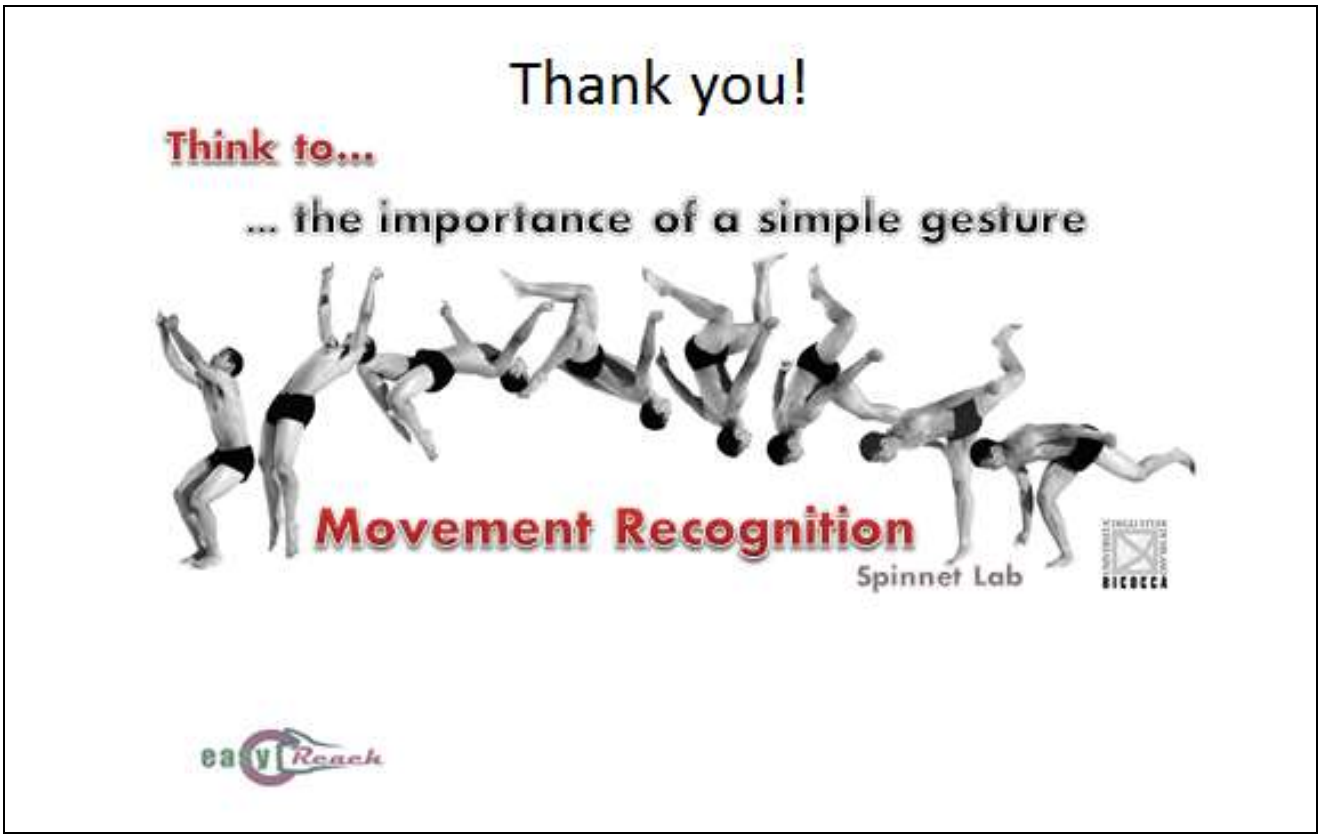
TEST.2 - Airpointer		TEST.2 - Mouse	
Time (s)	Errors #	Time (s)	Errors #
9,5	1	5,25	0
11,1	1,8	5,05	0
12,1	2,63	5,22	0,17
18,03	3,57	5,87	0,03



Results shows that we have similar results mouse vs airpointer when using big and medium size icons.

Conclusions

- The results in the five macro-areas of **QUIS**, are in the high positive zone of the evaluation scale (0-9) measuring a general satisfaction about user interface
- The satisfactions is also proven by the **SUMI** users feedbacks.
- Considering the high satisfaction of user we can consider the *EasyReach* Mobile Solution and its interface highly **accepted** by the elderly, target of our application and studies.
- The EKF-filter eliminates at runtime (<0.1 sec) all the problems that affects gyroscopes w/out introducing alterations and slow motion effects (no similar results in literature)
- The mouse is the best for fine control (but needs a table): using great or middle dimensions icons, the airpointer is have good results…
  - …and it is far better than trackpad (for elderly)
- Gaming… ?
  - They «loved» to use streetview with the airpointer
- Note: Protocols and Best Practices
  - Protocols for tests with elderly,
  - public database,
  - public frameworks


Thank you!
Think to...
... the importance of a simple gesture
Movement Recognition
Spinnet Lab
BICOCCA

F. Papa Fondazione Ugo Bordoni, Roma	Acceptance of technology-enabled solutions by elderly people: a field investigation	3

Nothing is beyond your reach ....

AAL Forum 2013

Norrkoping, September 2013

Acceptance of Technology-Enabled Solutions by Elderly People: A Field Investigation

Filomena Papa, Michele Comacchia, Bartolomeo Sapio, Enrico Nicolò, Raffaele Nicolussi, Gaetano Bruno

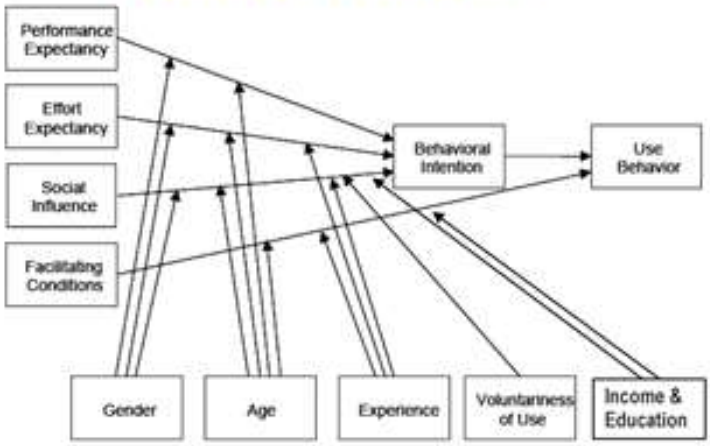
Fondazione Ugo Bordoni

www.easyreach-project.eu

Outline

- Acceptance of ICT solutions by the elderly
- The EasyReach Pilots
- Pilot in Roma
- Pilot in Milano

Acceptance of ICT solutions: UTAUT model



Unified Theory of Acceptance of Use of Technology (UTAUT)

Determinants of user acceptance:

- Perception of usefulness
- Perception of ease of use
- Social influence i.e. important others believe he/she should use the system
- Facilitating conditions e.g. provided user support

Acceptance of new technological solutions by the elderly

The group of elderly people is not homogeneous. We can identify two main sub-groups based on cultural characteristics:

- Inadequate elderly
  - Sense of inadequacy, incompetence, clumsiness
  - Needs of quiet way of access to the Internet world, without fatigue and without risks
- Curious elderly
  - Challenging attitudes
  - Personal interests and passions allow to overcome the psychological barriers

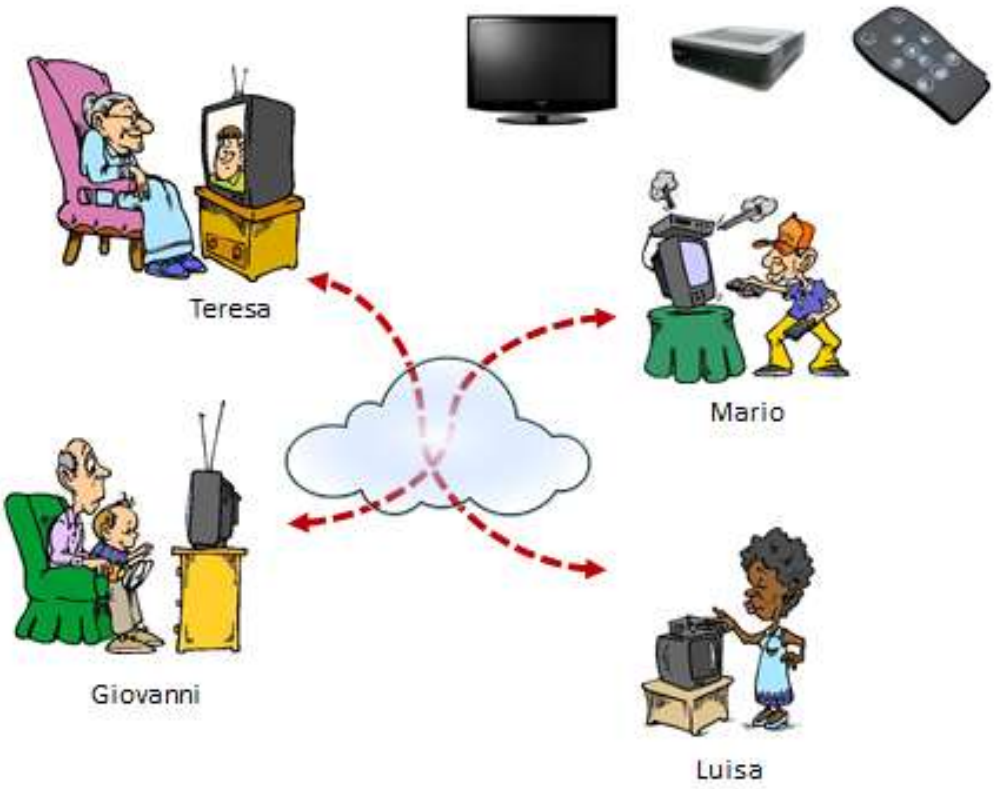
User Centred Design in EasyReach

Approach

- User Centred Design (UCD):
  - involvement of primary users (elderly people) and secondary users (e.g. caregivers and relatives) from the early stages of the development process of the EasyReach technical solutions

User involvement in EasyReach

- To gather user needs and preferences for user requirements identification
- To test and evaluate the intermediate and final EasyReach prototypes



EasyReach services/functions

The EasyReach pilots

- Locations: Roma and Milano
- Scenario Engagement methodology
  - Live demonstration of the technological solution
  - User guided in the interaction by a "facilitator" i.e. a mediator supporting the user in the I/O devices manipulation
  - Assessment of user's reactions and of his/her experience during the demonstration

The Roma Pilot

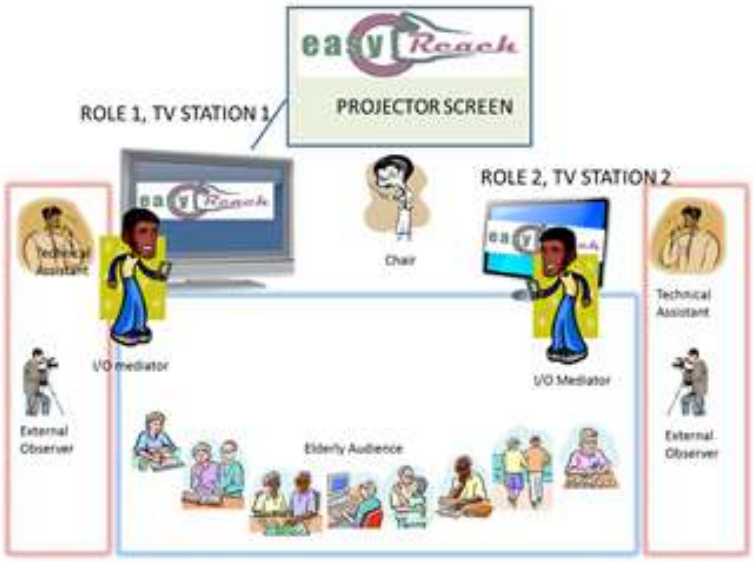
Objectives

- To assess the EasyReach solution in a real environment with the involvement of elderly people
- To evaluate user acceptance
  - Perception of usefulness
  - Intention of future usage

Method

- Qualitative evaluation
- The system installed at two senior centers in Roma "Torrevecchia"and Rebibbia-Ponte Mammolo"
- Selected subjects: 40 elderly (15 from each senior center plus 10 elderly considered "priviledged witnesses")
- Four group sessions (presentation, scenario engagement, group and personal interview)

ROOM SETTING FOR SCENARIO ENGAGEMENT



Scenario engagement

Two different use scenarios were demonstrated

- Scenario 1-Organisation of a group activity: "A day to the cinema"
- Scenario 2- Communication of good news to friends: "Becoming a grandmother"

Equipment layout

Group interview

Personal interview

Main results of the Roma pilot

- Scenario engagement methodology effective
- System perceived as useful: to stay in touch with friends and relatives, to meet new people sharing common interests, to reach many people at the same time.
- All the provided services considered useful
- Dance, cinema,books and plays main interests to be shared
- Potential for use at home: socialisation, simpler interactions with PA and positive effects on personal security
- Integration with medical or health services in future versions
- Improuvements: easier gestures, faster response, more secure password, faster learning to operate, ability to reach people using web interfaces (critical mass)

The Milano Pilot

objectives

- To test the EasyReach services in a real environment with the involvement of elderly people
- To evaluate user acceptance
  - Usability
  - Potential users
  - Possible future scenarios

Method

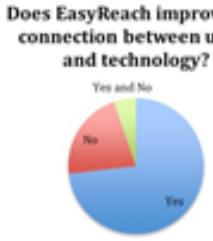
- Qualitative/quantitative evaluation
- Selected subjects: 62 older adults from 4 small tows in the area of Milano (Casarile, Buscate, Vanzaghello and Gessate)
- Four user forums (installation, presentation, demo, group discussion and filling questionnaire)

EasyReach presentation

Questionnaire compilation

Main Results of the Milano pilot

- Effective "Mediated experience" for the elderly
- Positive evaluation of EasyReach solution



- Learning the system highest obstacle: mediators needed
- Possible scenarios: EasyReach installed at the senior centers and at the nursing houses
- System more powerful to enhance real community better than support the creation of a new virtual one

Conclusions

- The EasyReach solution successfully tested in real environments with the involvement of elderly people in Roma and Milano
- Potential of the EasyReach system for improuvement of the quality of life of elderly people not only for social inclusion but also for interaction with Public Administration, health, personal security
- Future scenarios: EasyReach suitable to be installed at elderly home, at the senior centers and at the nursing houses

Thank you for your attention…

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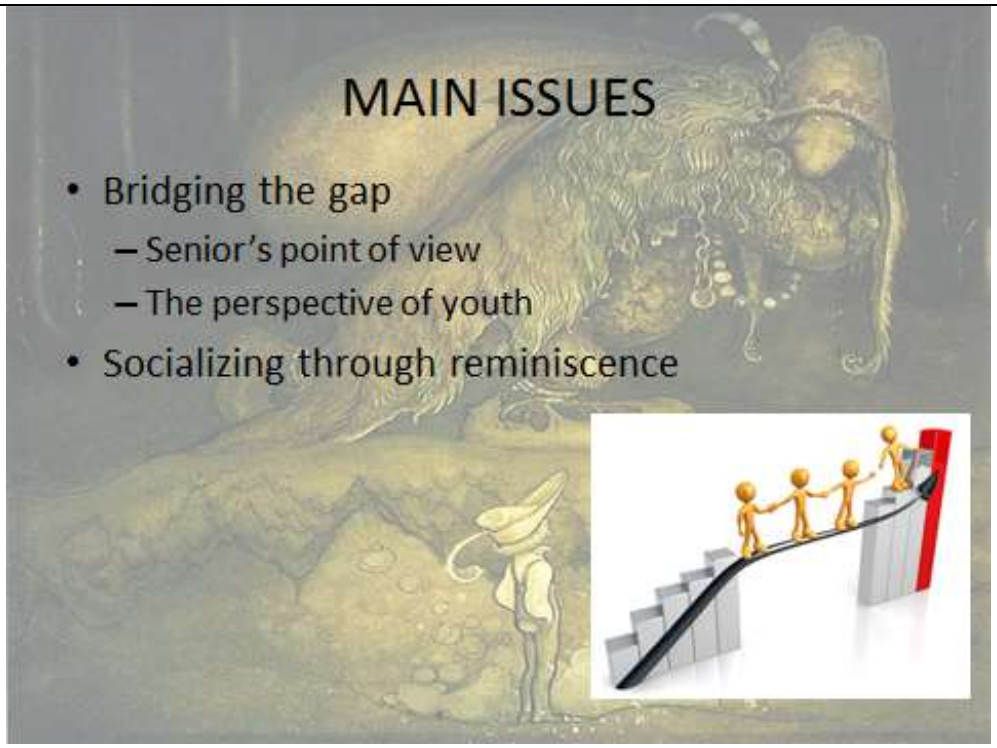
fpapa@fub.it

L. Morganti Istituto Auxologico Italiano, Milano	The values of "reminescing" in the older adults: socializing and bridging the gap with younger generations	4



BRIDGING THE GAP

- The NoBits project aimed at fostering social interactions between elderly and youngsters

Real contact
- Common activities
- Ad hoc Methodology

Virtual contact
- New modality
- Scientific Evidence

ISTITUTO AUXOLOGICO ITALIANO

FIMI Medical Display Solutions

ANCeSCAO

AAL

BRIDGING THE GAP

- Three intergenerational reminiscence meetings

Time 1	MEETING 1	MEETING 2	MEETING 3	Time 2
ELDERLY MEASURES 30 mins	Briefing on NoBits functioning Group Reminiscence with NoBits 30 + 45 mins	Group Reminiscence with NoBits 90 mins	Group Reminiscence with NoBits 60 mins	ELDERLY MEASURES 40 mins
CHILDREN MEASURES 30 mins				CHILDREN MEASURES 20 mins

BRIDGING THE GAP

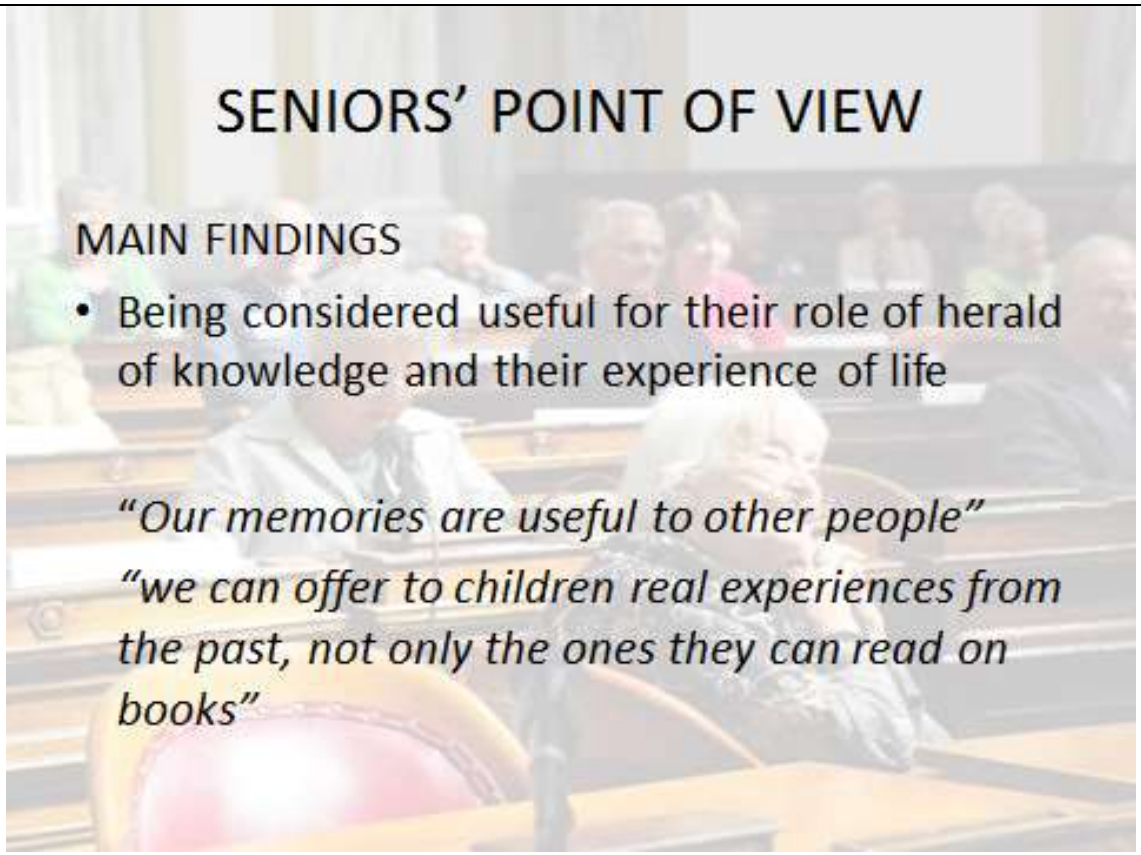
- Meetings were held in schools
- Groups made up of 2 elderly and up to 8 children

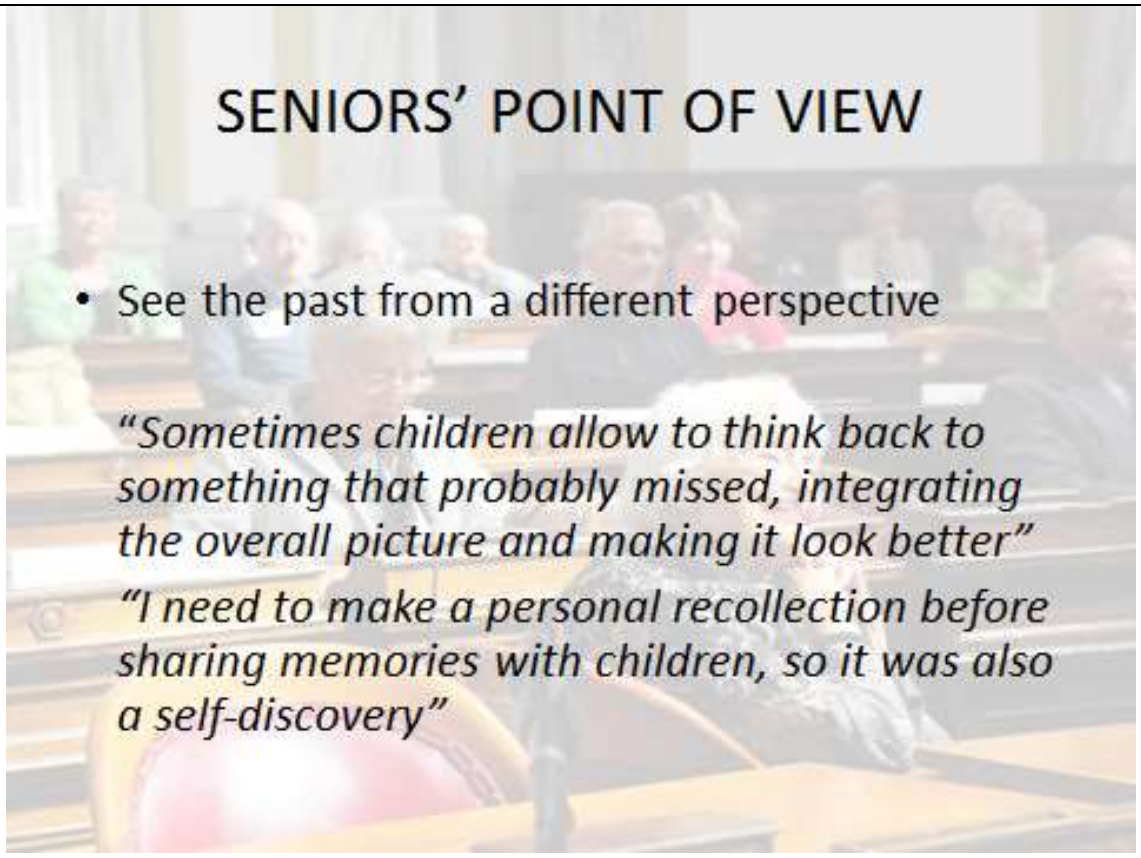
SENIORS' POINT OF VIEW

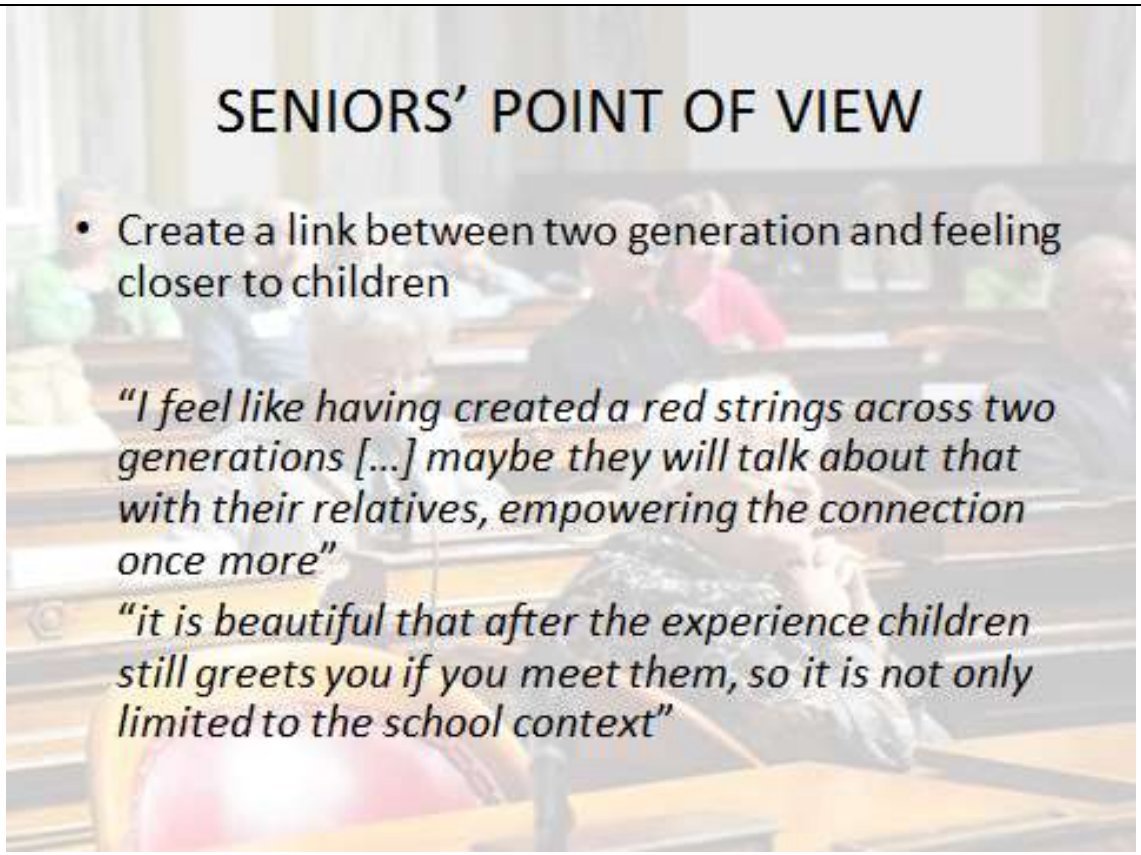
SAMPLE

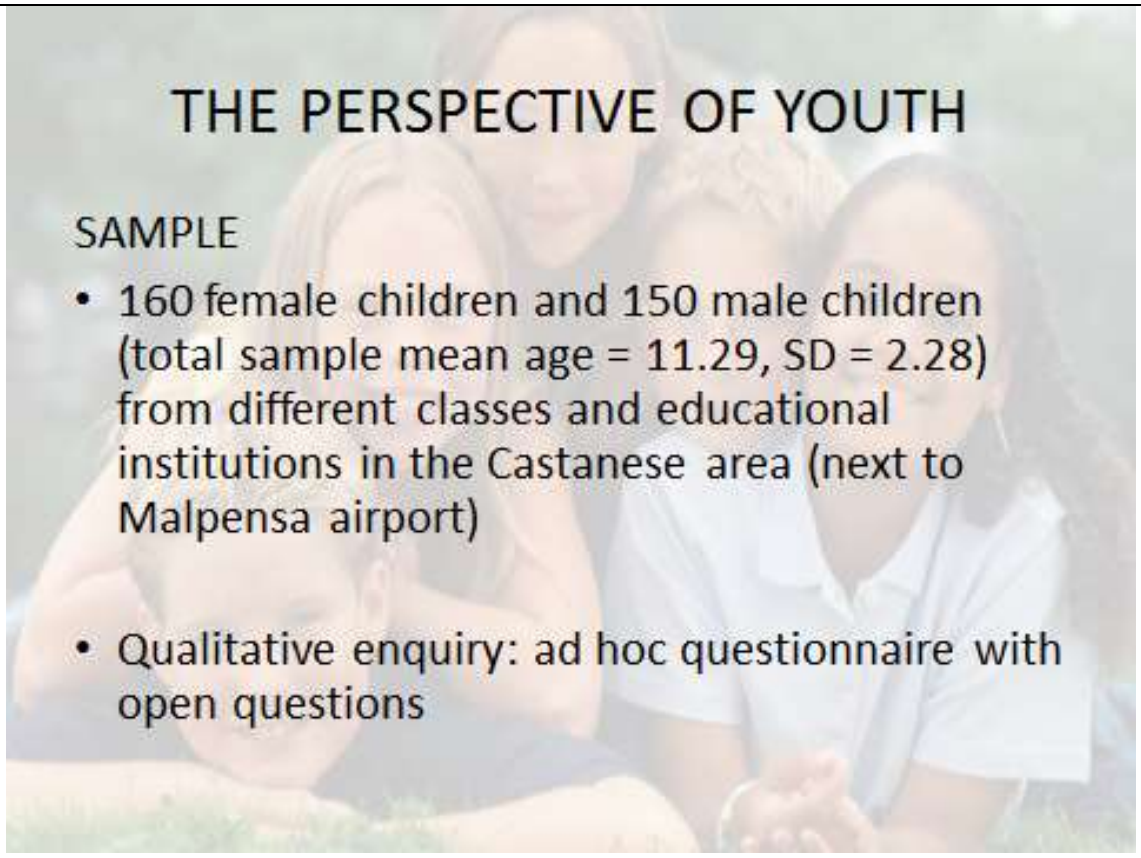
- Focus groups (32 older adults, *M* = 67.53, *SD* = 6.04) from the Castanese Area, next to Malpensa Airport in Milano. Recruited thanks to ANCeSCAO

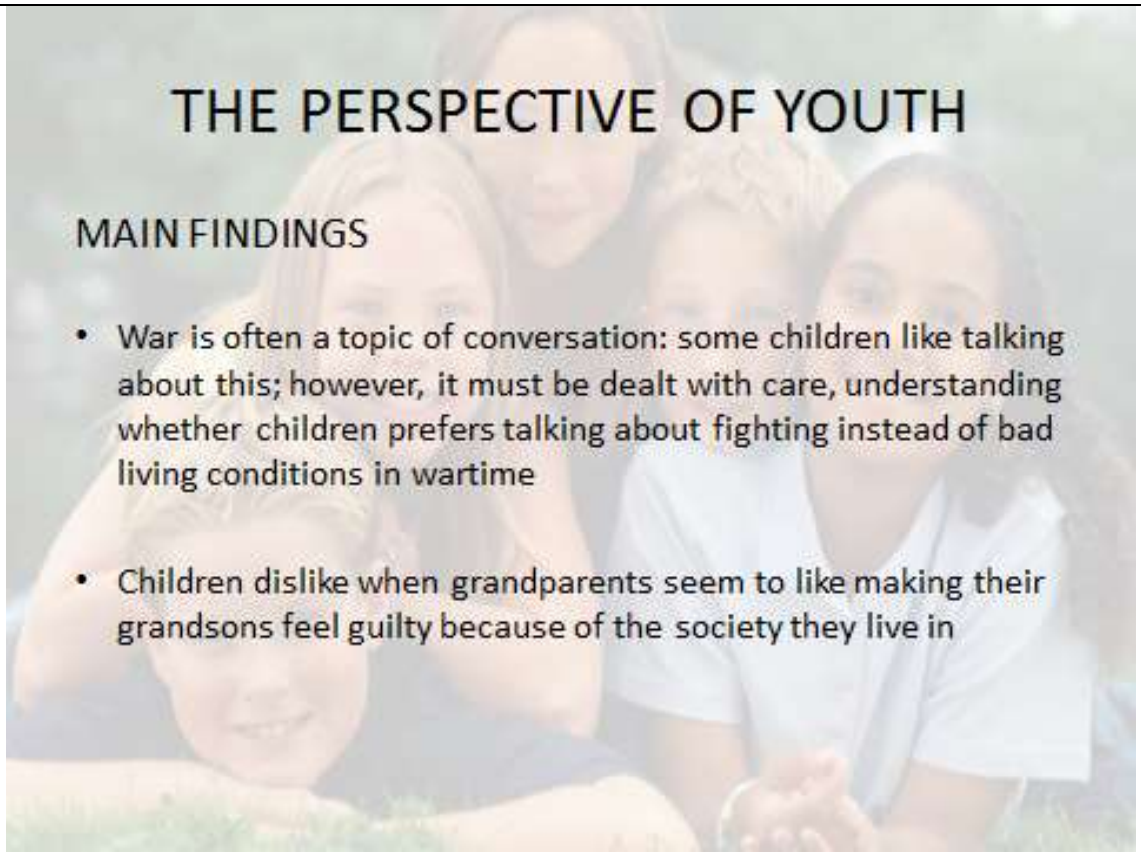
- Qualitative enquiry

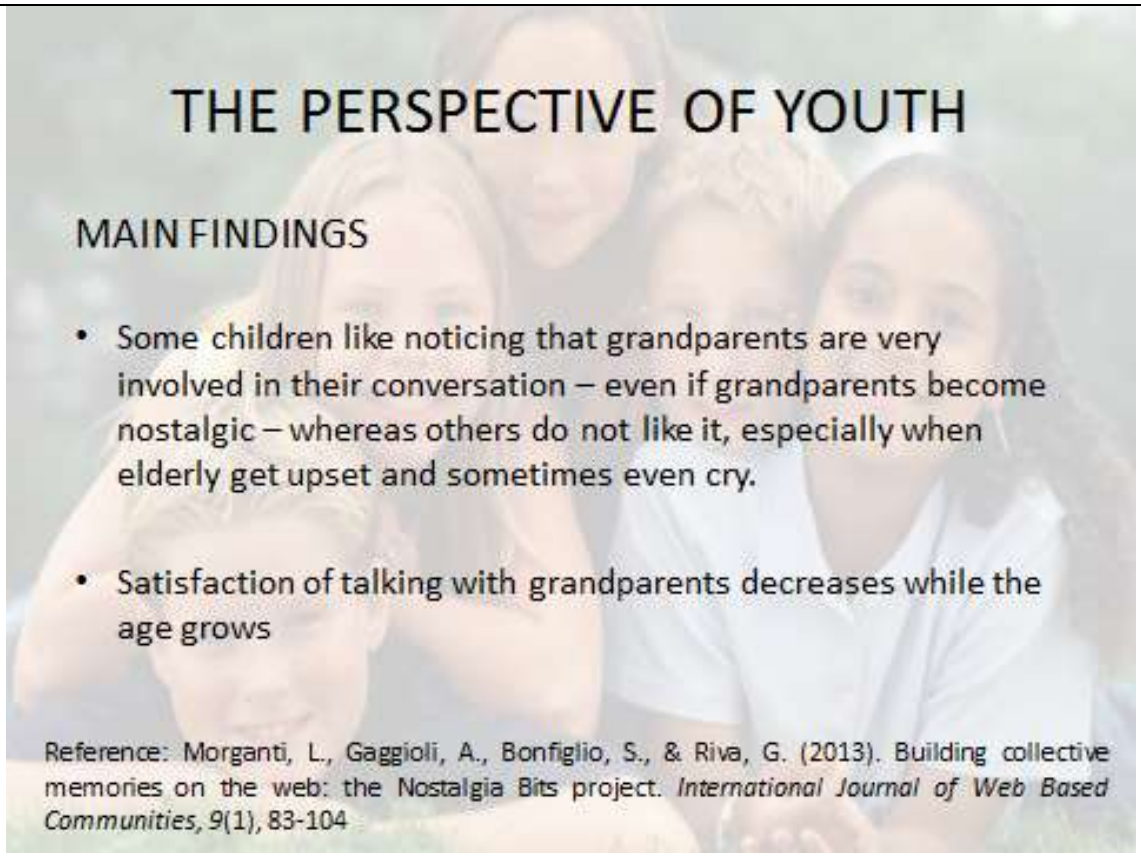

SENIORS' POINT OF VIEW
MAIN FINDINGS
• Being considered useful for their role of herald of knowledge and their experience of life
"Our memories are useful to other people"
"we can offer to children real experiences from the past, not only the ones they can read on books"

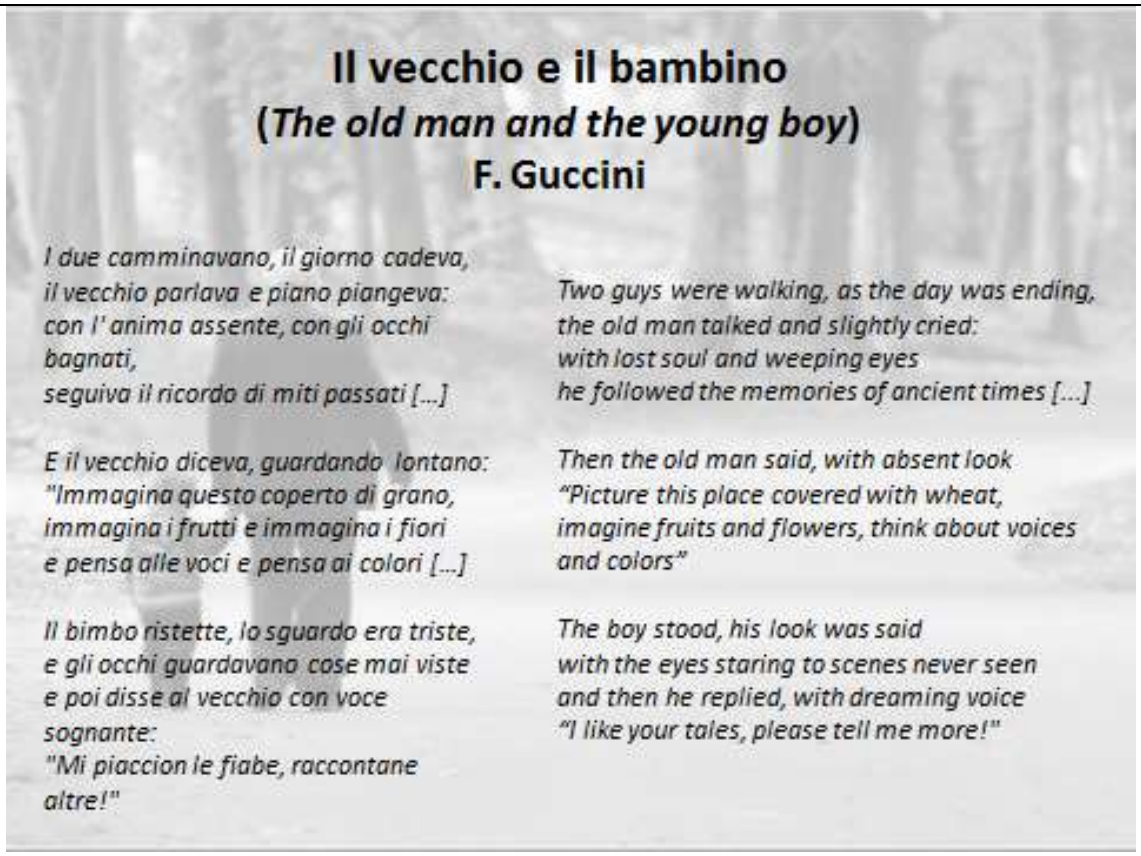

SENIORS' POINT OF VIEW
• See the past from a different perspective
"Sometimes children allow to think back to something that probably missed, integrating the overall picture and making it look better"
"I need to make a personal recollection before sharing memories with children, so it was also a self-discovery"

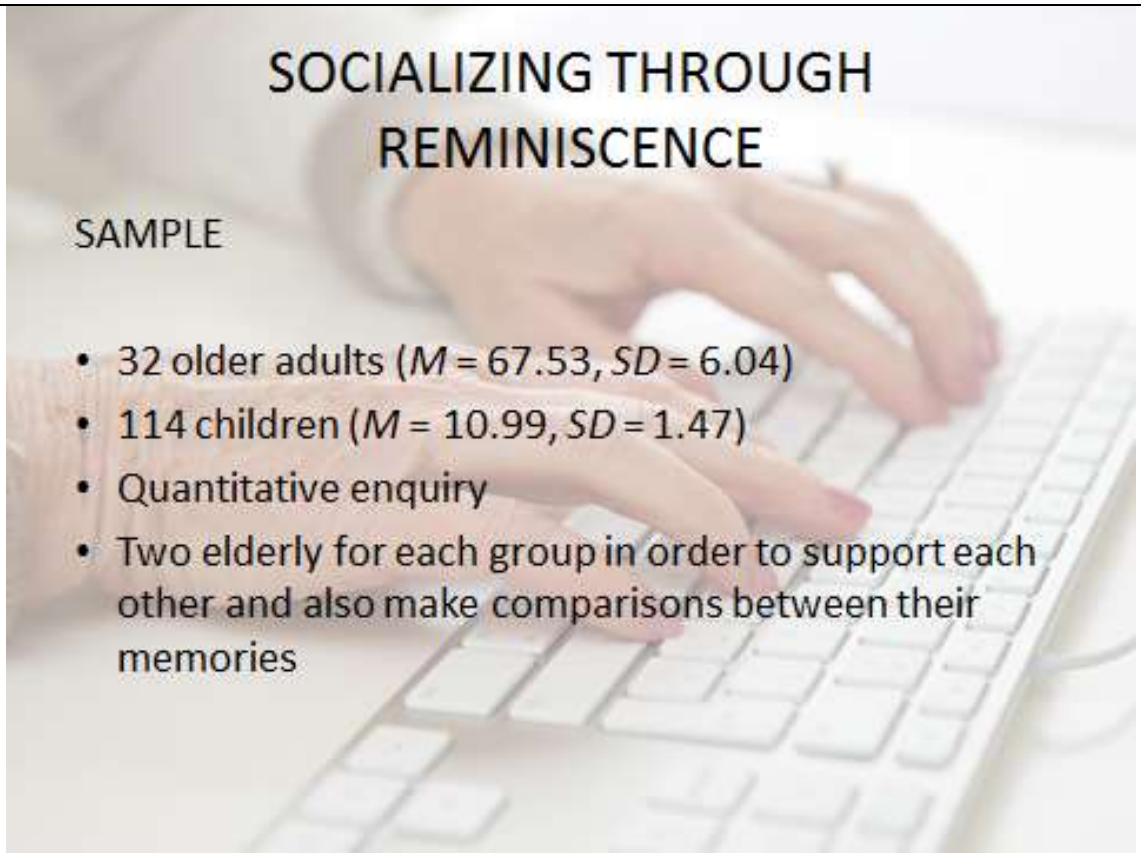

SENIORS' POINT OF VIEW
• Create a link between two generation and feeling closer to children
"I feel like having created a red strings across two generations [...] maybe they will talk about that with their relatives, empowering the connection once more"
"it is beautiful that after the experience children still greets you if you meet them, so it is not only limited to the school context"


THE PERSPECTIVE OF YOUTH
SAMPLE
• 160 female children and 150 male children (total sample mean age = 11.29, SD = 2.28) from different classes and educational institutions in the Castanese area (next to Malpensa airport)
• Qualitative enquiry: ad hoc questionnaire with open questions


THE PERSPECTIVE OF YOUTH
MAIN FINDINGS
• War is often a topic of conversation: some children like talking about this; however, it must be dealt with care, understanding whether children prefers talking about fighting instead of bad living conditions in wartime
• Children dislike when grandparents seem to like making their grandsons feel guilty because of the society they live in


THE PERSPECTIVE OF YOUTH
MAIN FINDINGS
• Some children like noticing that grandparents are very involved in their conversation – even if grandparents become nostalgic – whereas others do not like it, especially when elderly get upset and sometimes even cry.
• Satisfaction of talking with grandparents decreases while the age grows
Reference: Morganti, L., Gaggioli, A., Bonfiglio, S., & Riva, G. (2013). Building collective memories on the web: the Nostalgia Bits project. International Journal of Web Based Communities, 9(1), 83-104


Il vecchio e il bambino
(The old man and the young boy)
F. Guccini
I due camminavano, il giorno cadeva,
il vecchio parlava e piano piangeva:
con l' anima assente, con gli occhi
bagnati,
seguiva il ricordo di miti passati [...]
E il vecchio diceva, guardando lontano:
"Immagina questo coperto di grano,
immagina i frutti e immagina i fiori
e pensa alle voci e pensa ai colori [...]
Il bimbo ristette, lo sguardo era triste,
e gli occhi guardavano cose mai viste
e poi disse al vecchio con voce
sognante:
"Mi piaccion le fiabe, raccontane
altre!"
Two guys were walking, as the day was ending,
the old man talked and slightly cried:
with lost soul and weeping eyes
he followed the memories of ancient times [...]
Then the old man said, with absent look
"Picture this place covered with wheat,
imagine fruits and flowers, think about voices
and colors"
The boy stood, his look was said
with the eyes staring to scenes never seen
and then he replied, with dreaming voice
"I like your tales, please tell me more!"


SOCIALIZING THROUGH REMINISCENCE
SAMPLE
• 32 older adults (M = 67.53, SD = 6.04)
• 114 children (M = 10.99, SD = 1.47)
• Quantitative enquiry
• Two elderly for each group in order to support each other and also make comparisons between their memories

SOCIALIZING THROUGH REMINISCENCE

METHODOLOGY

- Within measures design (Time)
- Pre-post assessment via questionnaire
  - Older Adults
    - Italian Loneliness Scale
    - Rosenberg Self-Esteem Scale
    - WHO Quality Of Life-old
    - Flow State Scale
  - Children
    - Attitude towards older adults (Semantic differential)

SOCIALIZING THROUGH REMINISCENCE

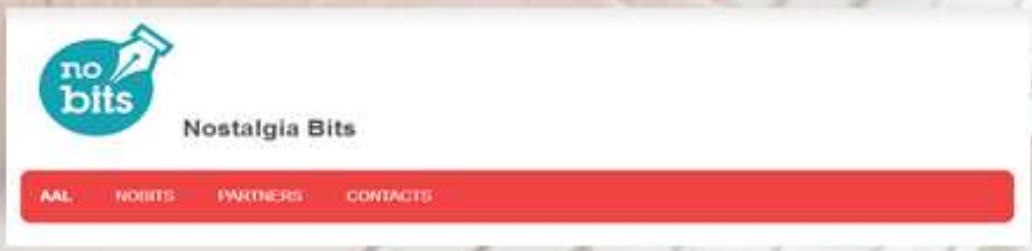
- Italian prototype (http://www.nobits.it)

SOCIALIZING THROUGH REMINISCENCE

- Italian prototype (http://www.nobits.it)

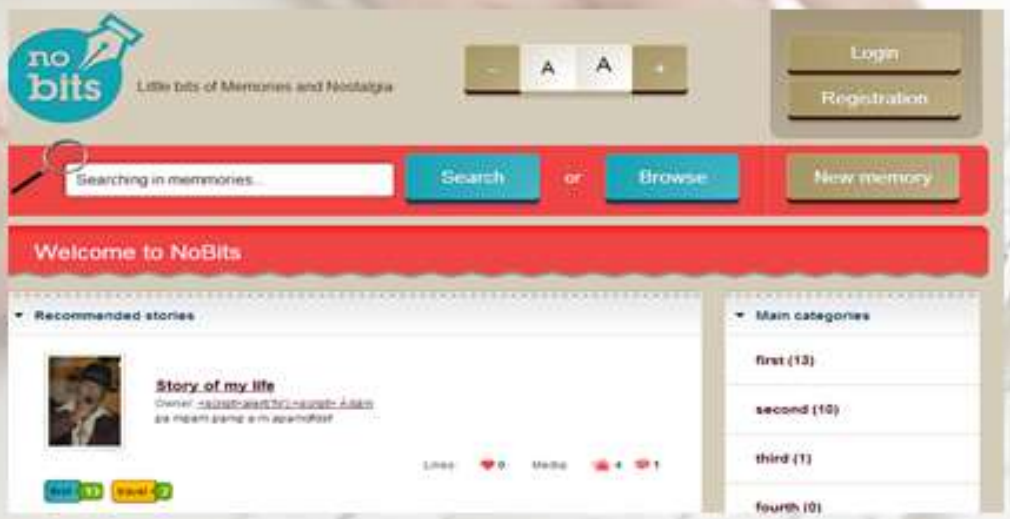
SOCIALIZING THROUGH REMINISCENCE

- European portal (http://www.nobits.eu)



SOCIALIZING THROUGH REMINISCENCE

- European portal (http://www.nobits.eu)



SOCIALIZING THROUGH REMINISCENCE

RESULTS

Positive effects of intergenerational reminiscence on General and Emotional Loneliness

		Loneliness		
		Emotional Loneliness	Social Loneliness	General Loneliness
Pre-test	Mean (SD)	1.76 (0.48)	3.24 (0.65)	1.88 (0.51)
Post-test	Mean (SD)	1.6 (0.46)	3.25 (0.47)	1.68 (0.51)
t-Student	T value	2.074*	-0.55	2.195*

Note. * $p < .05$

SOCIALIZING THROUGH REMINISCENCE

RESULTS

Positive effects of intergenerational reminiscence on Past, Present and Future activities subscale (Quality of Life measure)

		WhoQol-Old						
		SAB	AUT	PPF	SOP	DAD	INT	TOTAL
Pre-test	Mean	16.30	14.39	14.75	16.34	12.99	14.87	89.40
	(SD)	*(2.81)*	*(2.39)*	*(2.55)*	*(1.77)*	*(4.55)*	*(2.50)*	(10.20)
Post-test	Mean	16.53	14.50	15.40	16.18	13.66	15.50	91.78
	(SD)	*(2.61)*	*(2.49)*	*(1.81)*	*(1.61)*	(3.93)	*(2.47)*	(8.95)
t-Student	T value	-.521	-.370	-2.034*	.482	-.996	-1.256	-1.765

Note. * $p < .05$

SOCIALIZING THROUGH REMINISCENCE

RESULTS

High scores on the Flow State Scale

		Flow Scale									
		SB	AW	CG	DF	C	SC	LSC	TD	AE	TOTAL
Post-test	Mean	15.66	14.94	16.96	15.06	17.79	16.55	14.41	14.44	18.03	143.84
	(SD)	(2.43)	(3.04)	(2.04)	(2.61)	(2.00)	(2.74)	(4.39)	(3.54)	(2.18)	(18.69)

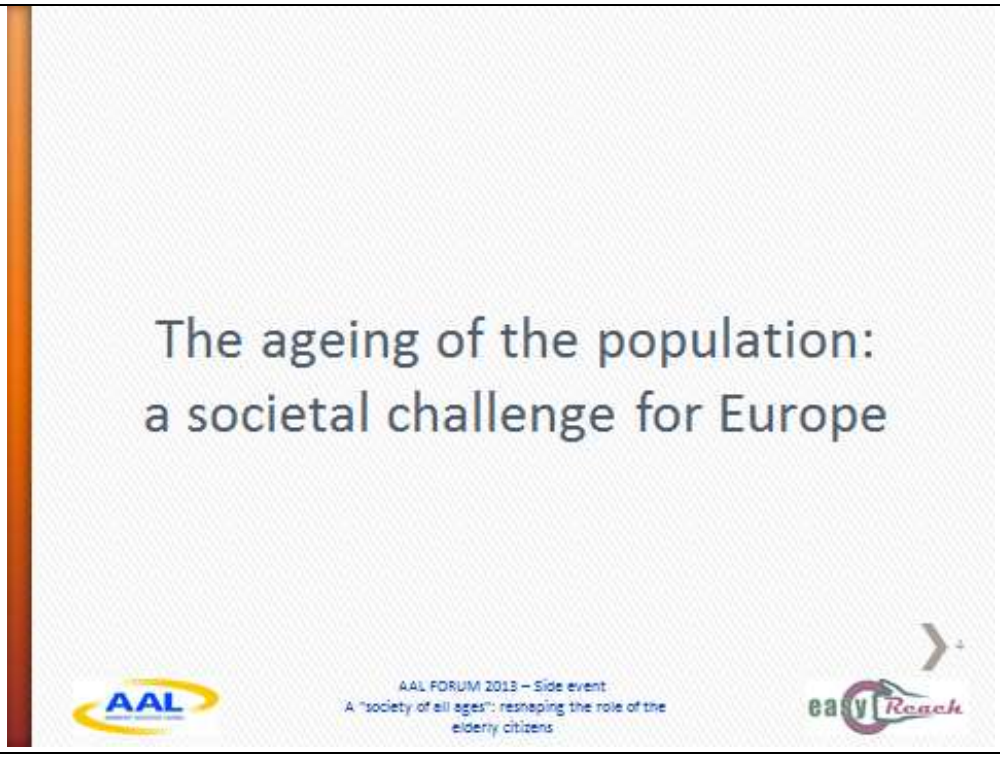
Reference: Gaggioli A., Morganti L., Scaratti, C., Cipresso P., Serino, S., Bonfiglio, S. and Riva, G. (2013) Intergenerational Group Reminiscence: a Potentially Effective Intervention to Enhance Elderly Psychosocial Wellbeing and to Improve Children's Perception of Aging, *Educational Gerontology* (in press)

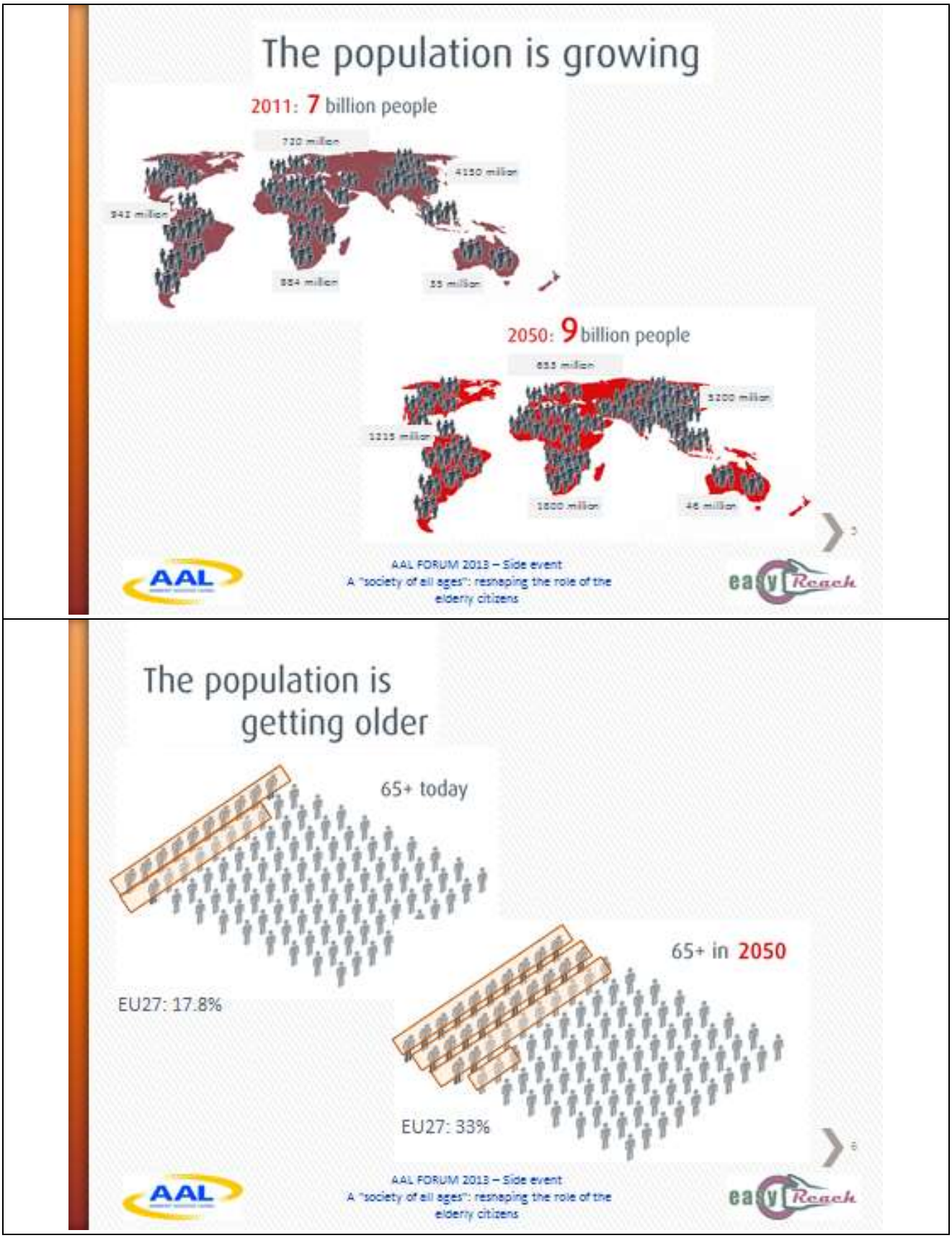

FUTURE RESEARCH GOALS
(analysis will be completed by the end of the project - March 2014)
THE ROLE OF TECHNOLOGY
• Possible difference between intergenerational reminiscence assisted by technology (experimental) and without any technological help (control)
• Preliminary findings:
• not direct benefits on users
• a useful tool to store the memories
• a medium to share memories with possible users (a social community)
• The New Zealand case

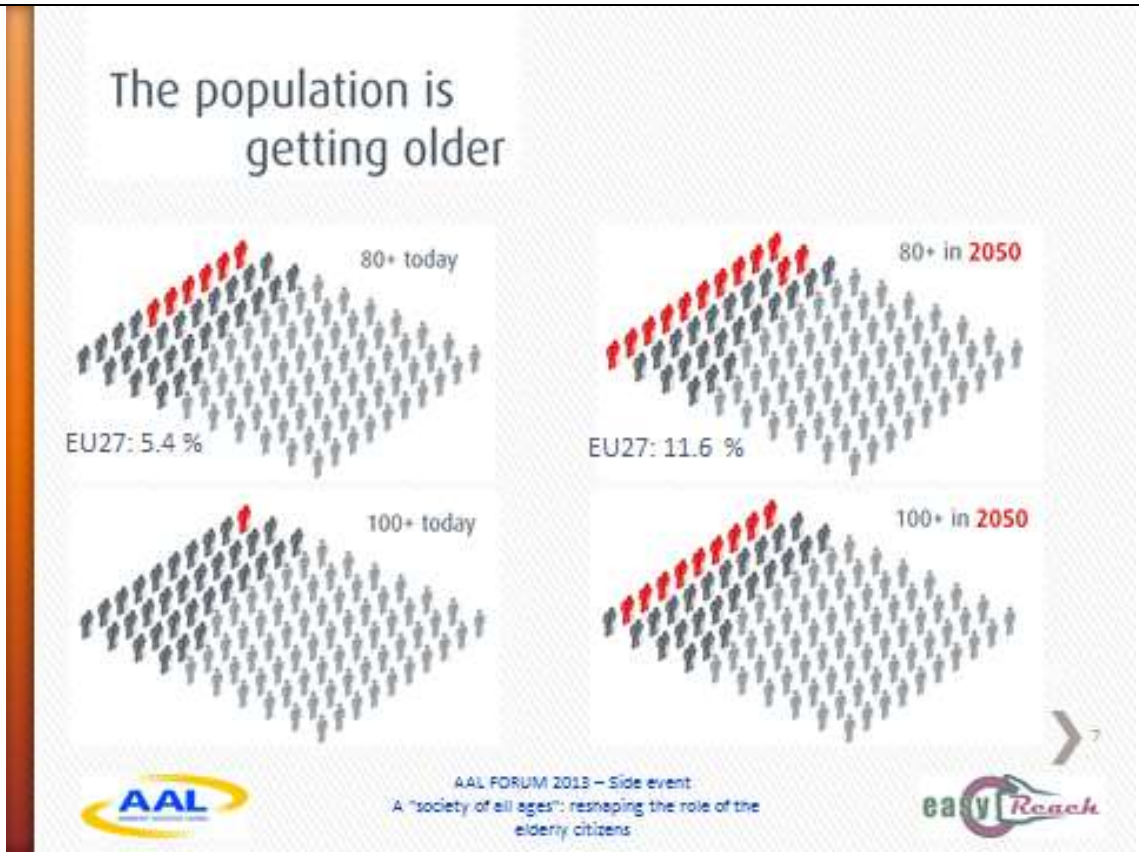

FUTURE RESEARCH GOALS
(analysis will be completed by the end of the project - March 2014)
SOCIAL PERCEPTION OF ELDERLY
• Analysis of the children's measures (attitude towards elderly)
• Does the social perception of elderly improve after intergenerational reminiscence?

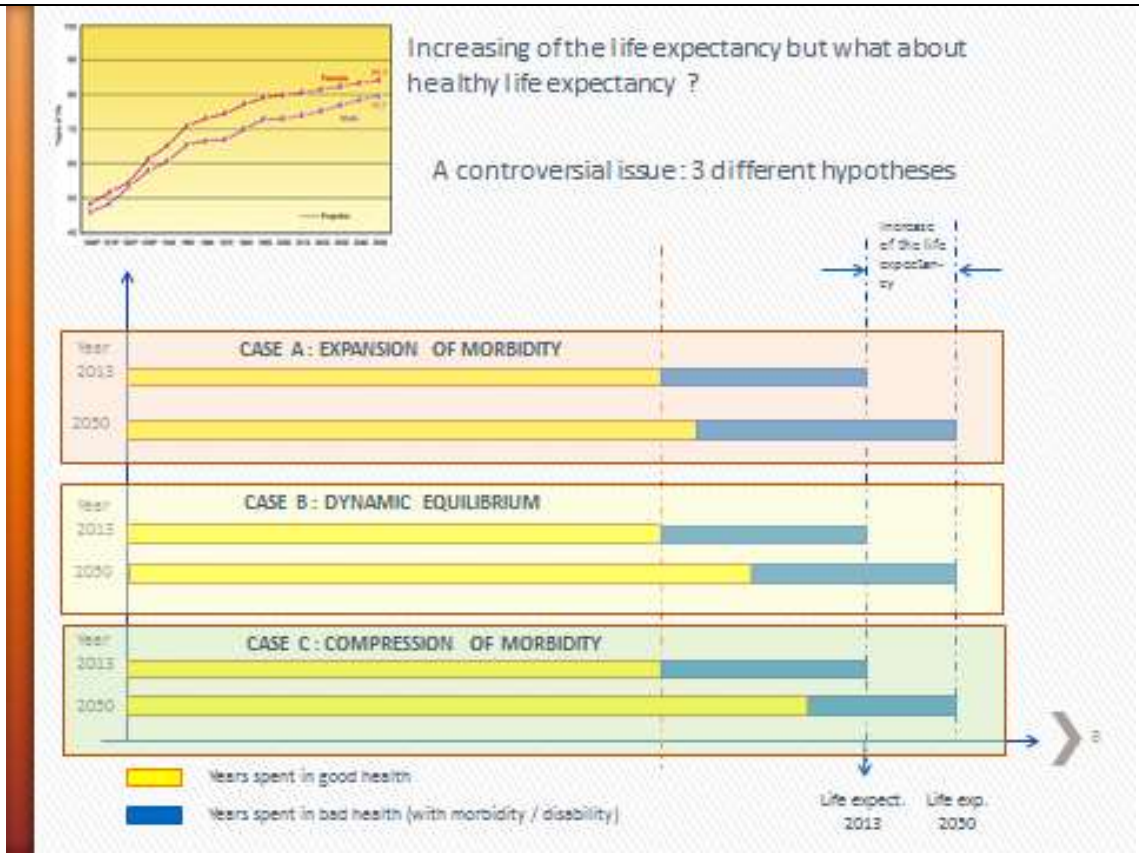
John Bauer, God kväll, farbror! Hälsade pojken (*Buona sera, vecchio! Salutò il ragazzo*; (1915) per la fiaba di Walter Stenström: *Il ragazzo e i troll o l'Avventura*

S. Bonfiglio FIMI BARCO, Saronno	**The new role of the User Associations and the Senior Centers : reshaping how to design and deliver social care to the citizens**	**5**




The population is growing
2011: 7 billion people
720 million
4150 million
341 million
884 million
35 million
2050: 9 billion people
653 million
1215 million
5200 million
1800 million
46 million
AAL FORUM 2013 – Side event
A "society of all ages": reshaping the role of the elderly citizens
The population is getting older
65+ today
EU27: 17.8%
65+ in 2050
EU27: 33%
AAL FORUM 2013 – Side event
A "society of all ages": reshaping the role of the elderly citizens


The population is getting older
80+ today
EU27: 5.4 %
80+ in 2050
EU27: 11.6 %
100+ today
100+ in 2050
AAL FORUM 2013 – Side event
A "society of all ages": reshaping the role of the elderly citizens


Increasing of the life expectancy but what about healthy life expectancy ?
A controversial issue : 3 different hypotheses
CASE A : EXPANSION OF MORBIDITY
CASE B : DYNAMIC EQUILIBRIUM
CASE C : COMPRESSION OF MORBIDITY
Years spent in good health
Years spent in bad health (with morbidity / disability)
Life expect. 2013
Life exp. 2050

The changing profile of the elderly citizen: ageing today .....

- The chronological age is becoming different from the "perceived age"
- Elders are healthier and more independent than they were in the past and there is a growing demand for better quality of care;
- They have a higher levels of education and are increasingly involved in decisions;
- The 'traditional family' model is also changing; it forces the older adults to live alone far away from their children or other relatives*: increasing numbers of one-parent families
- They likes to live actively and to continue to be engaged and create value;

* in Italy 27% of older adults live alone (37% among women, 14% among men)

3

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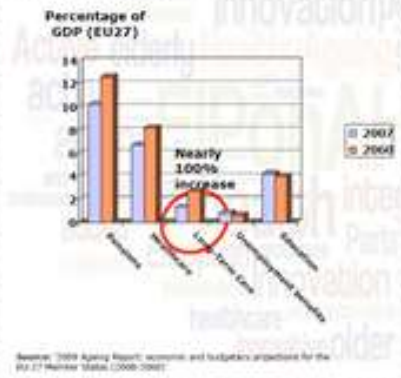
A "society of all ages": reshaping the role of the elderly citizens

Today, healthcare consumes 12% of GDP in most other Western countries

The costs



By 2020, healthcare will consume 16% of GDP

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The need of a paradigm shift:
a society for all ages
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A "society of all ages": reshaping the role of the elderly citizens
11
The need of a paradigm shift: a society for all ages
Cost cutting
Need of affordable solutions and cost saving for the national social and healthcare systems;>
Older adults empowered to self-manage their health through prevention and appropriate lifestyles;
Value genera-tion
The society cannot lose the valuable asset represented by the senior citizens: they have to continue to contribute to the economic, social and cultural growth of the community;
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12

The need of a paradigm shift: a society for all ages

Cost cutting

- Integration between different health & social care providers, a new and more sustainable equilibrium between "formal" and "informal" care able to compensate the declining involvement of the family as effect of the change of its structure and at reducing the costs of the welfare;

Better quality of care

- Remove the separation between social care and healthcare services and create opportunities for interoperable and unified services uniquely focused on the elderly citizen's needs and their wellbeing (physical, mental and emotional).

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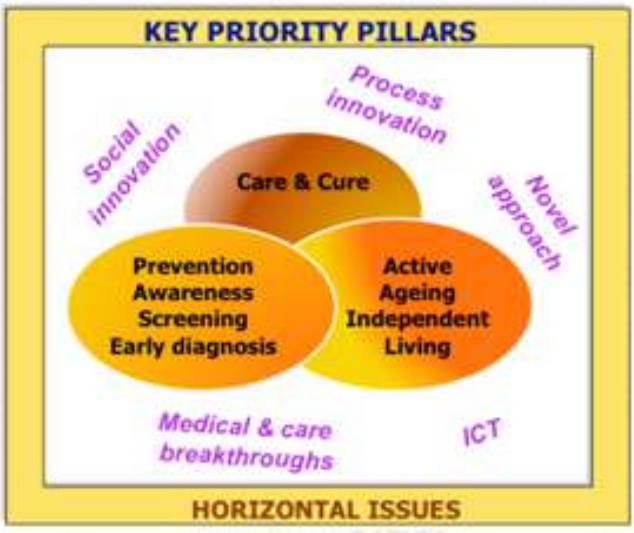

An integrated approach promoted by the European Commission

Source: European Innovation Partnership – Active & Healthy Ageing

http://ec.europa.eu/active-healthy-ageing

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A new approach: a community-supported welfare
15
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A "society of all ages": reshaping the role of the elderly citizens
A new approach: a community-supported welfare
Given the lack of public resources and sometime of experience and competence in social services, the contribution by the civil society and a coordinated and synergic integration of formal and informal care , of institutional and private initiatives are seen as crucial;
An approach integrated into the current policies and procedure of the social care systems available across Europe rather than being alternative and competing with them;
A new model of social care aiming at tackling the social and economical challenges of the ageing of the population in a more effective way and realizing the "ageing in place" paradigm.
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A "society of all ages": reshaping the role of the elderly citizens

A new role for the User Associations and the Senior Centers: driving the transformation

A reconsideration of the role of the User Associations such as the Senior Centers as promoters of the wellbeing (physical, mental and emotional) of the older citizens through a rich and effective program of initiatives aiming at:

- Fostering awareness about health and wellbeing among the senior citizens;
- Aggregating them in local networks of mutual assistance where each one – depending on the circumstances – could be a beneficiary or a provider of the requested help;

A new role for the User Associations and the Senior Centers: driving the transformation

- Acting as "mediators" between the older adults and the formal and informal carers and building a "team spirit" inside each of the "assistance groups" and among the various groups;
- Providing an effective link between the elderly citizens and the Institutions; giving and strengthening the "voice" of the elders;

A new role for the User Associations and the Senior Centers: driving the transformation

- Contributing to the reduction of the digital divide to allow senior citizens to participate to the global and digital society

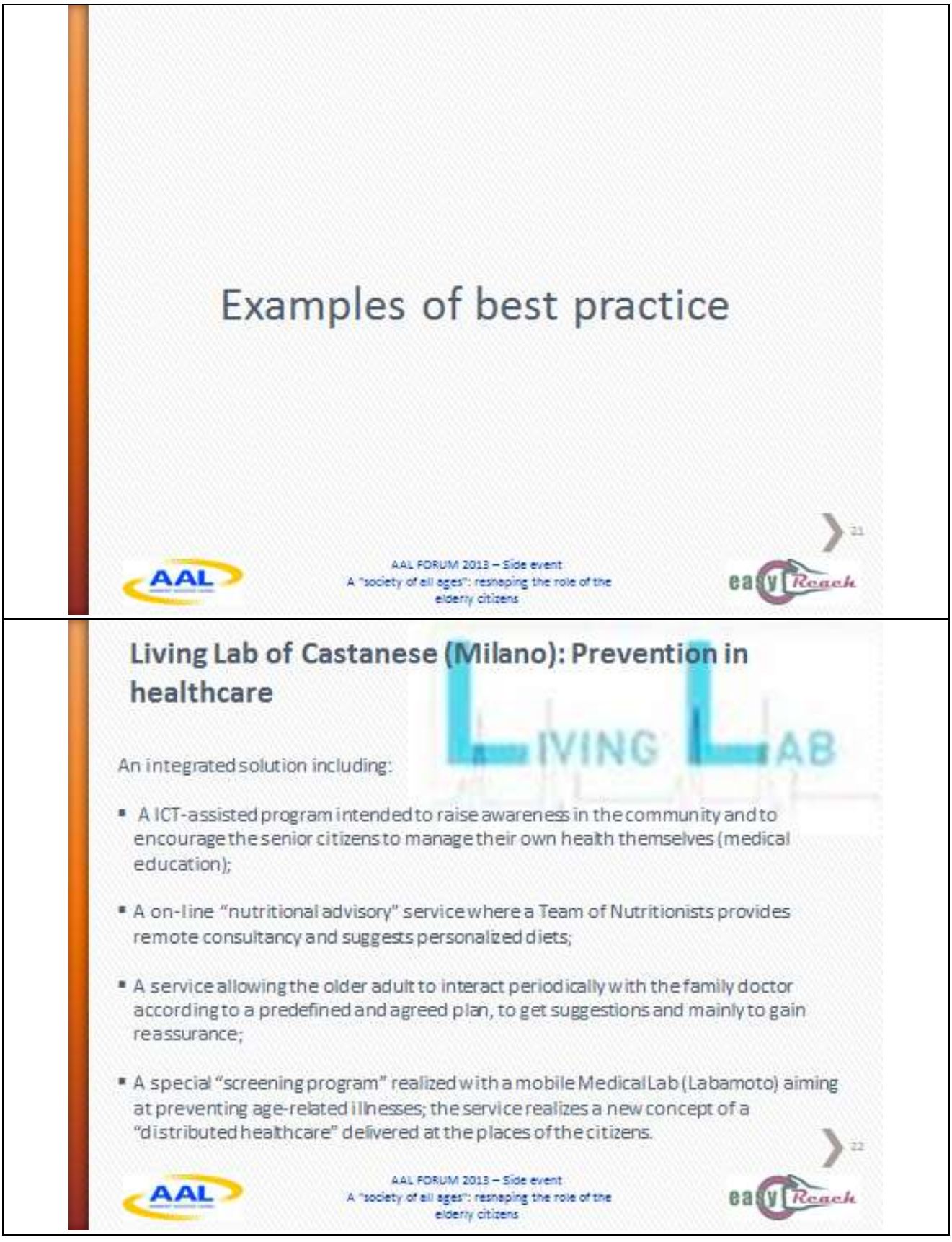
There is still a persistent "digital divide": only 25% of the 65+ people use the PC and only the 20% use Internet.

It is still present a "gender gap" in the use of the PC and Internet among the older population with women less familiar with ICT devices (by considering the longer life expectancy for women this is an important aspect).

A new role for the User Associations and the Senior Centers: driving the transformation

- Promoting the "social ageing" (the "third active age") with elderly citizens contributing with unpaid activities such as volunteering to the economic, social and cultural growth of the community.

This new model could provide the community with a valid and sustainable contribution to overcome the societal challenge related to the care of a population that is becoming older and older.


Examples of best practice
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A "society of all ages": reshaping the role of the elderly citizens
Living Lab of Castanese (Milano): Prevention in healthcare
An integrated solution including:
A ICT-assisted program intended to raise awareness in the community and to encourage the senior citizens to manage their own health themselves (medical education);
A on-line "nutritional advisory" service where a Team of Nutritionists provides remote consultancy and suggests personalized diets;
A service allowing the older adult to interact periodically with the family doctor according to a predefined and agreed plan, to get suggestions and mainly to gain reassurance;
A special "screening program" realized with a mobile Medical Lab (Labamoto) aiming at preventing age-related illnesses; the service realizes a new concept of a "distributed healthcare" delivered at the places of the citizens.
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OASIS Project : Health coach

Nutrition

Physical activity

Brain training

Knowledge

The Senior Centers become the "promoters" of the medical education among the senior citizens. They organize conferences, small group meetings , presentations aiming at generating awareness and motivation towards healthier lifestyles and at providing useful information about health and wellbeing.

This program of "education and health promotion" is integrated into the "institutionalized care" system, is harmonized with it and aims at contributing to its sustainability.

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A "society of all ages": reshaping the role of the elderly citizens

SENIORENGAGE Project : do not waste the experience of the older workers

SENIORENGAGE allows seniors and new professionals to network with each other; it includes three main modules:

Guidance to new, younger colleagues

Consultancy

Networking with peers

- **RetiredProf System**: allowing retired seniors to act as mentors of young professionals and to guide them.
- **SeniorConsult**: enabling older adults to provide their advice to businesses or non-profit organizations.
- **ProfBuddies**: Retired seniors can interact and network with each other, through the use of groups, message boards, instant messaging and a variety of Web 2.0 features.


NOBITS Project : Revitalize the intergenerational relationship through reminescence
Senior Centers and schools ...
Grand fathers and children ... all together.
Elderly memories are a precious social resource and identifying better ways of transmitting them to younger generations (not only within the family) is an important research goal (Capranietal., 2011).
The preservation of the past history and of the traditions related to the local territory;
The transmission of values to the new generations (sharing memories as the first step to the transmission of knowledge);
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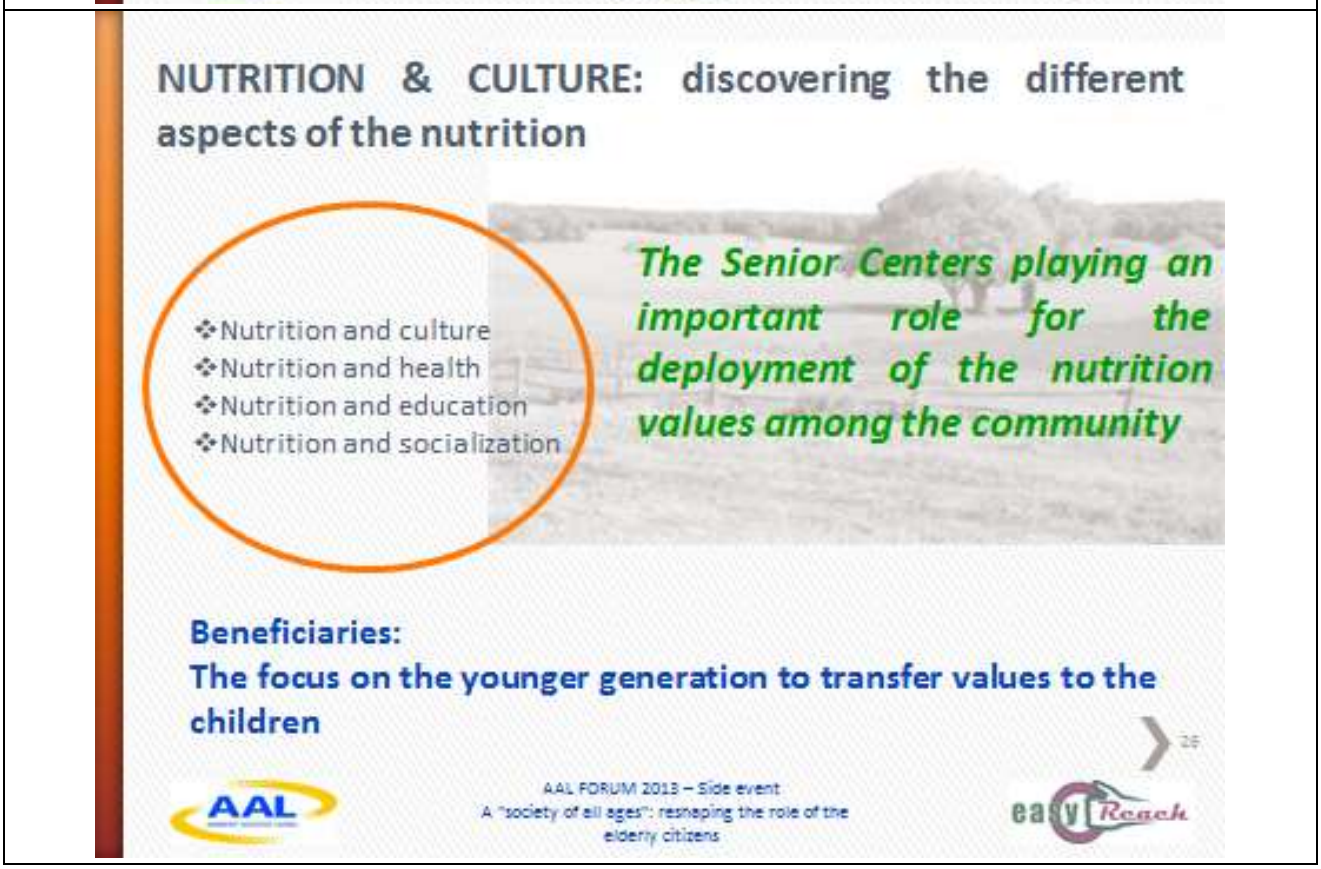
NUTRITION & CULTURE: discovering the different aspects of the nutrition
Nutrition and culture
Nutrition and health
Nutrition and education
Nutrition and socialization
The Senior Centers playing an important role for the deployment of the nutrition values among the community
Beneficiaries:
The focus on the younger generation to transfer values to the children
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A "society of all ages": reshaping the role of the elderly citizens


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Thanks
FIMI
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A. Cesta ISTC CNR, National Research Council, Rome	Removing digital barriers.... The EasyReach case: technology as a value	6

Nothing is beyond your reach ....

Removing digital barriers...
the EasyReach case: technology as a value

Amedeo Cesta
National Research Council of Italy
CNR-ISTC, Institute for Cognitive Science & Technology

AAL Forum 2013
24-26 September 2013 Norrköping - Sweden
www.easyreach-project.eu

Motivations

- Older adults very easily become isolated from their *already limited* social connection *when* increasing physical deterioration forces them to stay at home for a period

- How we can help those people to maintain sociality by using ...
  - A simple combination of technology
  - Without being too invasive at home
  - Taking also into account possible low levels of education?

ICT: often a difficult world for current elderly people

New technologies are often not tailored for elderly people's needs and problems

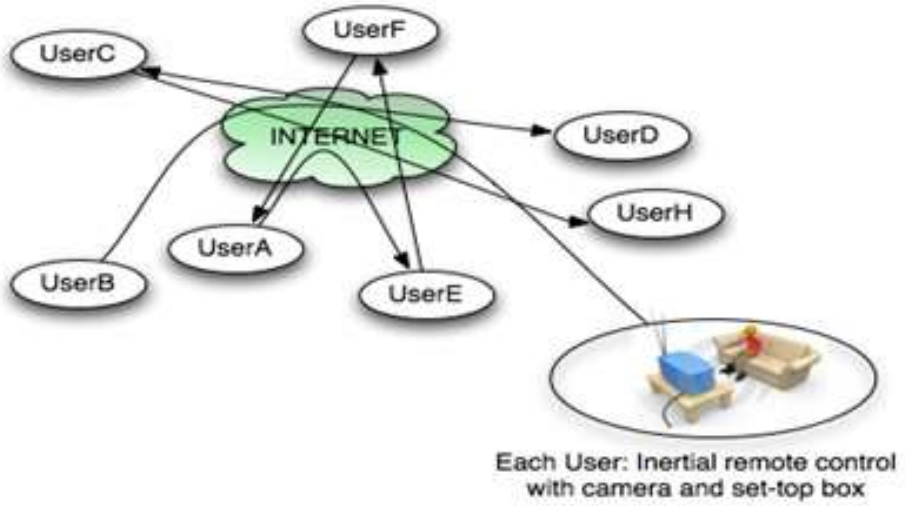
Why EasyReach rather then Already Available Solutions?

- NOT based on PC or smartphone model
  - Based on the most common appliance in the world: the TV
- Extremely cheap
  - Its cost could be in the ballpark of 250 euro in medium quantities
- *Pre digital-divide appliance that gives access to post digital-divide opportunities*
- "Extremely" user-friendly

Technologies to be combined

- Use the **TV set** as communication media to allow people to have a "window on the world" (introducing a "social TV channel" among the usual ones)
- Design an "innovative" **remote control** as an additional facilitator (gesture-based with camera)
- Use software technology (***"social network"***- *like*) to create circles of personal contacts on different topics and offer "socialization services" (**set-top-box** & internet connection)
- Being proactively assistive using an ***AI-based back-end*** that monitors user activities toward people and groups, reasons on their interests, and, in case, produces suggestions

What is EasyReach?



An ICT-based, "active" interface among people

The ingredients

- A Tv
- A Set-Top-Box
- A dedicated remote control
- ....
- *A good armchair* ☺

The EasyReach ingredients : the TV and the new STB

- The Set-Top-Box adds a new special channel to the TV ordinary channel list, providing the *EasyReach Social Interaction Environment...*
- ... preserving the usual management of ordinary tv channels

The EasyReach ingredients : the TV and the new STB

- In particular, the Set-Top-Box is used for:
  - Interpreting the user's gestures
  - Processing the multimedia information
  - Controlling the TV set
  - Provides the EasyReach Interaction Env
  - Managing internet connections

The EasyReach ingredients: the remote control

- Capable of synthesizing multimedia contents
  - camera
  - microphone
- Integrated three-dimensional Inertial Unit
  - accelerometer
  - gyroscope
  - magnetometer

Notice: the project proposal dates back to Spring 2009 ….

The EasyReach ingredients: the remote control

- Inertial data are used to recognize particular gestures performed by the user to interact with the system:
  - Up-down and vice versa
  - Left-right and v.v.
  - Rotations (cwise and ccwise)
- Camera and microphone are used to record multimedia contents to be shared with other users

The remote in action

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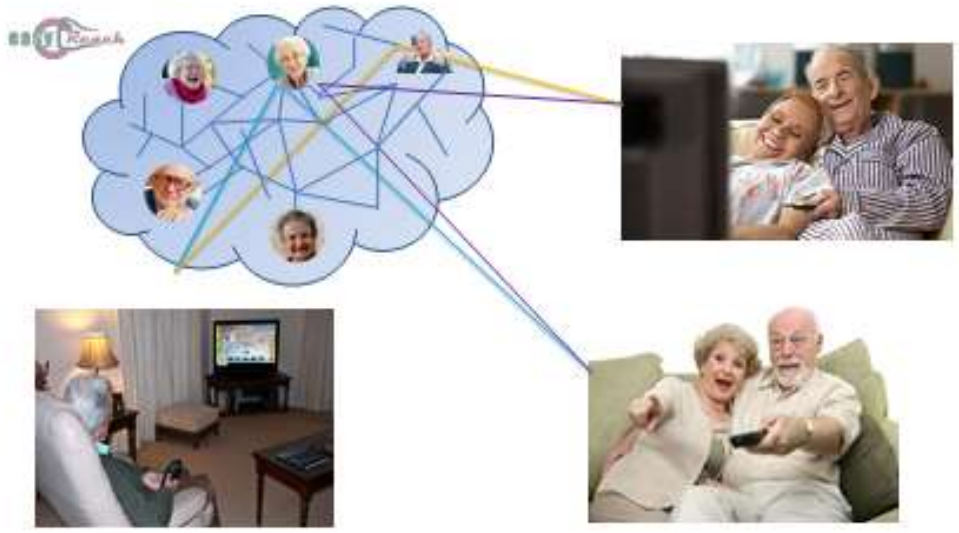
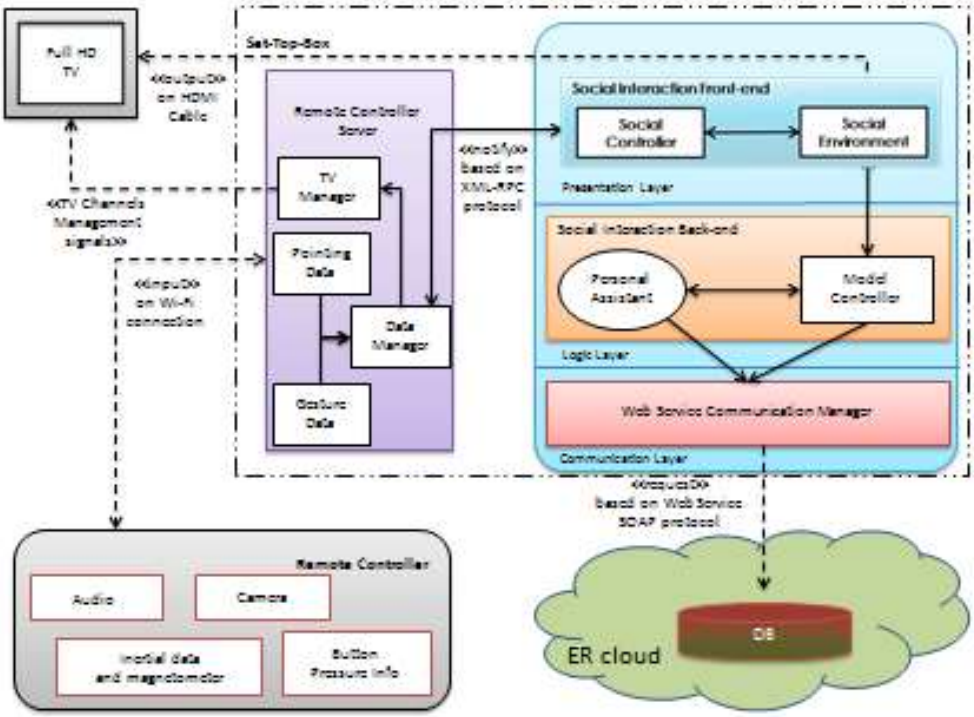
The EasyReach network



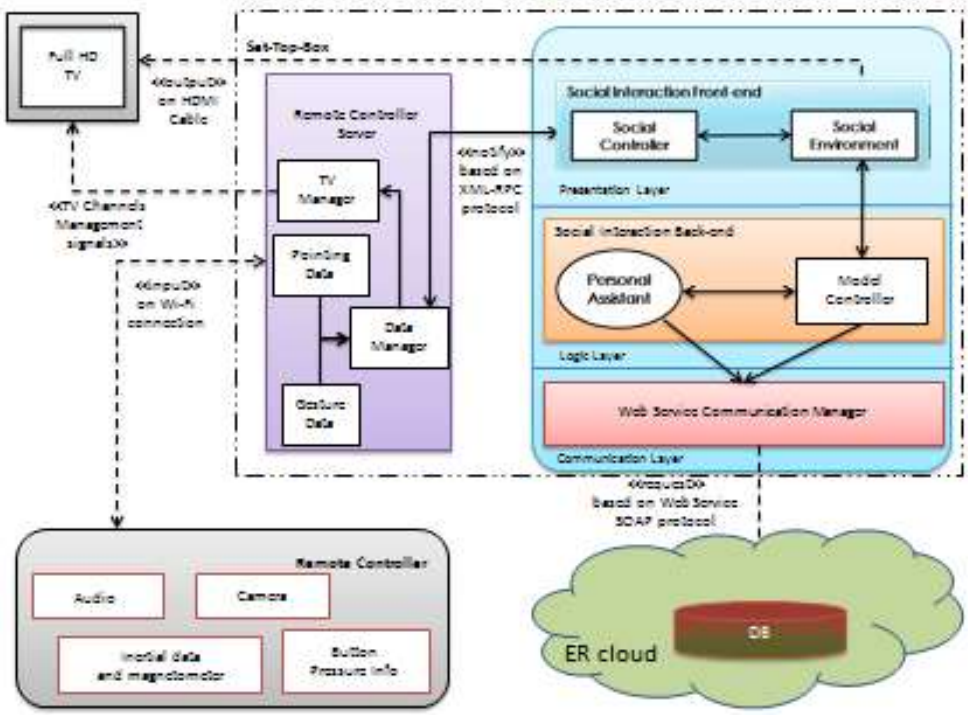
The EasyReach Technical Architecture



The EasyReach current application

The EasyReach environment: a single user interaction example

The EasyReach Technical Architecture

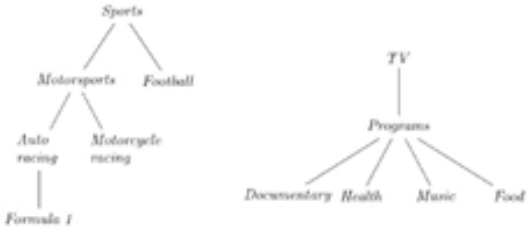


The Personal Assistant

- **Suggests** elements (users and groups), by reasoning on a **taxonomy** of user's interests, in order to foster social interaction among users in the system.

The Personal Assistant

- The used taxonomy is a forest of keywords provided by the user during the initial registration to the EasyReach system that describe his/her interests



- Reasoning is performed using Answer Set Programming techniques that exploit subsumptions present in the encoded logic program facts

The *Social Functionalities* provided by EasyReach

Keeping in touch

- "Easily" create and maintain connections with friends and relatives

Communicate with the external world

- Public organizations could have their specific version of the system
- Users would be able to communicate with their senior centers, parish churches and the like

Get help and give help

- Old people can share their life-time experience with other EasyReach users
- Creating narratives through images, movies, and subsequent messages

Evaluation

Constant contact with users

- In the period between October 2011 and June 2012, preliminary interviews with real user have been performed and several reactions collected:
  - The idea was judged benificial and appreciated as an adequate means "to remain in contact with the real world"
  - Some concerns about the easeness of use, the existence of an adequate assistance for the usage of the system and protection from illegal behaviors have emerged

Final Pilots

- Pilots have been carried out in Italy and Germany:
  - to evaluate system usability by the elderly people in different environments (e.g., senior centers)
  - to evaluate the effectiveness of the EasyReach solution in terms of social inclusion
  - To assess the overall system acceptance

The evaluated system

Some obtained feedback

More than 70% folder users stated that the project meets the goal of bridging the gap between senior citizens with a low level of technological skills and advanced technological solutions

The overall evaluation of the system has been positive: the main idea of reaching high technological solutions through common devices has been really welcome

The most significant difficulties in using the system seem to relate to the correct execution of gestures with the remote

Conclusions

- This project synthesized a system that aims at counteracting the elderly's tendency to isolate themselves when they are constrained at home for any reason
- The goal of the system is to maintain in the loop people not familiar with state-of-the-art ICT technology
- Continuous intermediate tests have constantly encouraged us in pursuing the project objectives
- More intensive tests with users have confirmed the such objectives have been satisfactorily achieved

Thank you!

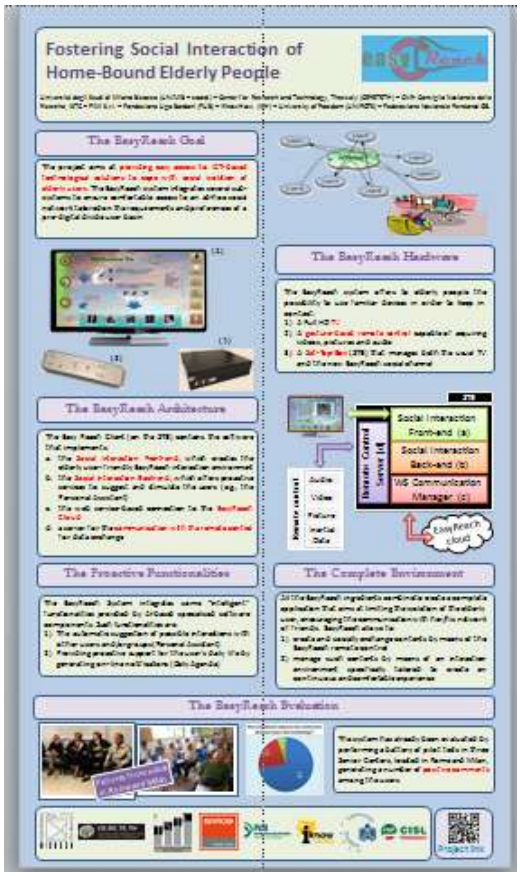
http://www.easyreach-project.eu/

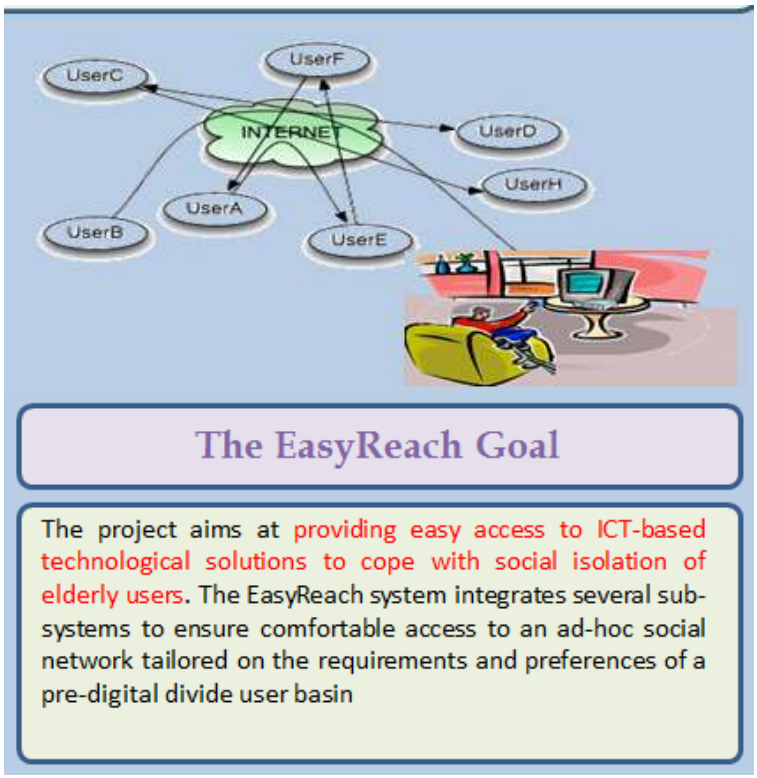
EUROPEAN COMMISSION

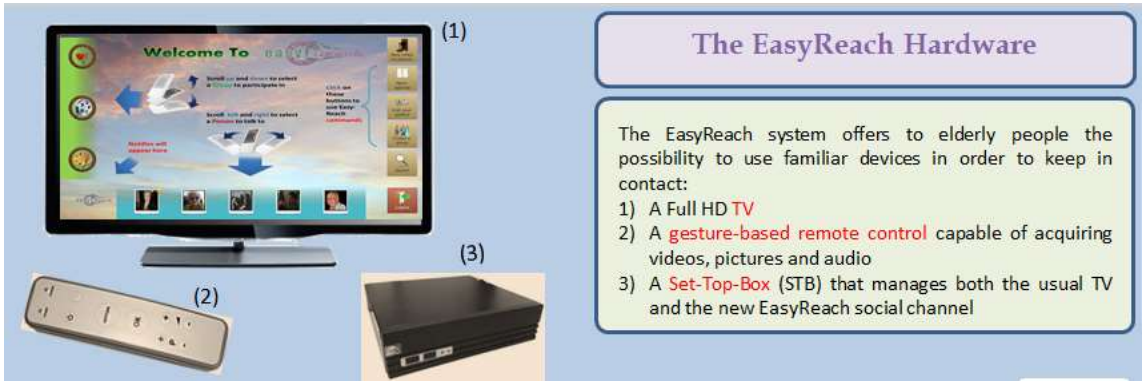
3. EASYREACH IN THE SCIENTIFIC PROGRAM OF THE 2013 AAL FORUM

3.1 THE EASYREACH POSTER

The poster was presented by Amedeo Cesta of CNR.



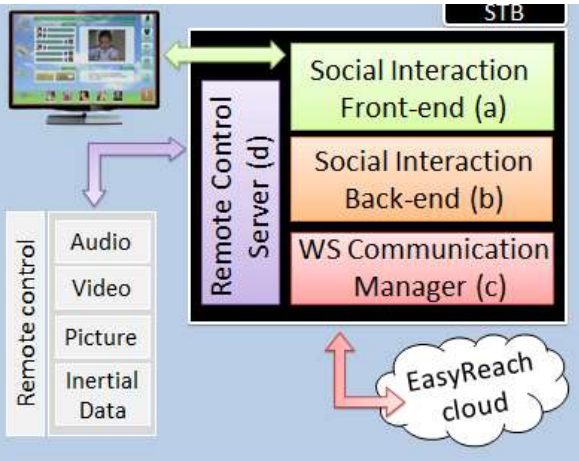




The EasyReach Architecture

The Easy Reach Client (on the STB) contains the software that implements:

a. the Social Interaction Front-end, which creates the elderly user-friendly EasyReach interaction environment
b. the Social Interaction Back-end, which offers proactive services to suggest and stimulate the users (e.g., the Personal Assistant)
c. the web service-based connection to the EasyReach Cloud
d. a server for the communication with the remote control for data exchange



The Proactive Functionalities

The EasyReach System integrates some "intelligent" functionalities provided by AI-based specialized software components. Such functionalities are:

1) The automatic suggestion of possible interactions with other users and/or groups (Personal Assistant)
2) Providing proactive support for the user's daily life by generating on-line notifications (Daily Agenda)

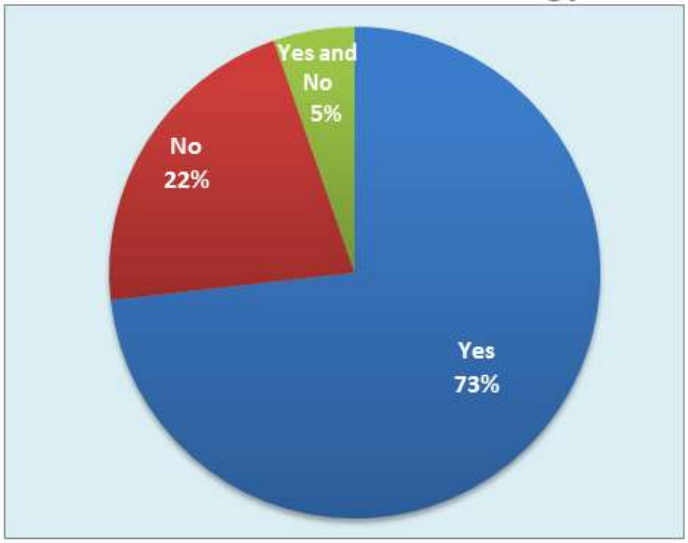
The Complete Environment

All the EasyReach ingredients combine to create a complete application that aims at limiting the isolation of the elderly user, encouraging the communication with her/his network of friends. EasyReach allows to:

1) create and socially exchange contents by means of the EasyReach remote control
2) manage such contents by means of an interaction environment specifically tailored to create an continuous and comfortable experience

The EasyReach Evaluation

Does EasyReach improve the connection between users and technology?



The system has already been evaluated by performing a battery of pilot tests in three Senior Centers, located in Rome and Milan, generating a number of positive comments among the users

Project link

3.2 THE EASYREACH STAND AT THE AAL FORUM 2013

In the EASYREACH stand we presented demos related to two application scenarios:

a. The home-based scenario,
b. A mobile scenario with a preliminary version of a possible "mobile EasyReach solution" (not part of the project).

➢ HOME-BASED APPLICATION SCENARIO

In the stationary application demo the components of the system were:

- A Full HD TV set,
- A Set-top-Box,
- A Remote Controller,
- The EasyReach server.

With this setting we have been able to show the EasyReach prototype to users, experts and visitors letting them also try the system in order to have a direct experience of the final product realized.
The demonstration has been shown to approximately 40 people, some of which also tried to use the system.

The overall appreciation of the EasyReach system emerging from the various visits has been good and users have appreciated the overall approach and the technology choices made.

The idea of providing a solution completely integrated with the home TV, where at anytime the user can switch to EasyReach channel in order to join the EasyReach Social Network, is the one that clients liked the most. The unique constraint to have a Full HD TV was not felt as a problem.

In general the visitors really appreciated the concept of providing elderly people with social functionalities by means of a non-invasive solution, using a tool (the TV) elders already know without changing their environment. Also the idea of using the same remote control to manage the TV as well as the interaction with the social channel has been very liked.

The general approach of avoiding to confuse elderly people by forcing them at installing several things at their home or using different tools to see their TV, access EasyReach Network and so on is the key concept that clients have mainly shared.

For what concerning the EasyReach Remote Control, the idea to avoid the use of a keyboard, a mouse or other "modern" devices and to found system interaction on gestures has also been appreciated.

Some (expected) issues have been found concerning the actual usage of a gesture-based interaction for some particular classes of elderly. Moreover the EasyReach Remote Control has not been felt ergonomic enough or very easy to use for elderly with physical issues such as problems in wrist articulation.
With regard to the functionalities provided by the system, some clients expected the possibility to make live calls with other system users. However the idea of a communication based on the exchange of asynchronous multimedia messages (audio, video and pictures) has been equally accepted. People liked the ease with which it is possible to capture new content by means of the EasyReach Remote Control and share with others these data through EasyReach Social channel.

Broadly speaking the overall system potentialities have been appreciated.
Mainly with the perspective of opening the Social Network to different categories of users such as doctors, public organizations or parents, and to realize different interaction mechanisms (i.e. interfaces or system clients) in order to take into account the needs of different classes of users.

Several people after visiting the booth demonstrated their interest for further interaction with the EasyReach tool and its Consortium in the future.

- **MOBILE SCENARIO**

A lot of social application has been developed for Tablet and Smartphone but they are full of information and sometimes cumbersome and awkward for elderly to be used, especially the very elderly.
The "mobile EasyReach" application has a very simple and flat design that is particularly suited to help user in access services in very few step, along with a simple and fixed framework design. Also offers ways to asynchronous communication both in video and audio mode, without using a keyboard.
A great number of people participating to the AAL 2013 Forum as stakeholders showed interest in the ER mobile application the way we proposed and its concrete technological realization.
In particular, they appreciated the fact that the interface is very easy to understand and that simplifies the access to web and mobile smart services. They like the design that according to ergonomic and cognitive criteria in conjunction with the geo-location services makes easy to use services otherwise inaccessible to elderly.
Some stakeholders showed interest in the proposed design because it could easily integrate with service they developed for elderly in particular services aimed to socialize communicate and advertise information in a smart city context.
These feedbacks agree with the results of SUMI (*Sofware Usability Measurement Inventory)* test carried out at the two Senior Centers in Italy for this realization at Centro Anziani di Buscate (MI) e l'Università della terza età – Università del Melo di Gallarate (VA), in July 2013 in which the users declared that :

- *"I work with this software with satisfaction"*
- *"The way information are presented is very clear and comprehensible "*
- *"To work with this software is mentally stimulating"*
- *"This software is quick"*
- *"It allows the user to complete his tasks in a few seconds"*
- *"Its interface is pleasant"*
- *"It is easy to see in a glance the different functionalities"*

3.3 SOME PHOTOS