

Social Robotics – From Cognitive Science to Robots in the Real World

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Citec - Cluster of Excellence: A Threefold Mission

Technology:

Elevate the interaction with technical systems into the ease and naturalness of human communication

Scientific:

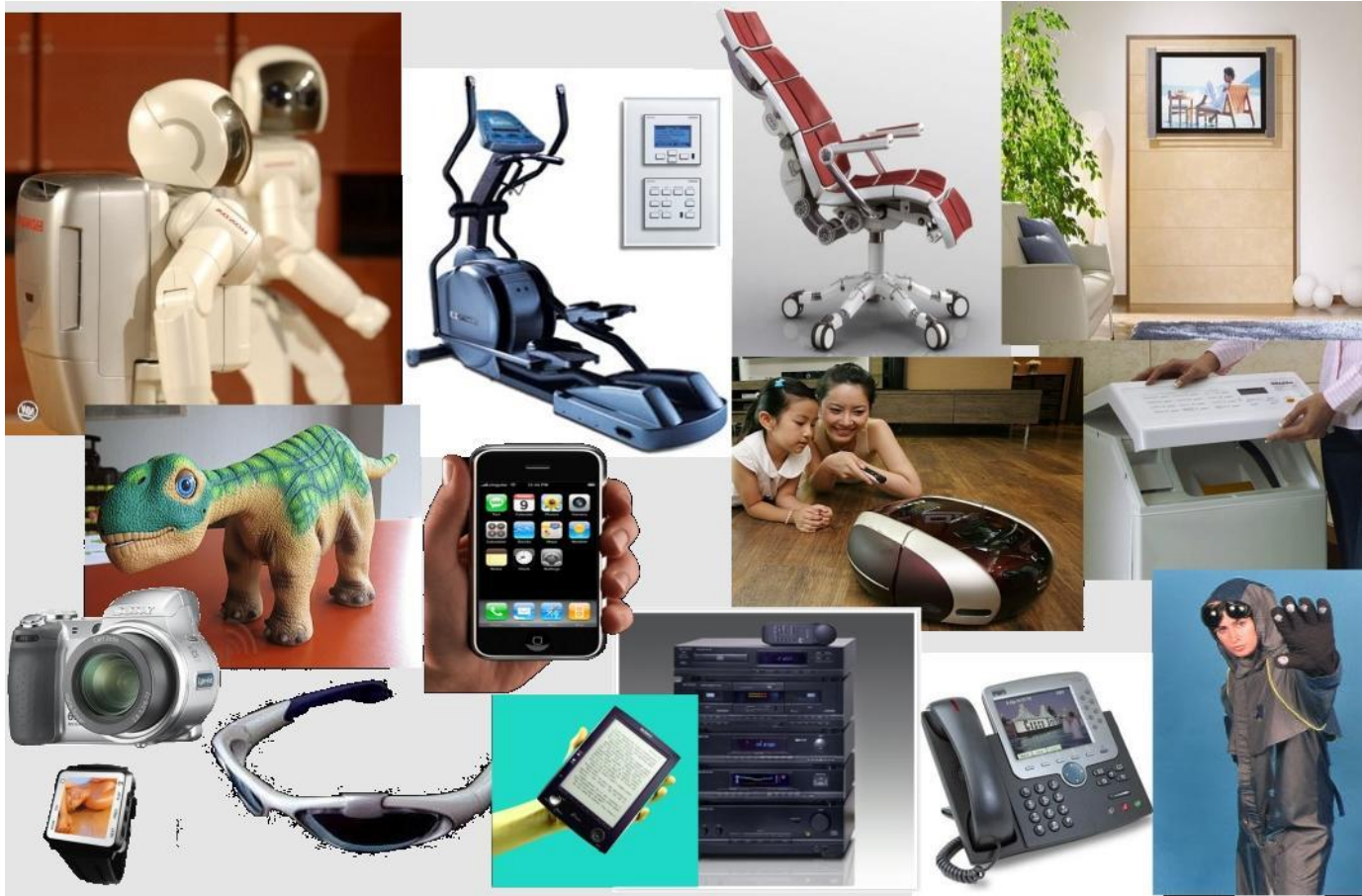
Gaining new insights into the principles and mechanisms of Cognitive Interaction

Bridge cultures:

Connect engineering and life sciences cultures to integrate technology into our daily lives

Cognitive Interaction Technology (CIT)

What is CIT useful for?



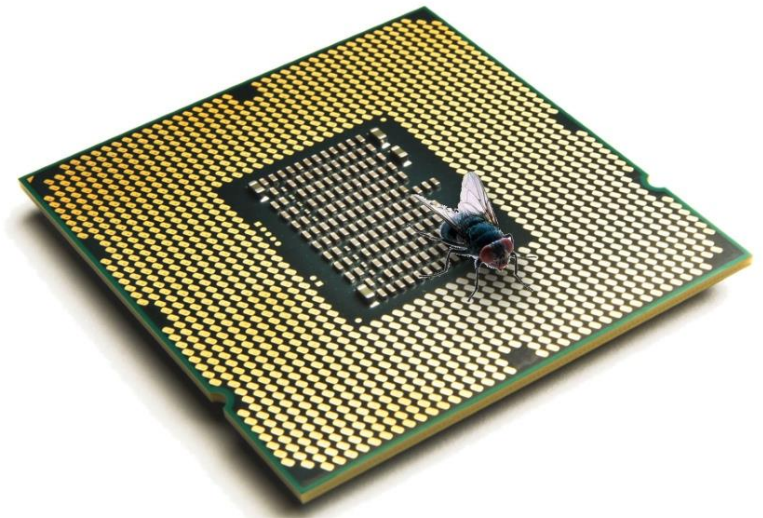
New Paradigm Leading into Second Funding Period (2012-2017)

Guiding Hypothesis:

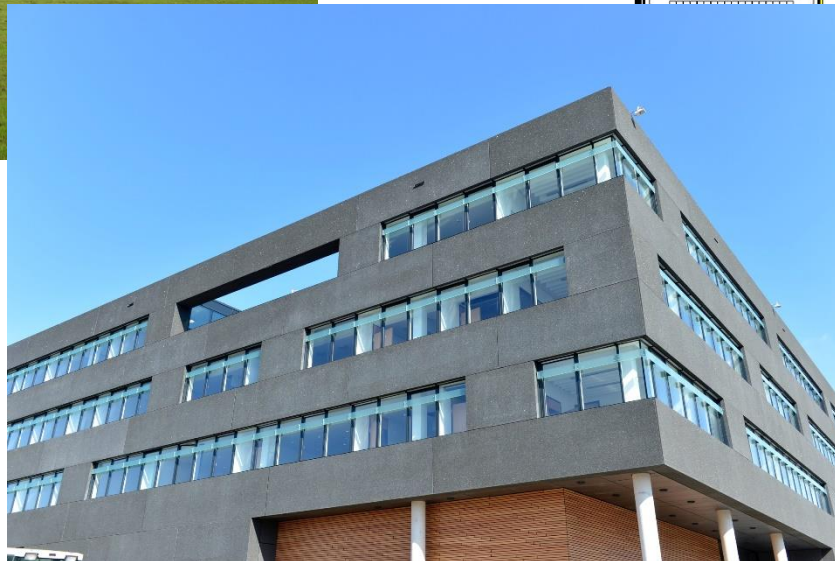
Cognitive Interaction Systems require **dynamic growth processes** instead of static construction from a "fixed blueprint"

Requires to gain **deep understanding** of:

- **Scaffolding mechanisms** to guide and focus growth
- **Adaptivity** to keep systems responsive to change
- **Resource sensitivity**: limitation of resources leads to optimal solution

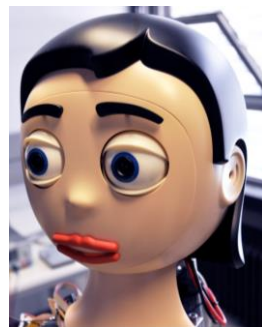
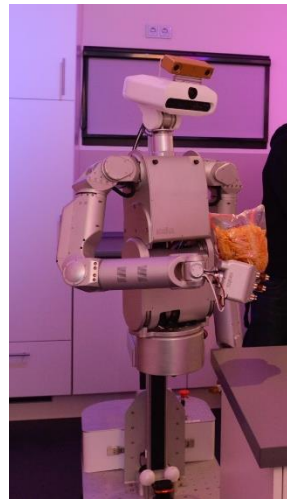


New Citec Building

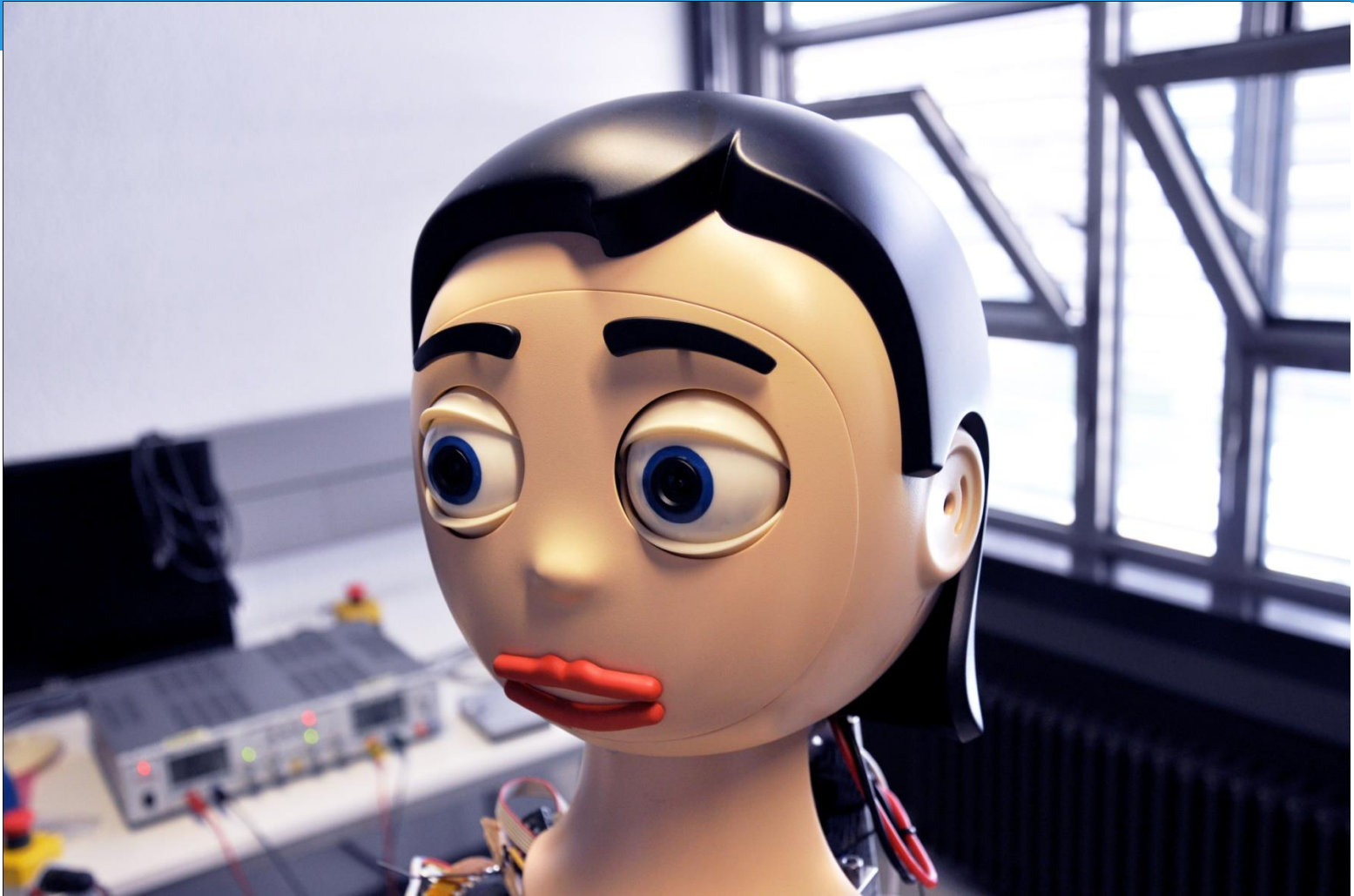


Robots at Citec

- Mekabot
- Biron
- Hector
- Flobi
- iCub
- Nao
- Shadow Hand

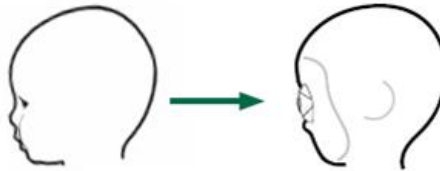


Flobi

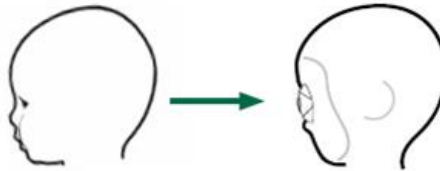


Flobi: Babyface Cues

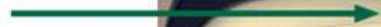
schematic drawing of a child



schematic drawing of Flobi



Curved forehead



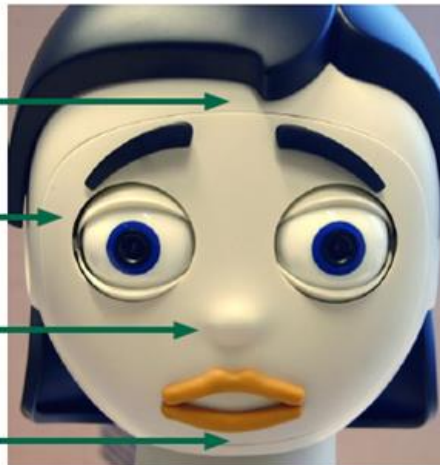
big, round eyes



small, short nose



Small chin



} Facial elements
(eyes, nose, mouth)
are located relatively low

Flobi: Demo Video

FloBi

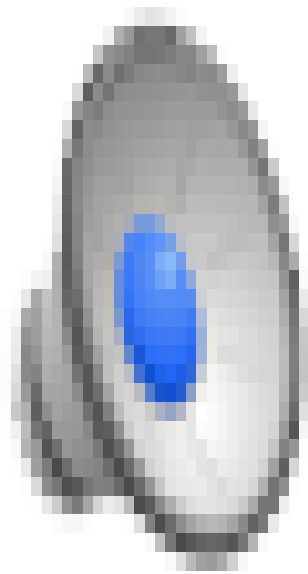
The Bielefeld Anthropomorphic Robot Head

Ingo Lütkebohle, Simon Schulz, Frank Hegel

Demovideo for ICRA'10 submission 1176

Example video from the pairs scenario

Flobi + Mekabot = Floka



SoziRob: Example video from the sports activity



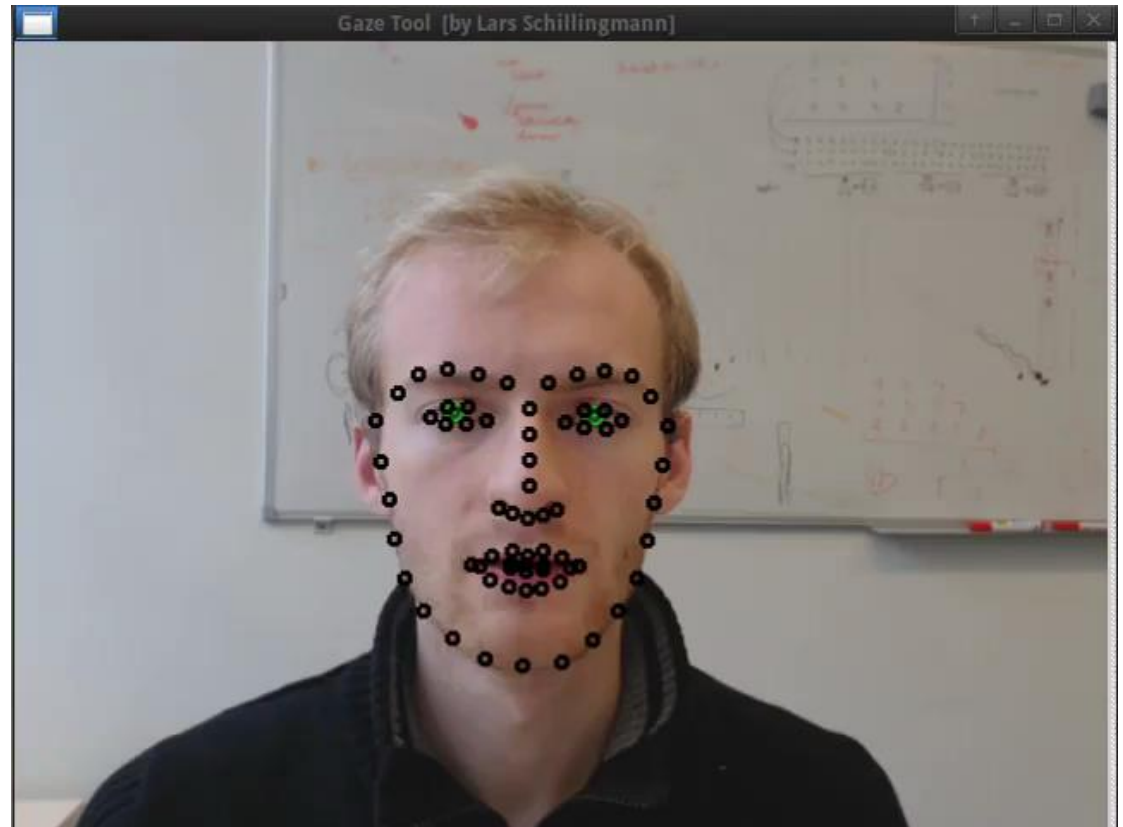
ToBI – Robocup Tournament Leipzig 2016



Art Guide Robot



Recognition of Socio-emotional Signals from Facial Expression -> Face Detection and Tracking of Facial Landmarks



-> Recognition of Head Pose and Head Gestures (nodding)

-> Gaze Recognition -> User Attention

Ludwigshafen

