



# MULTIMODAL INTERACTION

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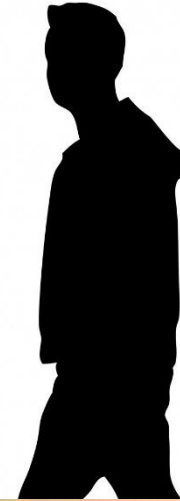
DETI/IEETA, Universidade de Aveiro



# We are multimodal

most of the time

- **Walking down the street** combines sense of balance, vision, touch...
- **Conversation** combines the sense of hearing and vision ...  
And, perhaps, movements and touch, if you tend to talk with your hands
- **Our senses** enable a wide range of behaviors



# Recent trends

- Environments are populated by **a myriad of devices**
  - Smartphones, smartwatches or even smart home appliances
- **Harnessed with technologies enabling** richer and more natural ways of **interaction**
  - Speech, gestures...
- **New needs for interaction**
  - Mobility
  - Small devices,
  - Multiple devices and users ..
  - Smart houses, buildings,
  - Smart Cities ...

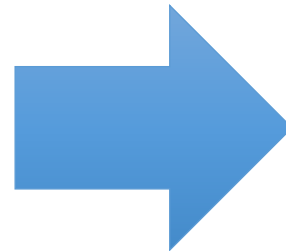


# Recent trends (cont.)

- **Pervasive Assistance**

**Assisting people in many ways....**

- Staying at home (classic AAL)
- Staying active
- Taking medication
- Using social networks
- Accessing Health Information
- In dangerous situations
- In cars, cities...



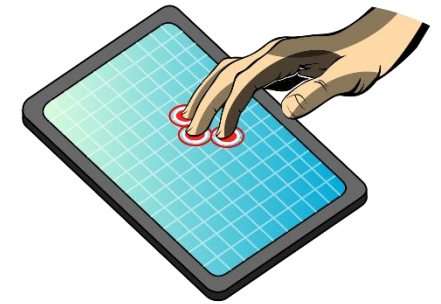
**NEW  
Services  
and  
Applications**

# Recent trends (cont.)

- Our **Interaction** with smartphones, smart TVs or home appliances, is **more and more present and important**
- Assistant **Robots** and **Smart Homes** continue this trend

# Recent trends – Natural and Multimodal

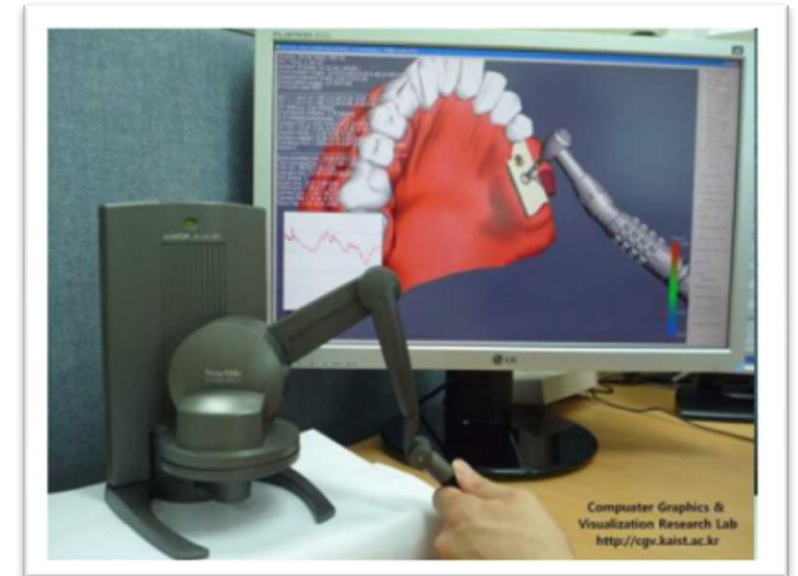
- **Increased demand for natural forms** of interaction
- Multiple modalities
  - Generalized use of **touch**
  - Multiple **voice-based** and conversation-based systems
  - Use of hands and body **gestures**
- **Joint use of multiple forms** of input and output
  - As Humans do





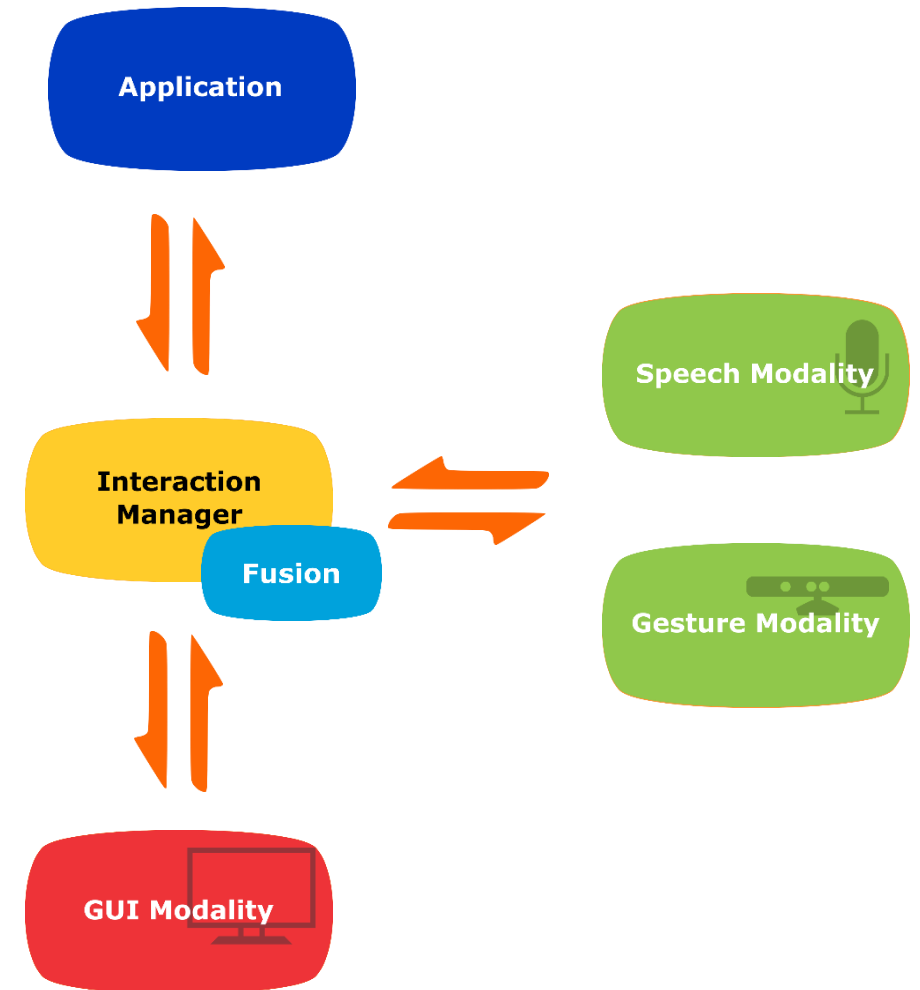
# Some Potential Advantages

- **Choice** of adequate modality
  - Considering task, context and user
- **Natural** / Human-like
- Higher **speed** in transmission
- **Interaction with small devices**
- **Realism**
  - Ex: Simulated training in Health (Haptic)
- **Robustness**
  - Mutual disambiguation of errors
- **More engaging**



# Our Approach

- **Modular, loosely coupled** extendable **framework** aligned with W3C
- **Modalities** (ways of exchanging information with applications)
  - Generic - off the shelf
  - decoupled modalities
- **Interaction Manager**
  - Separating interaction logic from application logic
  - Cloud friendly
- Capabilities to simplify **joint use of modalities**





# Key features

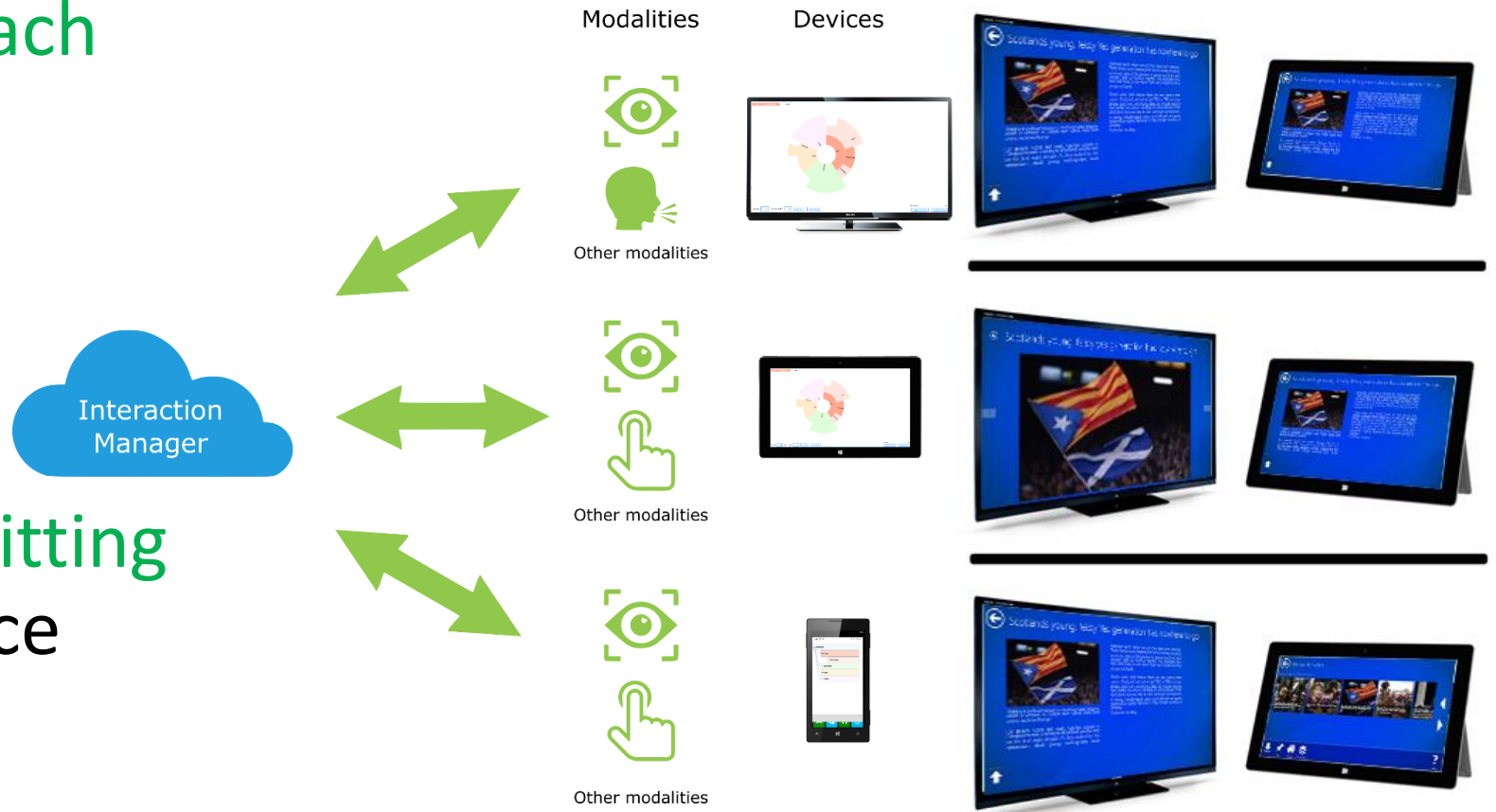
- Adaptive
- Multidevice
- Multiplatform
- Multilingual
- Multimodal Interaction
- **AM<sup>4</sup>I (amphorae)**



# Multidevice Support

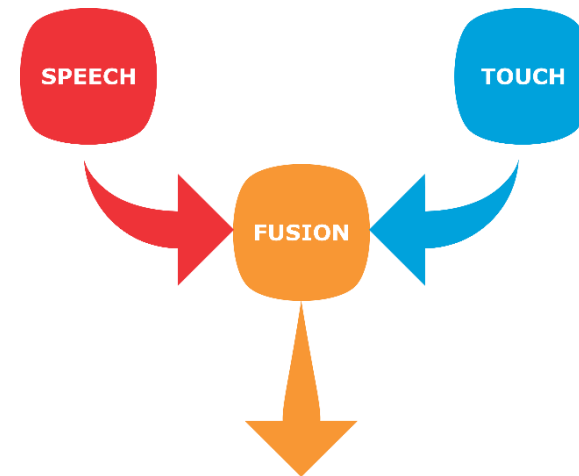
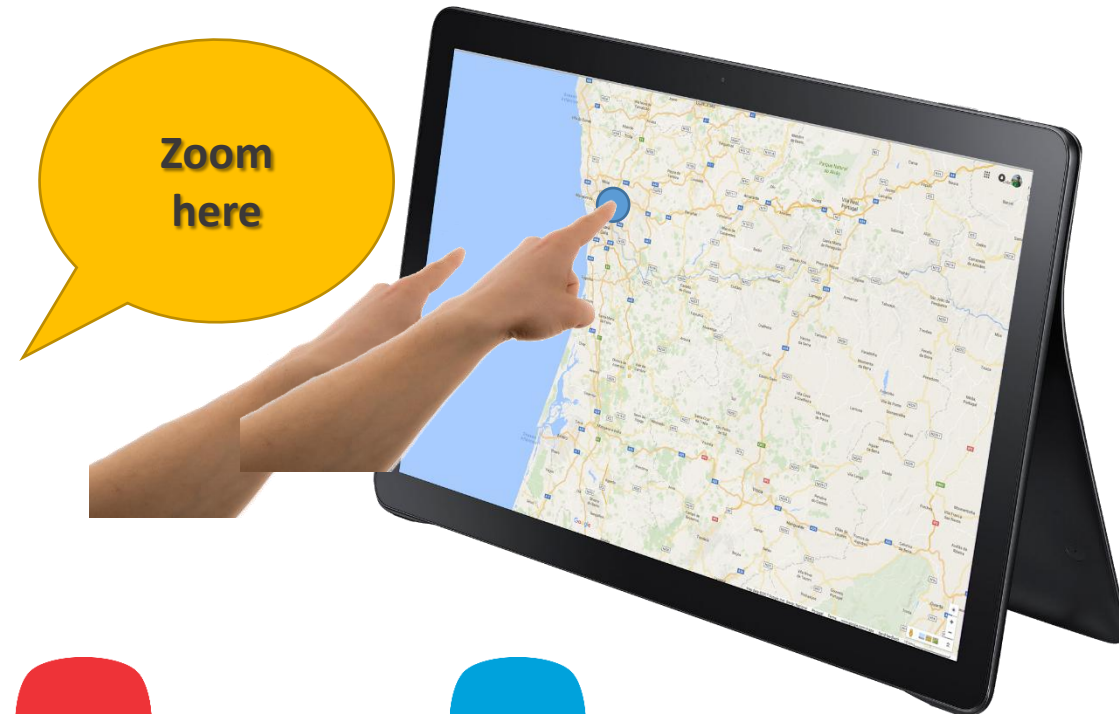
- Profit from the **characteristics of each device**

- Show **information fitting the size of the device**



# Joint use of modalities - *Fusion*

- Enables **combination of events** from different modalities
- “Zoom here” + touch the region





## *Multimodality in ACTION*

Examples from our group work

# Helping children with autism from different sources

## Helping users with social interaction



Conta o teu dia!

O que vamos fazer hoje?

Tirar uma Fotografia

Ver as minhas Fotos

Log das Perguntas

Abrir o meu Diário

NewsReader

App for Special Needs

fueLife

Towards Natural Interaction and Communication

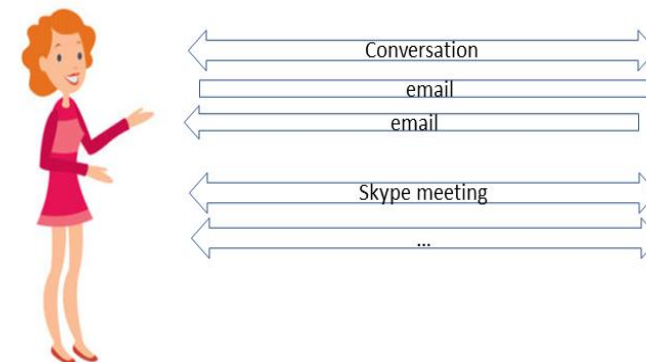
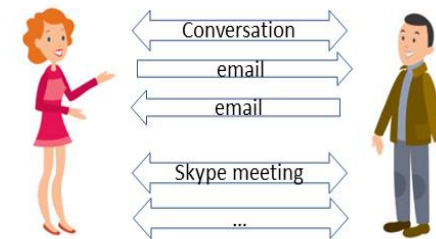
Ambient Assisted Living for All

# Human-Home Interaction

- Interaction for an **Accessible Smart Home**
  - Part of project SMART GREEN HOMES (SGH)



- **Inspired in HUMAN – HUMAN** communication
- Make the Home an Interlocutor
- Integrated interaction
- Inside and remotely





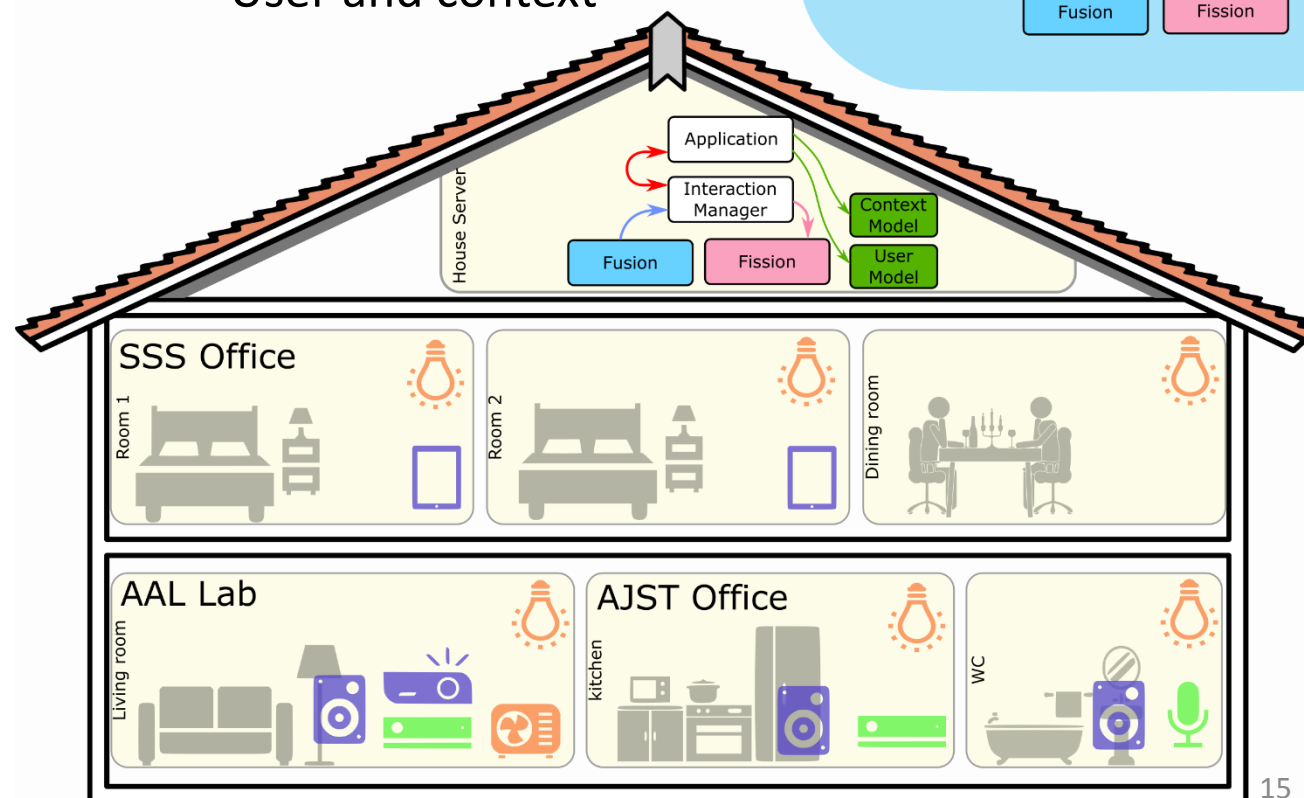
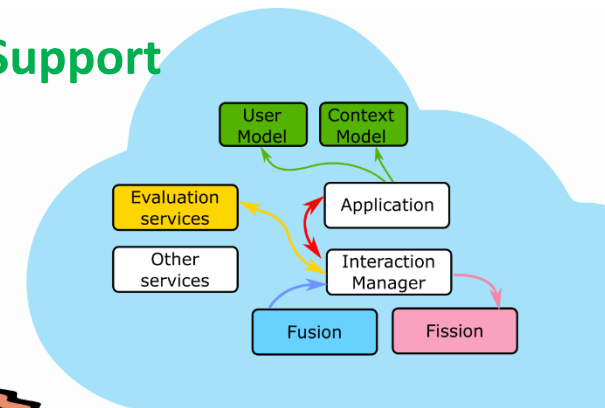
# Multimodal Home Assistant

- Interaction by touch and speech



## House:

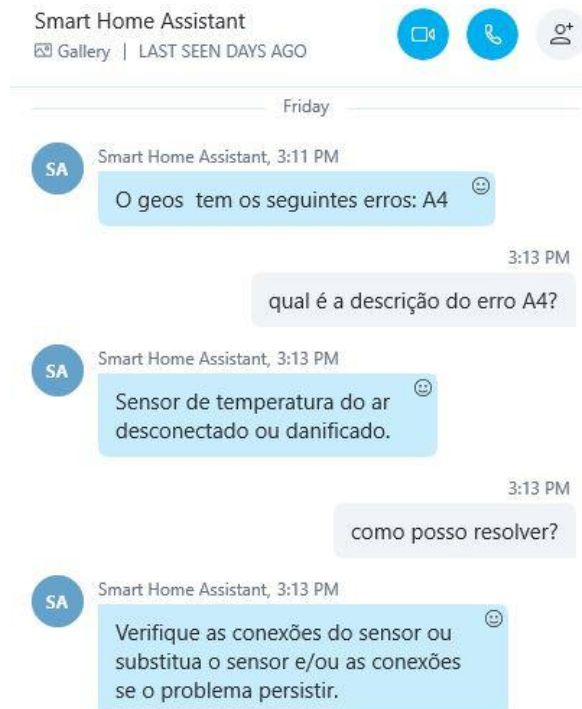
- Multimodal Interaction Support
- Information
- Control
- User and context



# Conversational Assistant (cont.)



- Chat with your Home in Skype
- Getting information
- Controlling



# Thanks for your Attention.

Future is anticipated Multimodal



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- Projects:
- Funding: FP7, AAL Joint Program, COMPETE, FEDER, QREN, FCT

