TECA: Towards an Effective Communication for All

In a today's world, Information and Communications Technology offers a lot of potential when it comes to facilitate people lives.

Jornada sobre adaptación de herramientas de comunicación para personas con necesidades especiales

Towards an Effective Communication for All

Sara Candeias
Science & Technology Project Manager
Speech Scientist

Microsoft

Microsoft Language Development Centre (MLDC)

Opening date/start date: 2005

Geographical location:
Lisbon and Porto, Portugal

Staff number: 35

Director: Miguel Sales Dias

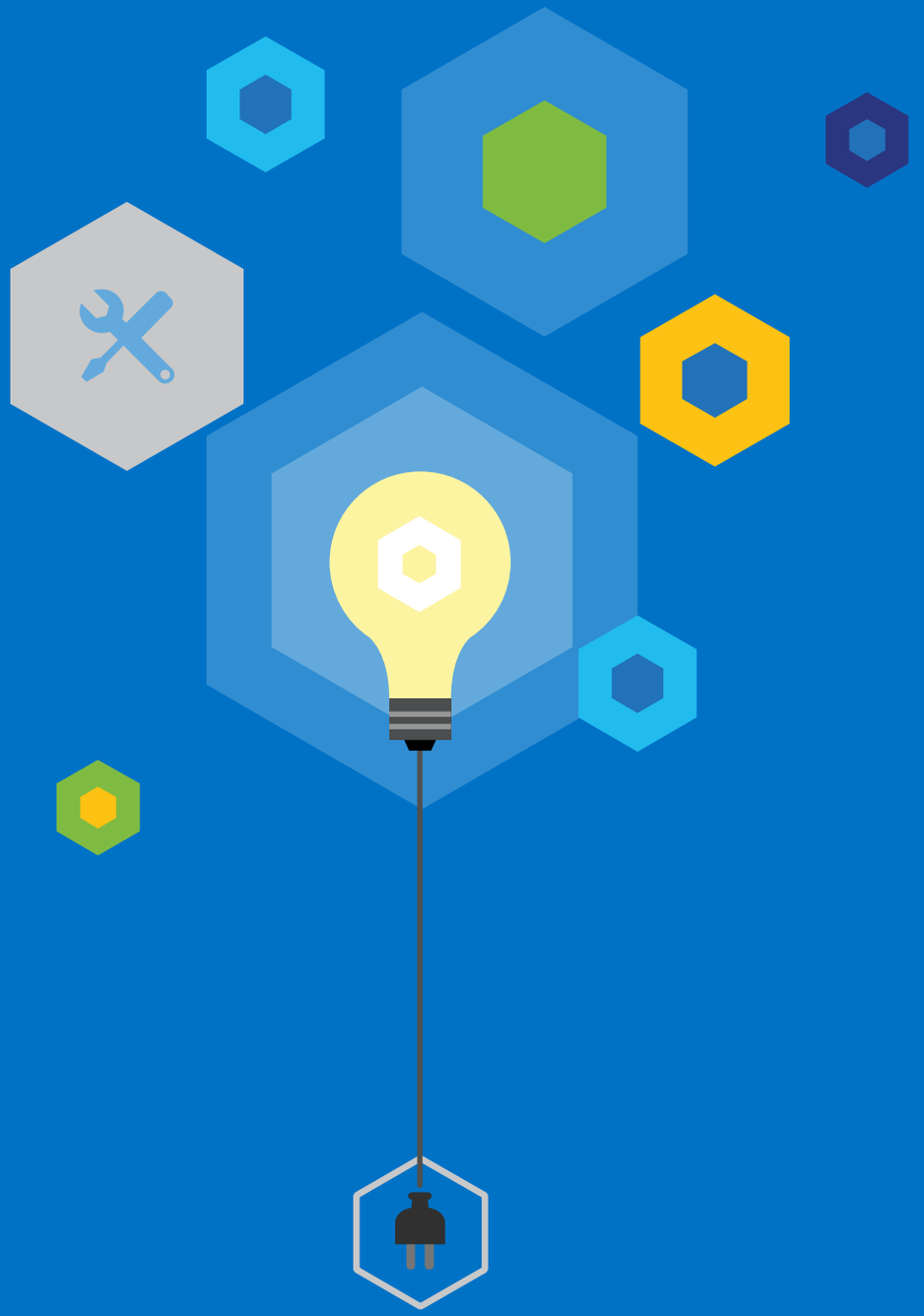
Who are we?

- a world-class development center in Europe as a strategic competitive asset for Microsoft IPE
- a group of the OSD focused on becoming the center of excellence to serve all data collection needs of IPE, to enable the training and testing of a variety of machine learning algorithms

Team

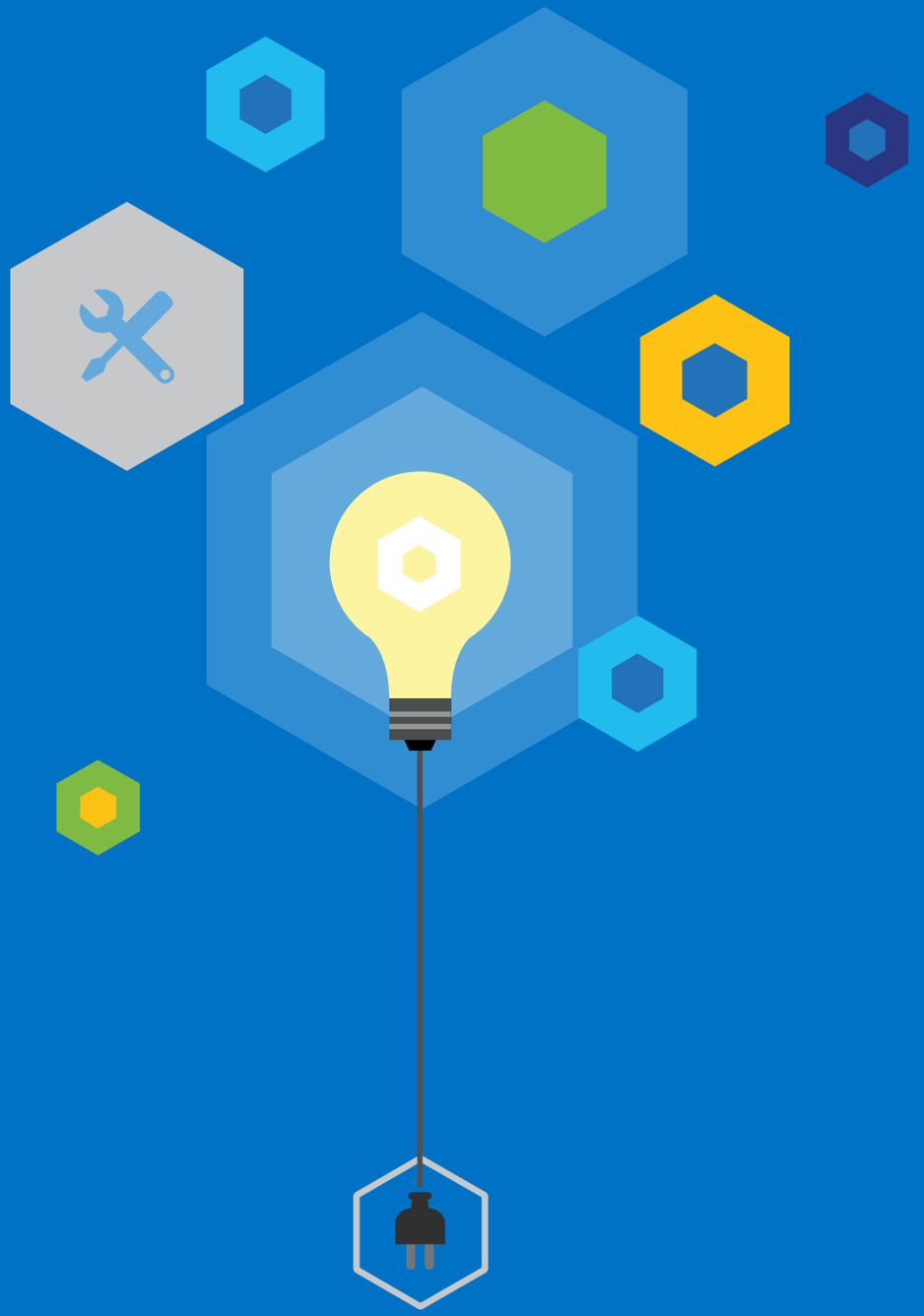
Our long term plans

- **Technology for searching and solving future problems** - Bing, Office, Windows, Xbox, Windows Phone
- **Provide language expert support**, leveraging and growing the existing ecosystem of experts to deliver on the language expansion plans **for Microsoft products**
- **Expansion of speech technologies** in the European and international context



Our action lines

- Perform **research** and **development**
  - in the area of **natural human-computer interaction technology**
  - to be exploited in Microsoft products for the global market
  - in the domains of mobility, entertainment and search



One Microsoft.
Better together.

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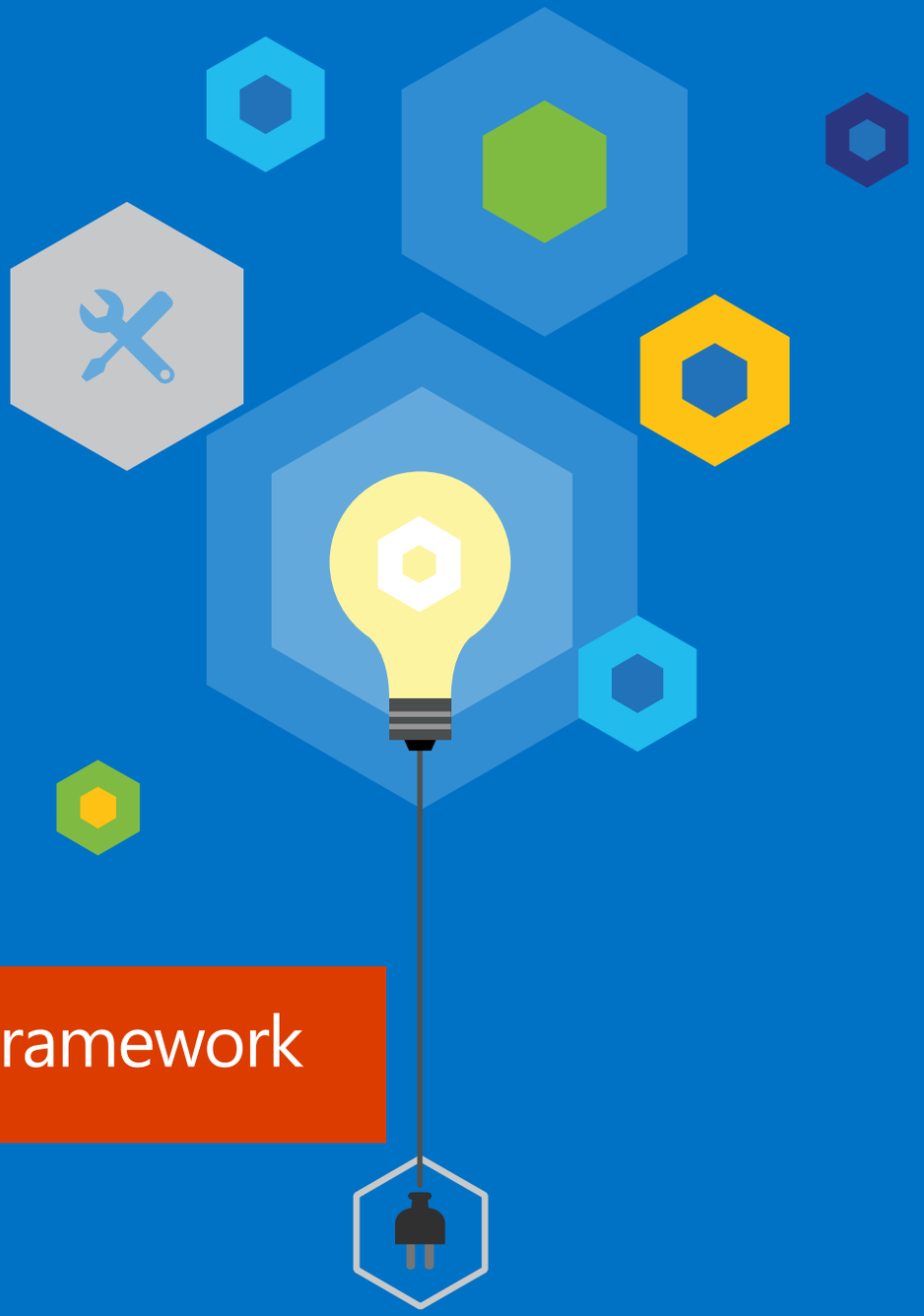


International & Portuguese **Collaborative** R&D Framework

- Describe some of our current and past projects in collaboration with academia
- Human-computer interaction
- Fundamental research in the area of speech and gestures

Have you asked yourself why ICT is so important today?

Just look around and you'll know why.

Literally, at every instant of time, you are surrounded by ICT.

Its use has made life easy.

We need it to communicate.

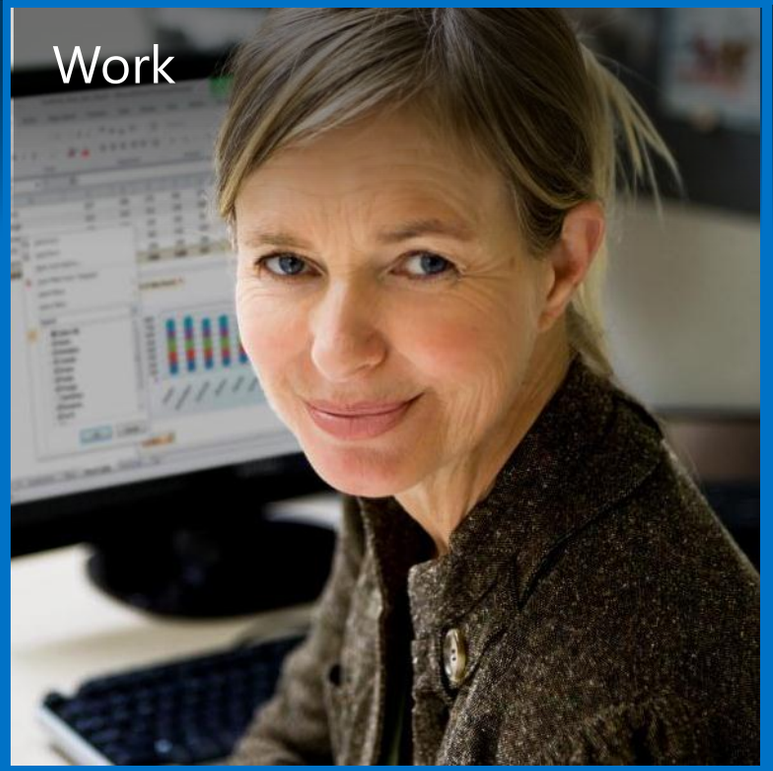
It's important.

ICT has changed every sector

Solutions that help elderly people to keep their brain active, enhance their health and preserve their security.

Education

Work

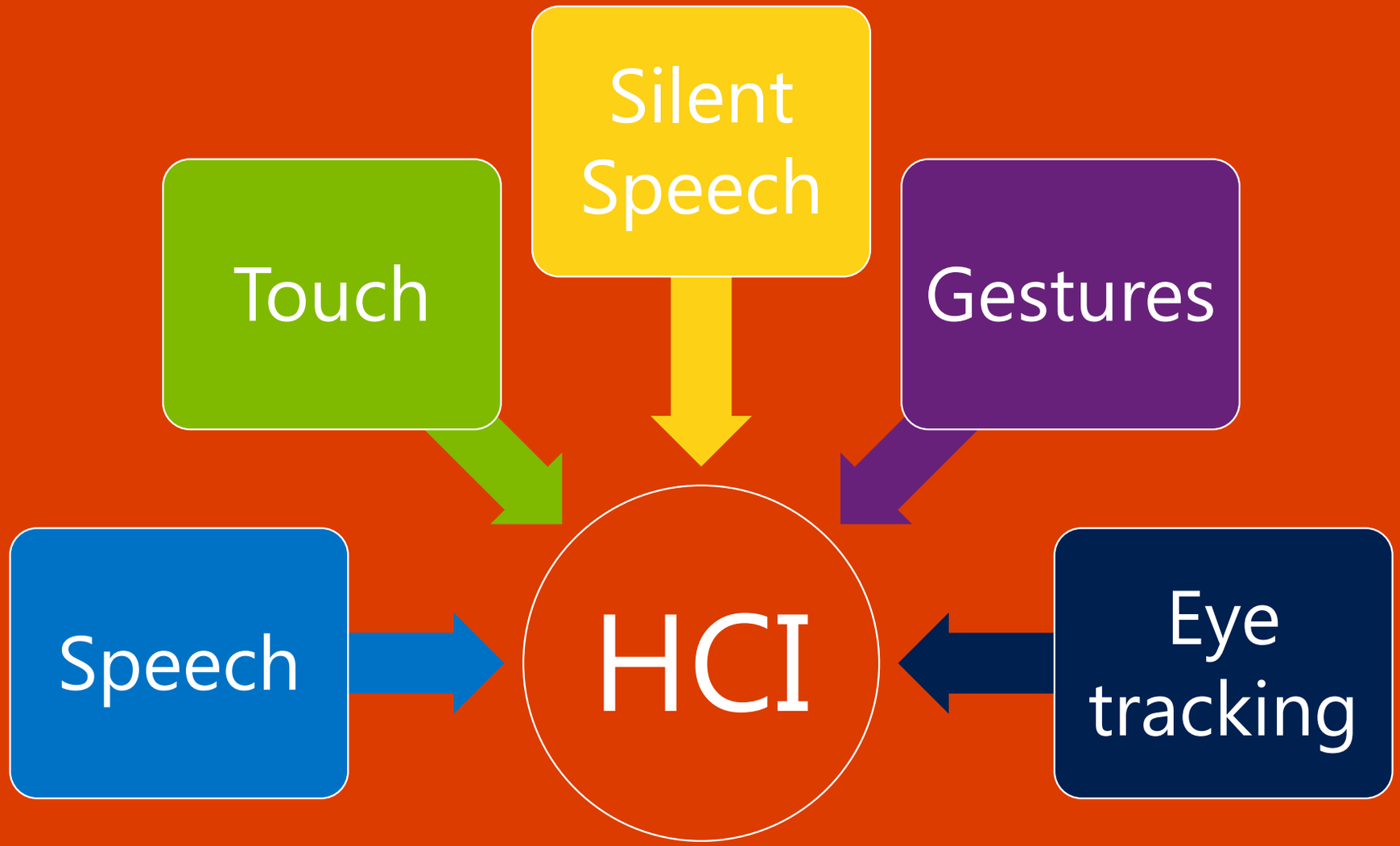


Fills communication gap

Source of instant help

Solutions that promote cognitive stimulation of children multicultural inclusion and independent living.

HCI multimodalities



Our research

Text-to-Speech

Examples:

http://ttsdemo.azure.mldc.pt/

Automatic Speech Recognition

First data collection of **elderly** speech for European Portuguese

First data collection of **children** speech for European Portuguese

Personalized Synthetic Speech

- SoA advances that users prefer family synthetic voices (Qiu, LY; 2005)
- Generate personalized voices using a small number of recorded utterances
- Currently running in a pilot with real users (Alentejo)

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Examples of PSS of elderly family based on 1k recorded utterances

Silent Speech

- Conventional ASR
  - Inadequate in situations where privacy or non-disturbance is required
  - Inadequate for users with speech-impairments
- [Silent Speech Interface is] “a system enabling speech communication to take place when an audible acoustic signal is unavailable.” (Denby et al., Silent Speech Interfaces, Specom, 2010)
- Extracts speech information from articulators, facial muscles or brain activity

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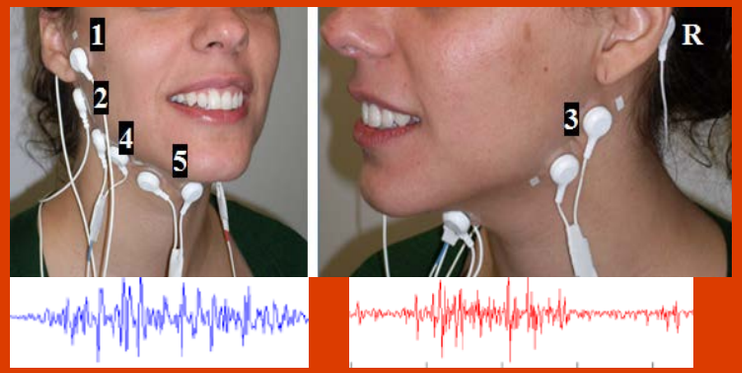
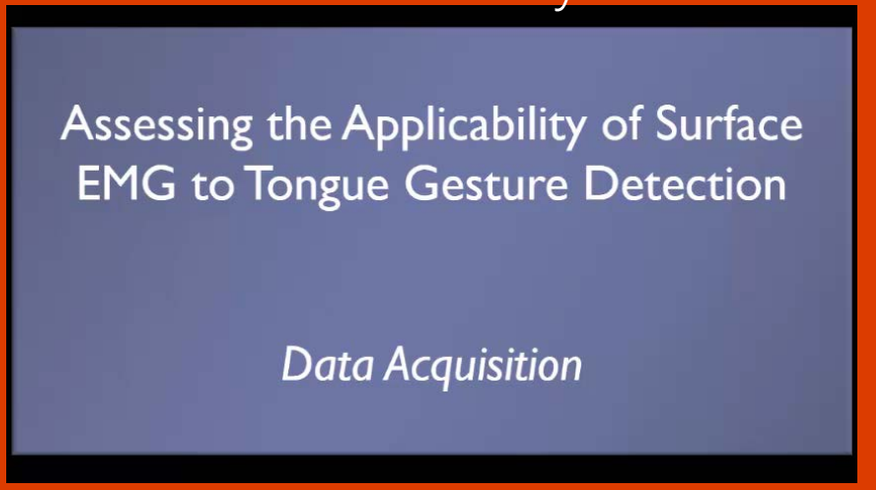
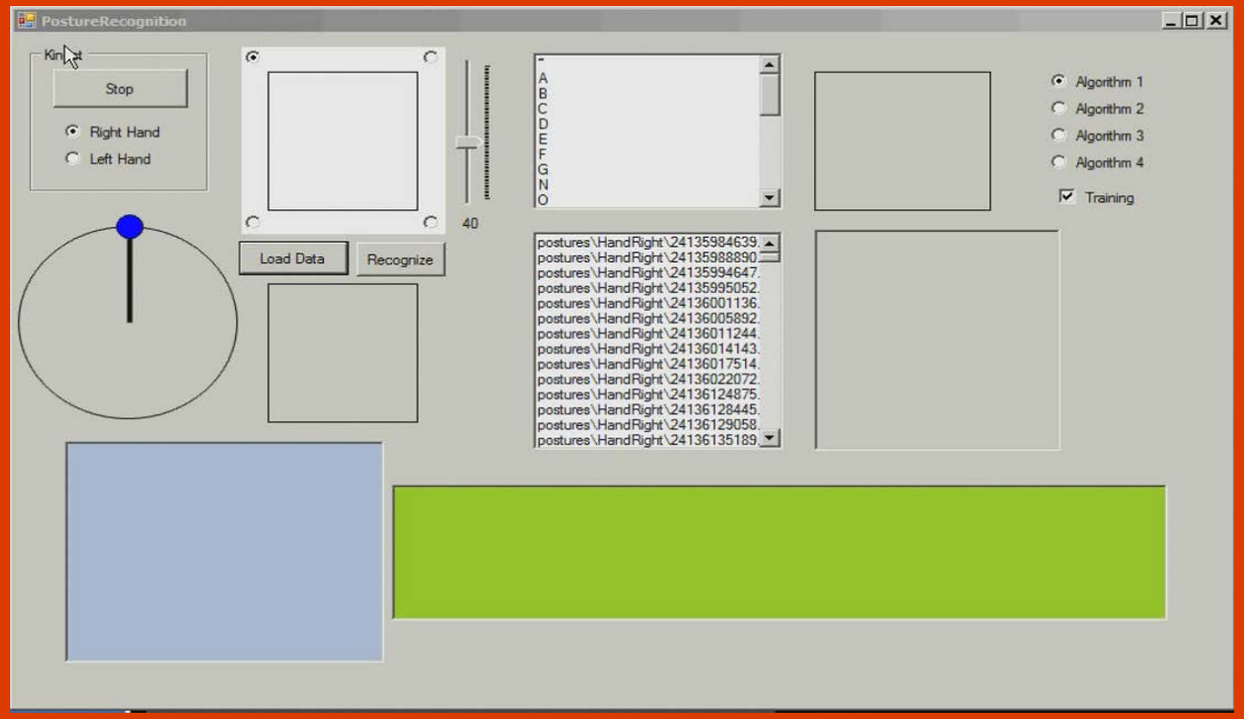
- Some approaches:
  - Surface EMG





Gestures

- Automatic recognition of gestures in sign language for Portuguese



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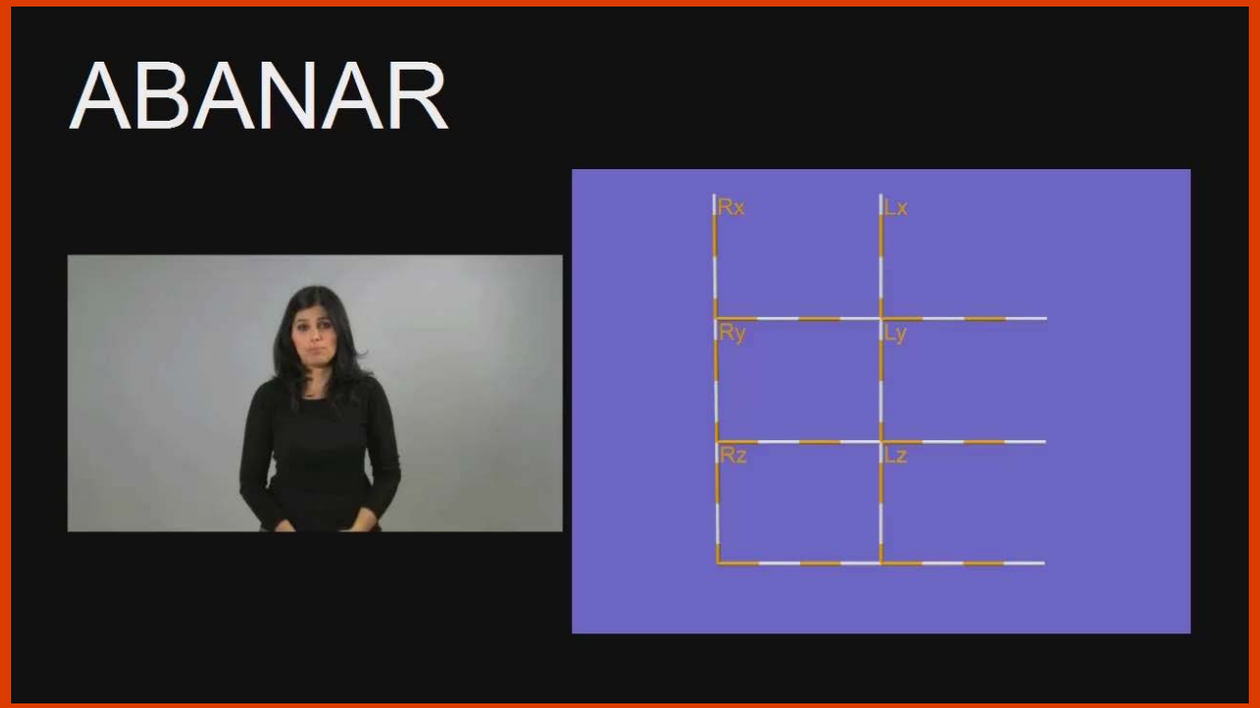
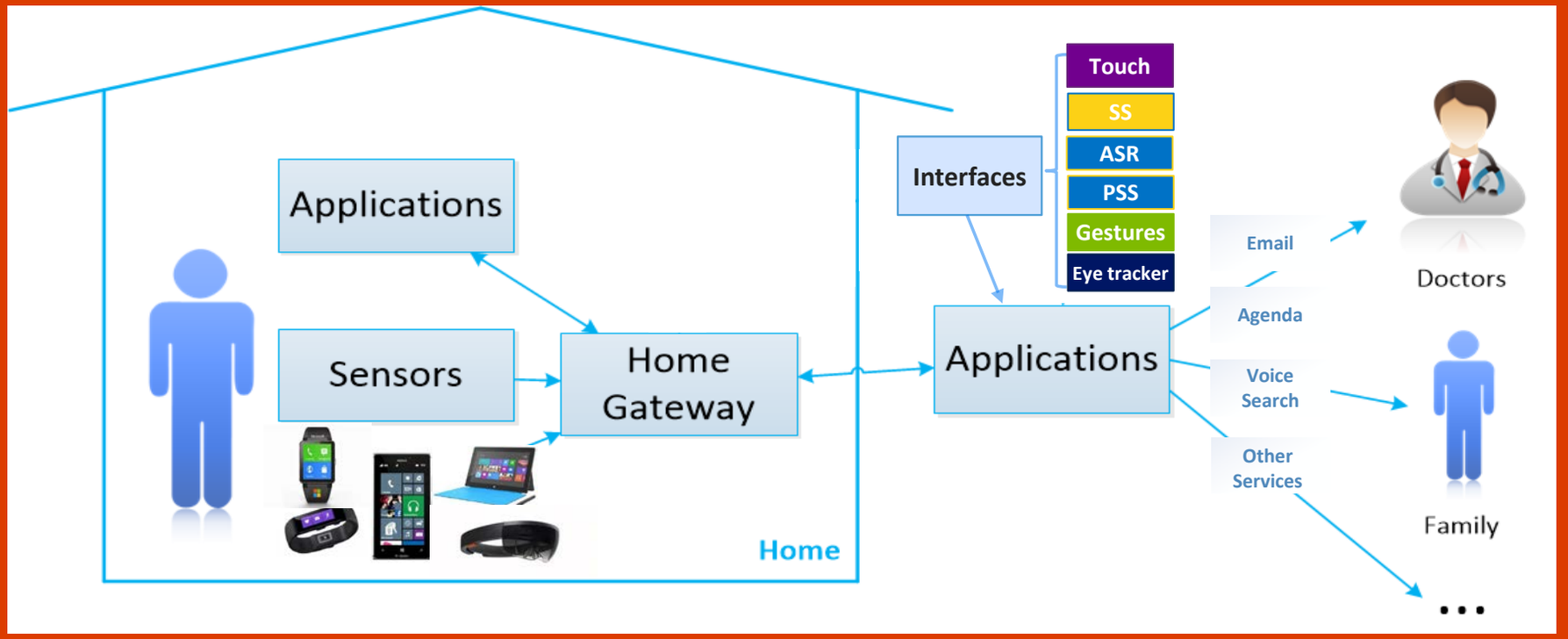


Home system architecture



Collaborative R&D Framework

~15 national partners from academia

Faculdade de Ciências da Universidade de Lisboa

Instituto Superior de Engenharia de Lisboa

Universidade da Beira Interior

Faculdade de Engenharia Universidade do Porto

INESC – Inov

Faculdade de Letras da Universidade de Lisboa

Instituto de Engenharia de Sistemas e Computadores, Investigação e Desenvolvimento

Instituto de Linguística Teórica Computacional

INESC – ID IMMI

Instituto de Engenharia e Eletrónica e Telemática de Aveiro

INESC Porto

Universidade de Aveiro

Universidade de Coimbra

~20 international partners from academia

University of Zaragoza, Zaragoza

Vigo University, Vigo

Universitat Politècnica de Catalunya

University of the Basque Country, Bilbao

Ludwigs-Maximilian-Universität, Munich

Technische Universität Dresden, Dresden

University of Bonn, Bonn

University of Technology of Troyes

ELDA, Paris

CNRS, Aix en Provence

~20 international partners from academia

Budapest University of Technology and Economics, Hugary, Budapest

The Bay Zoltán Foundation for Applied Research, Hungary

UCL, United Kingdom, London

Trinity College, Ireland, Dublin

University of Maribor, Slovenia, Maribor

Adam Mickiewicz University, Poland, Poznan

Chinese Academy of Sciences, China, Beijing

Middle East Technical University, Turkey, Ankara

~15 partners from industry

Grupo Português de Computação Gráfica

Plux

Link

Via Tecla

Micro I/O

I Zone

PT Comunicações

Maisis

Ponto.C

Priberam

Our R&D collaborative projects

Ageing well

Social inclusion

Children education

Ageing well

Ageing well

S4S - Smartphones for Seniors

QREN 21541 2012-2014

Provides more adapted technology to the senior population in mobile scenarios

Offers a simplified way to access social media services, email and calendar

Redesign interfaces:

- Users can interact using touch and speech (the most natural way of interaction).
- The interface is optimized for the elderly avoiding:
  - overloading on all pages
  - small graphical components (buttons and texts)

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AAL 2012-2014

Enhances the quality of life of older people

Fights social exclusion

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OLA - Organizational Life Assistant for future active ageing

AAL 2015-2018

A virtual presence that supports instrumental activities of daily living needs of older adults

Allows elderly to be more independent and to have a healthier, safer and organized life

Supporting caregivers

VUK - Visionless sUpporting framework

AAL 2015-2018

Approach the problem of the blind and visually impaired user

Considers all kind of blind and visually impaired in urban mobility

Ageing well

AAL4ALL – Ambient Assisted Living for All

QREN 13852 2011-2014

Development of an ecosystem of products and services for a national context

Targeting elderly and seniors with special needs

AAL4ALL
Ambient Assisted Living for All

Ageing well

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Targeting elderly and seniors with special needs

Currently a pilot is running:

Ageing well

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Cogniwin - Cognitive Support for older adults at work

AAL 2014-2017

Enables older adults to maintain or even increase their efficiency at work

Provides support to alleviate eventual age related memory degradations and gradual decrease of other cognitive capabilities (i.e. speed of processing, concentration level)

Social inclusion

Social inclusion

IRIS: Towards Natural Interaction and Communication

Marie Curie IAPP - 2014-2017

LIFEisGAME: LearnIng of Facial Emotions Using Serious GAMEs

2010-2013

Applies a serious game approach to teach people with Autism Spectrum Disorder to recognize facial emotions

GOLEM - Realistic Virtual Humans

Marie Curie - 2012-2014

Uses real time synthesis and automatic facial expression analysis

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CNG Contents for Next Generation Networks

QREN 7943 CNG – 2011-2013

Includes speech and gesture in children education scenarios

Development of games to aid the learning of basic mathematics and music for children aged 4 – 8

LetsRead - Automatic assessment of reading ability of children

2014-2016

Application for helping Portuguese children in their reading activity

Includes speech recognition and automatic assessment

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Thank you !

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Microsoft

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other

references

Qiu, LY; 2005

Denby, B., Schultz, T., Honda, K., Hueber, T., Gilbert, J.M., Brumberg, J.S., 2010. Silent speech interfaces. Speech Commun. 52, 270–287. doi:10.1016/j.specom.2009.08.002

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