Increasing the Adoption of AAL solutions, Senior Centred IoT, Workshop 9

John McGrory
Technological University Dublin, john.mcgrory@tudublin.ie

Matteo Zallio
Technological University Dublin, matteo.zallio@tudublin.ie

Follow this and additional works at: https://arrow.tudublin.ie/engscheleart

Recommended Citation
Workshop 9: Increasing the adoption of AAL solutions

SENIOR CENTERED IoT
A new challenge for Senior friendly habitats

AAL Forum 2017
3rd OCTOBER, 2017
COIMBRA, PORTUGAL

Dr Matteo Zallio
Dublin Institute of Technology

Dr John Mc Grory
Dublin Institute of Technology

© Dr John Mc Grory & Dr Matteo Zallio 2017
Our focus is to empower Senior Citizens to change their own world

Education, to enable Senior Citizens engage....
If a person has blurry vision & lights are turned up, they’ll just see a much brighter blurry image. But they might be able to make out what the image is. However, if you focus that image through a lens they can see the image distinctly with less light.
Digitization v’s Digitalization

- Digital Thermometer
- Digital SLR
- 35mm SLR
- Liquid Thermometer
- Internet, Modbus, WIFI,

High Volume
High Accuracy
Acquisition, exploiting data links & knowledge

Digitization (Technical Connectivity)
Low

High

Digitization vs Digitalization

(Business Connectivity)

DigitalSLR
How do we establish communications?

Nouns, People Place or thing

Verbs, Action

Adjective, describes the noun

An adjective ... sweet round big describes a noun!

green hot sad
Labelling...for example

But what is the underlying CONSTRUCT to make meaning
The man turned on the bedroom light
My dream
Compound-Complex Sentence

Tom cried

because

ball hit him

and

apologized

immediately

independent clause

dependent clause

independent clause
<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Amount Per Serving</th>
<th>% Daily Value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calories</td>
<td>250</td>
<td>10%</td>
</tr>
<tr>
<td>Fat</td>
<td>12g</td>
<td>18%</td>
</tr>
<tr>
<td>Saturated Fat</td>
<td>3g</td>
<td>15%</td>
</tr>
<tr>
<td>Trans Fat</td>
<td>3g</td>
<td>15%</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>30mg</td>
<td>10%</td>
</tr>
<tr>
<td>Sodium</td>
<td>470mg</td>
<td>20%</td>
</tr>
</tbody>
</table>

**Quick Guide to % DV**

- Low: 0% or less
- 1% to 14%: Low
- 15% or more: High

**Limit these Nutrients**

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Amount Per Serving</th>
<th>% Daily Value**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calories</td>
<td>100</td>
<td>3%</td>
</tr>
<tr>
<td>Fat</td>
<td>15</td>
<td>3%</td>
</tr>
<tr>
<td>Saturated Fat</td>
<td>0.5g</td>
<td>3%</td>
</tr>
<tr>
<td>Trans Fat</td>
<td>0g</td>
<td>0%</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>0mg</td>
<td>0%</td>
</tr>
<tr>
<td>Sodium</td>
<td>140mg</td>
<td>0%</td>
</tr>
<tr>
<td>Potassium</td>
<td>180mg</td>
<td>6%</td>
</tr>
<tr>
<td>Total Carbohydrate</td>
<td>20g</td>
<td>7%</td>
</tr>
<tr>
<td>Dietary Fiber</td>
<td>3g</td>
<td>0%</td>
</tr>
<tr>
<td>Soluble Fiber</td>
<td>1g</td>
<td>0%</td>
</tr>
<tr>
<td>Sugars</td>
<td>1g</td>
<td>0%</td>
</tr>
<tr>
<td>Other Carbohydrate</td>
<td>16g</td>
<td>0%</td>
</tr>
<tr>
<td>Protein</td>
<td>3g</td>
<td>0%</td>
</tr>
</tbody>
</table>
### Current Label

**Nutrition Facts**

- **Serving Size**: 2/3 cup (55g)
- **Servings Per Container**: About 8

<table>
<thead>
<tr>
<th>Amount Per Serving</th>
<th>% Daily Value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calories 230</td>
<td>12%</td>
</tr>
<tr>
<td>Calories from Fat 40</td>
<td></td>
</tr>
<tr>
<td><strong>Total Fat</strong> 8g</td>
<td>12%</td>
</tr>
<tr>
<td>Saturated Fat 1g</td>
<td>5%</td>
</tr>
<tr>
<td>Trans Fat 0g</td>
<td></td>
</tr>
<tr>
<td><strong>Cholesterol</strong> 0mg</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Sodium</strong> 160mg</td>
<td>7%</td>
</tr>
<tr>
<td><strong>Total Carbohydrate</strong> 37g</td>
<td>12%</td>
</tr>
<tr>
<td>Dietary Fiber 4g</td>
<td>16%</td>
</tr>
<tr>
<td>Sugars 1g</td>
<td></td>
</tr>
<tr>
<td><strong>Protein</strong> 3g</td>
<td></td>
</tr>
</tbody>
</table>

**Vitamin A** 10%

**Vitamin C** 8%

**Calcium** 20%

**Iron** 45%

* Percent Daily Values are based on a 2,000 calorie diet. Your daily value may be higher or lower depending on your calorie needs.

<table>
<thead>
<tr>
<th>Calories:</th>
<th>2,000</th>
<th>2,500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Fat</td>
<td>Less than 65g</td>
<td>80g</td>
</tr>
<tr>
<td>Sat Fat</td>
<td>Less than 20g</td>
<td>25g</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>Less than 300mg</td>
<td>300mg</td>
</tr>
<tr>
<td>Sodium</td>
<td>Less than 2,400mg</td>
<td>2,400mg</td>
</tr>
<tr>
<td>Total Carbohydrate</td>
<td>300g</td>
<td>375g</td>
</tr>
<tr>
<td>Dietary Fiber</td>
<td>25g</td>
<td>30g</td>
</tr>
</tbody>
</table>

### Proposed Format

**Nutrition Facts**

- **8 servings per container**
- **Serving size**: 2/3 cup (55g)

<table>
<thead>
<tr>
<th>Amount per 2/3 cup</th>
<th>Calories 230</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Fat</strong> 8g</td>
<td>12%</td>
</tr>
<tr>
<td>Saturated Fat 1g</td>
<td>5%</td>
</tr>
<tr>
<td>Trans Fat 0g</td>
<td></td>
</tr>
<tr>
<td><strong>Cholesterol</strong> 0mg</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Sodium</strong> 160mg</td>
<td>7%</td>
</tr>
<tr>
<td><strong>Total Carbohydrate</strong> 37g</td>
<td>12%</td>
</tr>
<tr>
<td>Dietary Fiber 4g</td>
<td>14%</td>
</tr>
<tr>
<td>Sugars 1g</td>
<td>1%</td>
</tr>
<tr>
<td>Added Sugars 0g</td>
<td></td>
</tr>
<tr>
<td><strong>Protein</strong> 3g</td>
<td></td>
</tr>
</tbody>
</table>

**Vitamin D** 2mcg

**Calcium** 260mg

**Iron** 8mg

**Potassium** 235mg

### Alternate Format

**Nutrition Facts**

- **8 servings per container**
- **Serving size**: 2/3 cup (55g)

<table>
<thead>
<tr>
<th>Amount per 2/3 cup</th>
<th>Calories 230</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Fat</strong> 8g</td>
<td>12%</td>
</tr>
<tr>
<td>Saturated Fat 1g</td>
<td>5%</td>
</tr>
<tr>
<td>Trans Fat 0g</td>
<td></td>
</tr>
<tr>
<td><strong>Cholesterol</strong> 0mg</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Sodium</strong> 160mg</td>
<td>7%</td>
</tr>
<tr>
<td><strong>Total Carbohydrate</strong> 37g</td>
<td>12%</td>
</tr>
<tr>
<td>Dietary Fiber 4g</td>
<td>14%</td>
</tr>
<tr>
<td>Sugars 1g</td>
<td>1%</td>
</tr>
<tr>
<td>Added Sugars 0g</td>
<td></td>
</tr>
<tr>
<td><strong>Protein</strong> 3g</td>
<td></td>
</tr>
</tbody>
</table>

**Vitamin D** 2mcg

**Calcium** 260mg

**Iron** 8mg

**Potassium** 235mg

* Footnote on Daily Values (DV) and calories reference to be inserted here.
Tyre Labelling Information

Fuel Efficiency Class
7 classes from G (least efficient) to A (most efficient)
Effect may vary among vehicles and driving conditions, but the difference between a G and an A class for a complete set of tyres could reduce fuel consumption by up to 7.5%* and even more in case of trucks.

Tyre External Rolling Noise Class
In addition to the noise value in Decibel dB(A) a pictogram displays whether the tyre external rolling performance is above the future European maximum limit value (3 black bars = noisier tyre), between future limit value and 3dB below it (2 black bars = low noise tyre) or more than 3 dB below the future limit (1 black bar = low noise tyre).

NB: The tyre external rolling noise is not entirely correlated to the interior noise.
Privacy

Things I think about but never disclose externally

Things I disclose by my gesture/behaviour/manner/reaction

Things I disclose by my intention typing/writing/searching/shopping

Behind my walls I should be safe

Loyalty cards gave you something for your data?
Common causes of memory loss

Memory loss can occur in words and thought patterns, and can also be present physically with the loss of motor memory. Memory loss is not always complete, sometimes failing to remember only a selected group of items.

- Impaired Concentration
- Disease
- Aging
- Intoxication
- Medication
- Trauma
If a person has blurry vision and the lights are turned up, they'll just see a much brighter blurry image. But they might be able to make out what the image is. However, if you focus that image through a lens they can see the image distinctly with less light.
Processing in the Brain
Processing in the Brain
Processing in the Brain

Network Knowledge
Processing in the Brain

- Inside
- Emotion
- Feeling
- Thinking
- Physiology

- Outside
- Behaviour
- Performance

- Frontal lobe
- Parietal lobe
- Occipital lobe
- Temporal lobe
- Cerebellum
Emotion and Feelings are different

Feeling mental portrayal of what is going on in your body when you have an emotion and is the by-product of your brain perceiving and assigning meaning to the emotion, and are subjective being influenced by personal experience, beliefs, and memories.

Emotions are lower level responses occurring in the subcortical regions of the brain, the amygdala and the ventromedial prefrontal cortices, creating biochemical reactions in your body altering your physical state.
In 2050, the **33% of population** will be over 60 years old

**Decrease of fertility rate** within worldwide developed markets

Increase **spending** on **healthcare** and **welfare system**
MAIN ISSUE

Today, the welfare system is still deeply structured with assistive traditional methods, which are managed directly by staff, careers and doctors, with high demanding of time and costs.
Could smart technologies become useful to improve people’s quality of life within their own environment?

Which kind of methods, tools and scenarios could enhance wellbeing and healthy conditions, reducing time and costs?
SENIOR PEOPLE AND SMART TECHNOLOGIES

77% OVER 65 OWN A CELL PHONE

59% OVER 65 SURF ON INTERNET

27% OVER 65 OWN A TABLET

55% OVER 65 HAVE BROADBAND AT HOME

Source: Pew Research Center 2013
IOT FOR A BETTER LIVING
STATE OF ART OF TECHNOLOGIES

WHAT WE HAVE TODAY?

- Smoke sensor prevents fire, can be used as a people monitoring
- Smart lighting system understands when people are
- Smart dish-washer can start when energy cost less, in silent mode
- Smart oven can be controlled via smartphone
- Smart plugs help in using home appliances via remote control
- Flooding sensor prevents water damage & send alerts on smartphone
STATE OF ART OF TECHNOLOGIES

WHAT WE HAVE TODAY?

- Smart lighting system turns down when watching TV or relaxing on sofa
- Curtains and windows controlled via Wi-Fi or Bluetooth
- Smart TV is connected to Internet and provide infos & home control
- Anti-blackout notify you if energy consumption is too high
- Robotic devices for connecting and socializing with people
- Lifestyle monitoring systems help in daily activities & keep in good conditions
- Smart trackers help in reminding where things are left
- Smart plugs turn on/off appliances when needed, via Wi-Fi
- Connected speakers play favourite music inside home
- Smart thermostat sets the right temperature if there are people or not
STATE OF ART OF TECHNOLOGIES

WHAT WE HAVE TODAY?

- Lighting system set scenarios when going to bed or waking up
- Surveillance systems keep control of home if there's an unexpected entry
- Assistance systems aid in keeping good physical conditions
- Monitoring devices keep you under control and tell info to doctors & family
- Security systems keep home secure & aid for keyless entry or easy access
- Smart cleaner helps in daily cleaning activity & is connected to home systems
EMOTIONAL DESIGN

PINCH TO ZOOM

A new form of Interaction: Pinch to Zoom 2007
EMOTIONAL DESIGN

iPhone Alarm Setting - Interface of an iPhone 3GS and iPhone 6

![iPhone Alarm Settings](image)
Round Knob and Lever style: How to open a door

KNOB HANDLE

LEVER HANDLE
FORM - FIT - FUNCTION

Does it **look good?**
**AESTHETICS**

Does it **make sense?**
**CLARITY**

Does it have **intended effect?**
**IMPACT**
STARTING POINTS: USER NEEDS

- Interactions to increase usability
- User interfaces
- Simplicity & Usability
- Complexity inside systems
- User Acceptance – Affordance
SENIOR FRIENDLY HOUSES

CRITERIA ANALYSIS

KEY POINTS

DEVELOP & CONSTRUCTION

FEEDBACKS

EVALUATION CHART

PASSIVE TECH

ACTIVE TECH

USER FEEDBACK
SENIOR FRIENDLY HOUSES: RESULTS

Users
- Primary users
- Secondary users
- Experts, designers, researchers, doctors

Feedback
- Positive feedback
- Negative feedback
- Not available feedback
A STRATEGY FOR DESIGNING A SENIOR FRIENDLY ENVIRONMENT

EDSU
Environment Design Sustaining Users

- Passive Technologies
- Lifelong Housing Design
- Lifelong Technological Integration
- Active Technologies

SMART PACKAGES

LABELS
LIFELONG HOUSING DESIGN: LABELS

A new assessing and evaluation method for establishing Good Design Practices to guarantee accessibility, adaptability and flexibility features for a Senior friendly house.
LIFELONG TECHNOLOGICAL INTEGRATION
SMART PACKAGES

COMFORT PACK
- Philips HUE Lighting System
  - Wireless system connection
  - Application provided for usage & control
  - Power supply needed

SAFETY PACK
- VIPER Home Security & Monitoring
  - Wireless system connection
  - Application provided for usage & control
  - Power supply needed

FAMILY PACK
- SAMSUNG Novobot cleaning Robot
  - Wireless system connection
  - Application NOT provided
  - Power supply NOT needed

HEALTHY PACK
- CUPTIME Smart Cup aider
  - Wireless system connection
  - Application provided for usage & control
  - Power supply NOT needed
DESIGNING SCENARIOS

- Incourage the usage of new technologies for users, by simply & clear informations
- Makes more accessible & affordable existing devices instead of domotics systems
- Increase the added value of products by making easier trading and a larger diffusion

**SCENARIOS**

**OUTCOME**
- Smart Packages
- Lifelong Tech Integration
- Lifelong Housing Design

**OUTPUT**
- Labels

**HELPFUL INFORMATION**
- Helps to easily identify which features are in a “Senior Friendly” Home
- Each house could earn added value by a wider purchasing audience
- Could be established more reductions & tax incentives, in case of improving the indoor equipment following “Lifelong Housing Design” principles
GOOD DESIGN ENABLES, BAD DESIGN DISABLES

Paul Hogan, EIDD-DFA Europe president Emeritus

THANK YOU FOR YOUR ATTENTION

Dr. Matteo Zallio
p: +353 (85) 840 4530
e: matteo.zallio@dit.ie

Dr John McGrory
p: +353-1-4022848
e: john.mcgrory@dit.ie

© Dr John Mc Grory & Dr Matteo Zallio 2016