ECHORD++

The European Coordination Hub for Open Robotics Development

CoCoMaps
(Collaborative Cognitive Maps)

Communicative Machines (CMLabs, UK)

Icelandic Institute for Intelligent Machines (IIIM)

Thor List, CMLabs

Ragnhildur Sigurðardóttir, IIIM

Brief Experiment Description

Collaborative Cognitive Map for multi-robot/multi-human cooperation

- Improve natural human-robot communication & collaboration

- Working together on task specification and completion

- Based on real-time dialogue skills

  - Cognitive model of turn-taking, knowledge and goals

  - Task-oriented coordination of multi-party task completion

- Using conversational dialogue to obtain and convey information
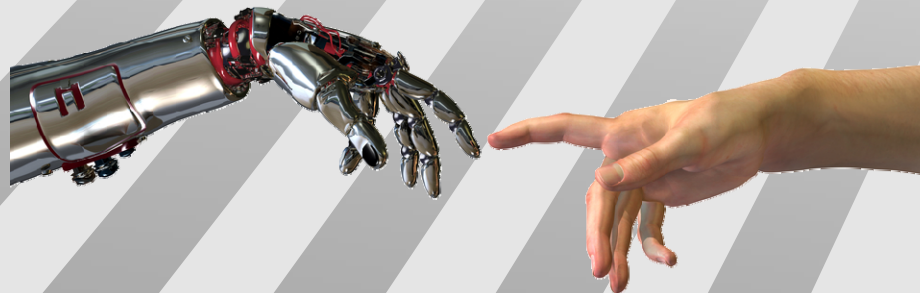
Novelty/Objectives

- Real-world robot-robot interaction using Collaborative Cognitive Maps
- 4-way interaction involving two robots and two humans
- Real-time task-oriented social interaction in a multi-robot, multi-human environment
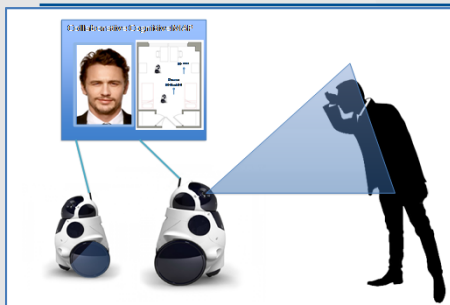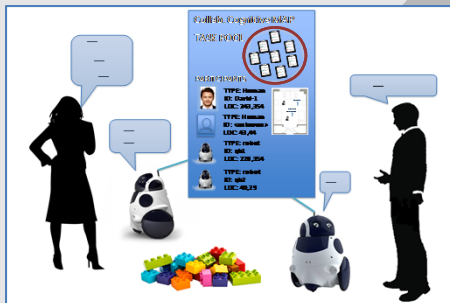

Objective 1: Collaborative Plan and Detect

– 2 robots collaborating on detecting and tracking humans in the scene
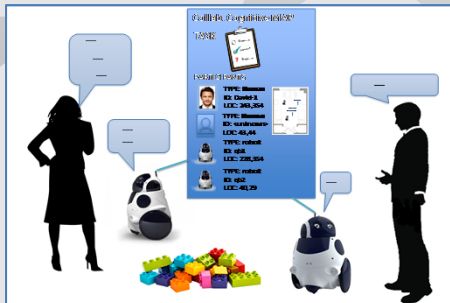
Objective 2: Collaborative Extract, Plan, Detect and Inform

*– 2 robots extracting information about known task from 2 humans*

Objective 3: Collaborative Extract, Plan, Execute and Inform

– 2 robots trying to identify a task from information from 2 humans

Impact

## Facilitate natural real-time multi-robot/multi-human collaboration for commercial use

- New principles enabling more practical development of tightly integrated systems

- Develop and apply engineering approaches for real-time requirements ensuring flexibility, robustness and scalability

- Contribute to systems that

  - interact with the world in real-time
  - capable of integrating multiple channels of data
  - adapt smoothly to varied requirements and data quality
  - in complex task-oriented contexts
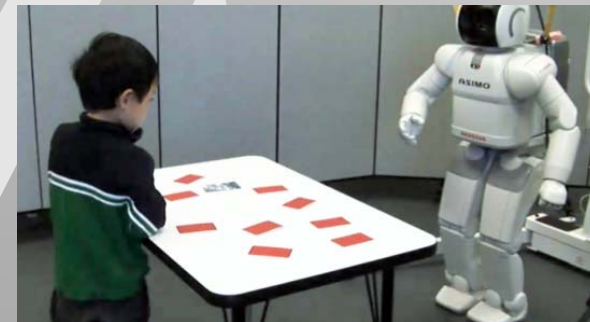
Partners & Technology

Communicative Machines (UK)

- Psyclone platform for AI

- Computer vision, social interaction, homeland security, biometrics

- ASIMO learning from interaction
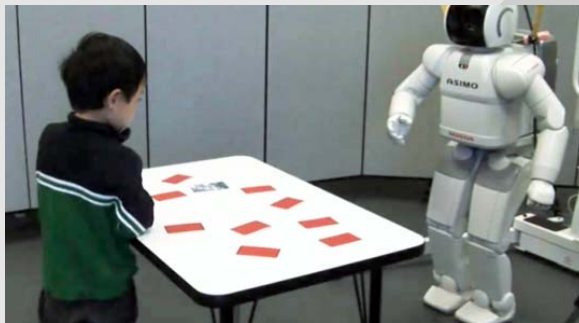
Icelandic Institute for Intelligent Machines

- Industry/academic technology transfer

- Gandalf - first fully-multimodal, embodied, situated real-time dialogue with artificial agent

- Multi-party natural dialogue system