ERF Workshop on

Robot's Social Intelligence and Natural Interaction Capabilities with End User Development

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Idea: Social robotics being a domain with multidisciplinary experts

Why not bring them together?

Unique workshop:

Session I: *Social Intelligence*
(Short Presentations: 30 min)

Session II: **Natural Interaction**
(Short Presentations: 30 min)

Session III: **End User Driven Development**
(Short Presentations: 30 min)

Session IV: **Geneal discussion and Q&A**
(with public participation: 25 min)

15 exciting presentations by speakers from 8 countries

On the Sociality of Social Robots: from a Sociology of Knowledge perspective; *Michaela Pfadenhauer*, Uni. of Vienna, Austria

Mind Reading for Robot's Social Intelligence; *Rachid Alami*, LAAS-CNRS, France

Cooperative learning for robot's social intelligence: a perspective from the iCub project; *Lorenzo Natale*, Italian Institute of Technology, Italy

Statements of interests and scope of Socially Intelligent Robots: from the perspective of SIRo-SA topic group of euRobotics; *Amit Kumar Pandey*, Aldebaran, France

Introductory remarks on the topic "Natural interaction with social robots"; *Agnieszka Wykowska*, LMU/TUM Munich, Germany, *Anna Esposito*, Seconda Università di Napoli, Italy

User involvement as key to success for natural HRI with social robots?; *Astrid Weiss*, TU Wien, Austria

Results of the first experimental loop in Robot-Era Project; *Filippo Cavallo*, Scuola Superiore Sant'Anna, Italy

Robot Social-Aware Navigation Framework to Accompany People walking Side-by-Side; *Alberto Sanfeliu Cortes*, Institut de Robòtica i Informàtica Industrial, Spain

Affective and social spoken interaction with robots: the challenges of the evaluation; *Laurence Devillers*, LIMSI/CNRS - Univ. Paris Sorbonne, France

<<TBA>>; *Andrea Bonarini*, Politecnico di Milano, Italy

End-User Design of a Robot's Dialogue Behavior; *Milan Gnjatović*, Megatrend Uni. and Uni. of Novi Sad, Serbia

End-User Development for social therapies; *Emilia Barakova*, Eindhoven Uni. of Technology, The Netherlands

Intuitive Interfaces for Creating Robot and Character Animation; *Katsu Yamane*, Disney research, USA

A Human-Centric API for Programming Socially Interactive Robots; *James P. Diprose* and *Bruce A. MacDonald, University of Auckland, New Zealand*

Tangible programming of robots for school children; *J. Terken* and *T. Van den Gurp*, Eindhoven Univ. of Technology, The Netherlands

The **precautionary measures** are:

Speakers: ***Please Introduce yourself*** and Please ***respect your alloted time slot***

Audience: Please ***keep your questions for the general discussion*** at the end of session III.
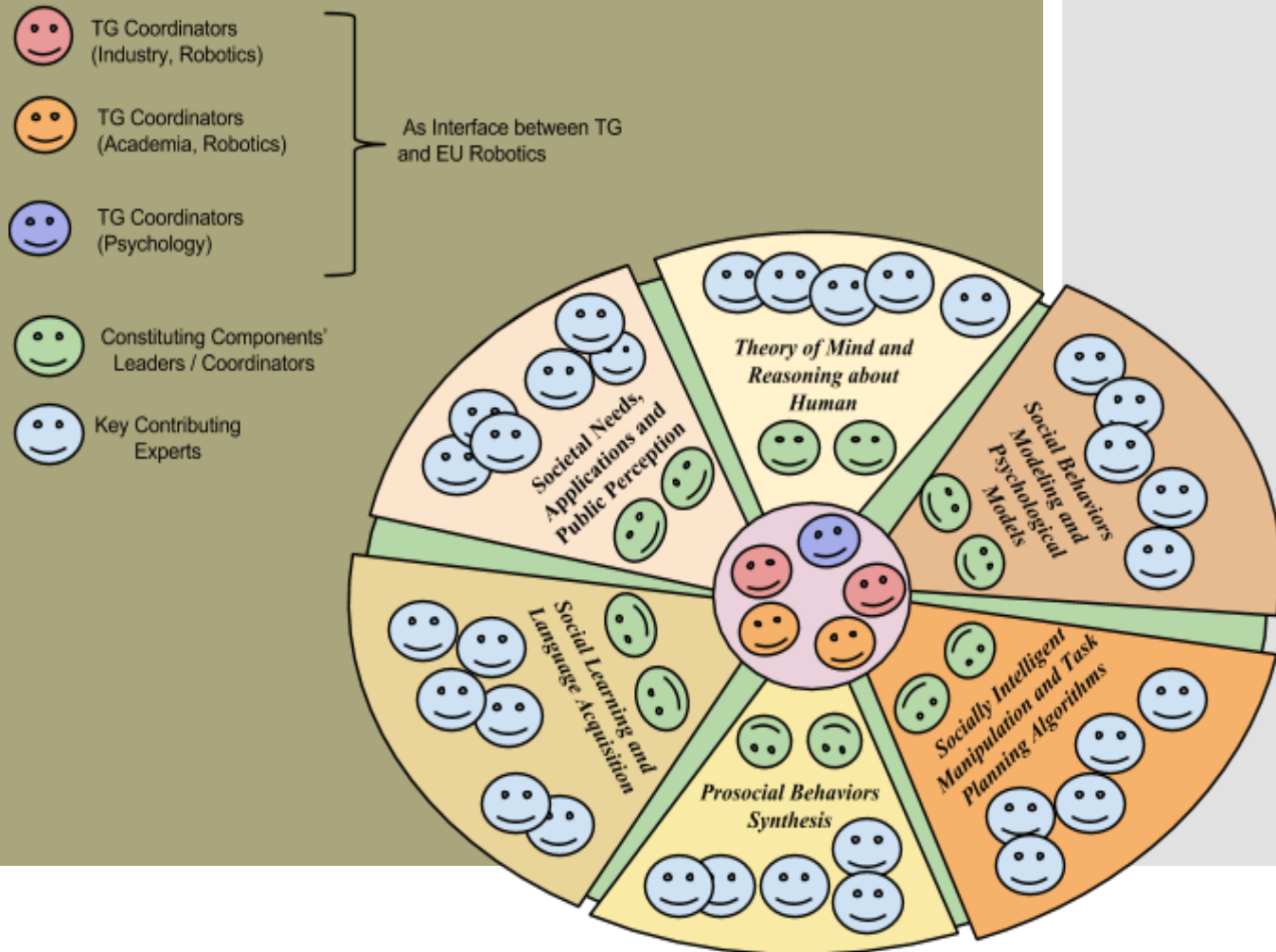
WARNING:

Statements of interests and scope of Socially Intelligent Robots: from the perspective of SIRo-SA topic group of euRobotics

Amit Kumar Pandey,
Chief Scientist
Aldebaran Robotics (SoftBank Group)
France

A topic group of euRobotics.
Current Exploration dimensions:

TG Coordinators
(Industry, Robotics)

TG Coordinators
(Academia, Robotics)

TG Coordinators
(Psychology)

As Interface between TG
and EU Robotics

Constituting Components'
Leaders / Coordinators

Key Contributing
Experts

Theory of Mind and
Reasoning about
Human

Societal Needs,
Applications and
Public Perception

Social Behaviors
Modeling and
Psychological
Models

Social Learning and
Language Acquisition

Socially Intelligent
Manipulation and Task
Planning Algorithms

Prosocial Behaviors
Synthesis

Bottom Up Development of Robots Social Intelligence

- To facilitate open ended development

- Identify the basic blocks from psychology

- Identify and address R&D challenges for embodiment in robots

- E.g.
Perspective Taking + Affordance + Effort = elevated robot's human-aware reasoning capabilities

- *Incorporate* with higher level mechanisms of *social learning* for:
- *task semantics*, *action possibilities*, *proactivity*, *grounding*, *cooperation*, etc.

http://fr.linkedin.com/in/amitkrpandey
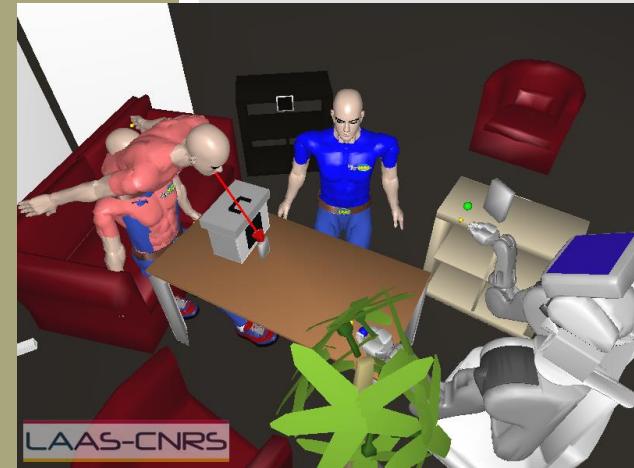
Amit Kumar Pandey, A-Lab, Aldebaran SoftBank Group, Paris, France

Socially Intelligent Manipulation, planning and learning

- *Semantic perception of objects and learning from human activities*

- *Application: object handover, task learning from demonstration*

- Approach: range sensing, *advanced user interaction modalities like haptic augmented reality*, active robot exploration of the environment

http://rimlab.ce.unipr.it/Aleotti.html

Jacopo Aleotti, University of Parma, Italy
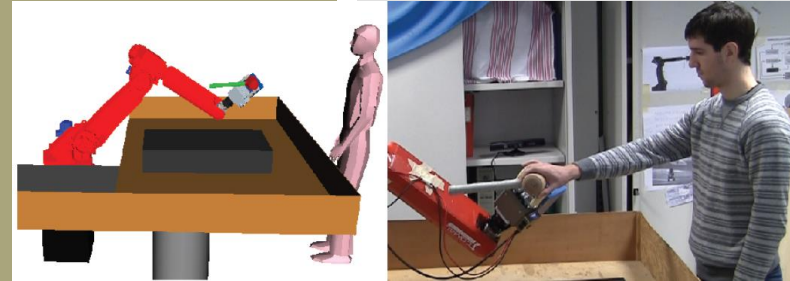
- Creative *multidisciplinary approach*:
  Clinical psychology, Social psychology,
  Psychoanalysis, Philosophy

- *Ethics* of autonomous agents

- Affect & Motion (qualitative & quantitative
  analysis) with and for Social Robots

- Affect, Social Acceptance & Motivation

http://fr.linkedin.com/in/rittabaddoura

Ritta Baddoura, Institut Mines-Télécom

Real-time measurement of sensorimotor communication flow

- sensorimotor implicit communication to synchronize multi-agent behavior

- Based on *Motion capture and computational tools* for quantification of information flow in complex scenarios [1]

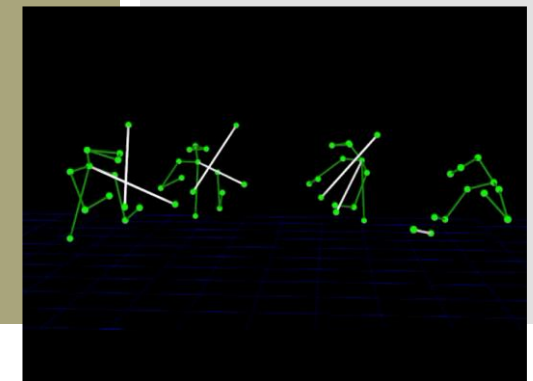- *Situation Understanding*, *modeling of Complex group Behaviors*, *Synthesis of Prosocial Behaviors*

Orchestras are the perfect example of group sensorimotor coordination [2]

[1] D'Ausilio, et al., (2012) Leadership in Orchestra Emerges from the Causal Relationships of Movement Kinematics. **PLoS ONE** 7(5), e35757.
[2] D'Ausilio, et al., (2015) What can music tell us about social interaction? **Trends Cogn Sci** 19(3), 111-114.

Quartet Body Motion Capture

Alessandro D'Ausilio
Italian Institute of Technology

Social Robots from a Human Perspective

- The creation and *shaping of social robots*: by human users

- Motivated by examining the management of social and individual *interaction of everyday normative practices and machines*, such as *mobile communications devices*

www.surrey.ac.uk/dwrc

Jointly Edited Publications :
http://www.springer.com/engineering/robotics/book/978-3-319-15671-2; Social Robots from a Human Perspective (forthcoming) Vincent J., Taipale S., Sapio B., Lugano G., Fortunati L. (eds.) Springer
http://www.fus.edu/intervalla/ Intervalla Journal (2013) with Satomi Sugiyama (eds.)

Jane Vincent

Visiting Fellow London School of Economics and Politics Science.
Visiting Fellow Digital World Research Centre University of Surrey

Socially Intelligent Task planning Keeping Human in the Loop

● Combining _symbolic (task) planning_ with _geometric reasoning_

● _Results in a shared plan_ **(involving human and the robot**) for a goal (e.g. let us clean the table) that works in the real world!

●Performance and practicality issues

●Context: _Robot as co-worker_, _Human-Robot collaborative manipulation_

Lavindra de Silva   The University of Nottingham
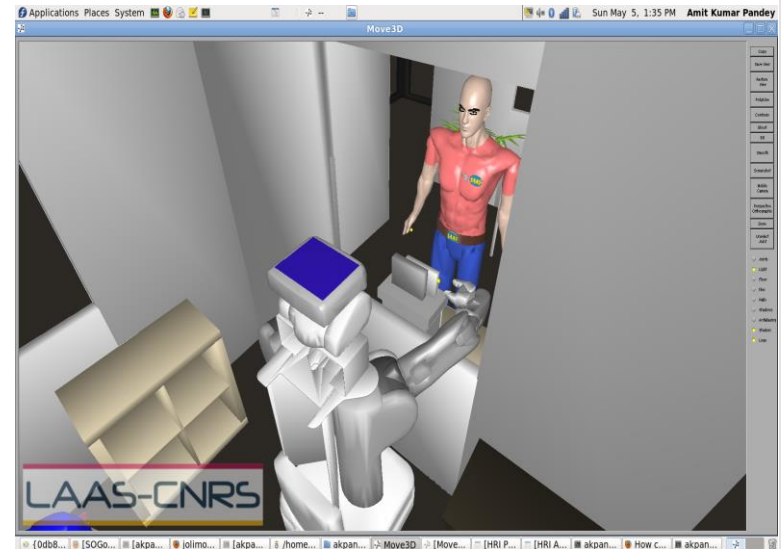
Face-to-face conversation with socially intelligent robots

- *Face-to-face conversation + Social Intelligence*

- **Implement** models of robot communication *based on observations of human behaviour*, and **validate** the models through interactions with humans in real-world settings

- Involves Theory of Mind and Situation Understanding; Multi-Modal Complex Social Behaviors Modeling

http://maryellenfoster.co.uk/

"Last Conversation Piece" by flickr user **nostri-imago**, licensed under CC BY 2.0

Dr Mary Ellen Foster, Heriot-Watt University

(Proactively) Acting with humans

- How can robots *support humans proactively*.

- Users don't have to adapt to the machine

- Focusing on *understanding of human activities* (in a kitchen), *human-aware navigation and action planning*

www.hci.uni-tuebingen.de

Alexandra Kirsch, University of Tübingen

Social robots and mobile ICTs in everyday life

- ***Social science + communication and media studies + robotic functions = social robots as media***

- Studying _Relationship between machines and humans_, automation of various aspects of "being human" (e.g., emotions, taste, sociality, etc.)

- Examining robotic functions that are increasingly incorporated into our everyday life in overt and covert ways

- Focusing on _societal need, application, and public perception_

http://www.fus.edu/intervalla/
Social Robots and Emotions: Transcending the Boundary between Humans and ICTs, co-edited with J. Vincent (publication based on an exploratory workshop among scholars of mobile ICTs, 2013)
http://link.springer.com/article/10.1007/s12369-015-0283-1
Recent publication in International Journal of Social Robotics "The Automation of Taste: A Theoretical Exploration of Mobile ICTs and Social Robots in the Context of Music Consumption" co-authored with N. Barile, 2015

Satomi Sugiyama, Associate Professor,
Communication and Media Studies, Franklin University Switzerland

Sociatel needs, attitudes and policies for social robots

- Exploring the (supposed) friction between *the high societal need for social robots* and *people's un/willingness to accept social robots*.

- Understanding *how social robots enter into the domestic sphere* (full-fledged robots right off or ICTs gaining increasingly robotic features first)

- Studying *which social groups are readiest to adopt social robots*

- to *politically and publicly support people's engagement with social robots* (cf. ICT programmes in the EU in 1990s/2000s.)
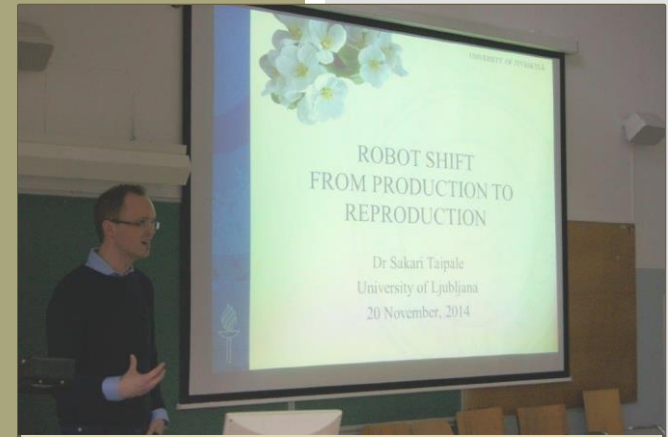
Forthcoming in Autumn 2015!

Jane Vincent, Sakari Taipale, Bartolomeo Sapio, Giuseppe Lugano, & Leopoldina Fortunati (eds.) **Social Robots from a Human Perspective.** Springer.

Dr Sakari Taipale, Univeristy of Jyväskylä, Finland

ASK NAO: A platform for societal application of Socially Intelligent Robots

- *Interactive, educational web interface and customized NAO applications to engage children with autism*

- Enhanced by NAO's cartoony humanoid shape and non-judgemental, tireless, predictable behaviour.

- *Incorporates basic theory of mind, task planning, turn-taking...*

https://asknao.aldebaran.com/

Céline Boudier, Aldebaran

Development of clinically relevant interactive capacities

- Autonomous robots (with psychotherapist supervision), assist the therapist in teaching the child.

- Exploring ethical guidelines for deployment of robot-enhanced therapy.

- Fusing turn-taking, imitation, joint attention, Multi-sensory data and interpretation for diagnostic support.

- EC-funded DREAM project (-> 2020).

http://dream2020.eu/

Rodolphe Gelin, Aldebaran

Cognitive processes underlying Human-Human action coordination

- What *cognitive processes influence and establish coordination between two or more human or non-human interaction* partners?

- Controlled *behavioral experiments with human subjects*

- Serves for <u>action planning and prediction</u>, movement adaptation, non-verbal communication, *joint task representation*, synchronization, intentional/unintentional *coordination*


https://sites.google.com/site/cordulavesper/
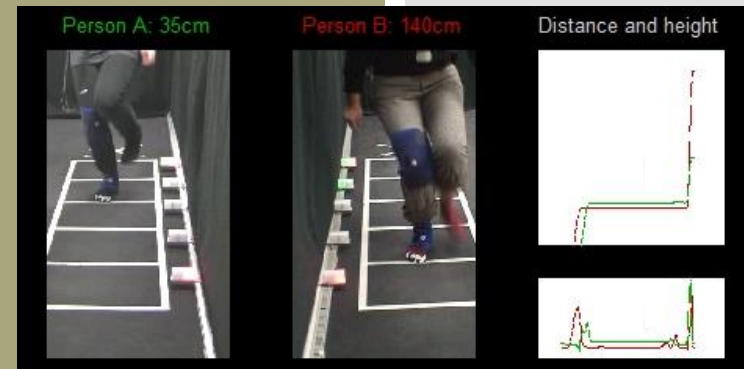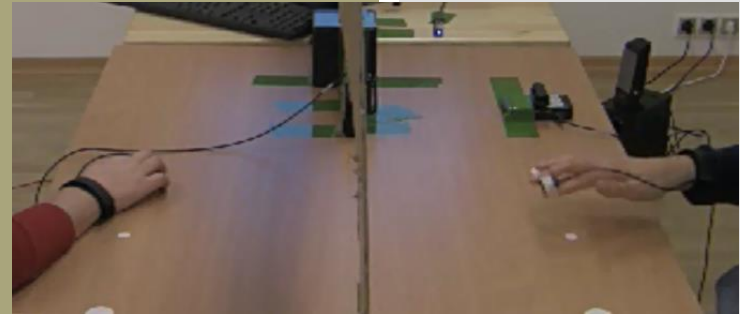
Cordula Vesper
Department of Cognitive Science, Central European University, Budapest

# Learning from Interaction in Human-Robot Collaboration

- *Social Learning* with Active engagement of teacher and learners

- with *multiple types of information exchange* (demonstrations, feedback, queries, …)

- *Curiosity and active multi-task learning from demonstration for Socially Intelligent Manipulation and Task Planning and Prosocial Behaviors Synthesis*…

http://3rdhandrobot.eu/
http://flowers.inria.fr

Manuel Lopes, Inria
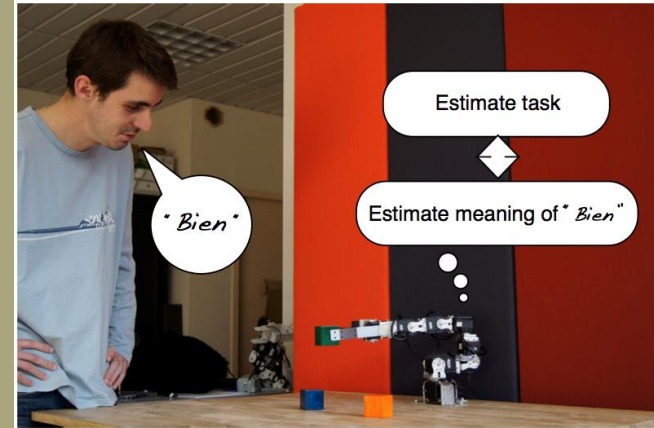
Affective and social dimensions in spoken interactions with humanoid robots

- *Towards build a relationship between human and robot*

- Creating *a generic intelligent user interface* providing a multimodal dialogue system with social communication skills including humor, empathy, compassion, emotion.

- *Dynamic user profile* using personality and interaction dimensions (extrovertion, emotionality,..),
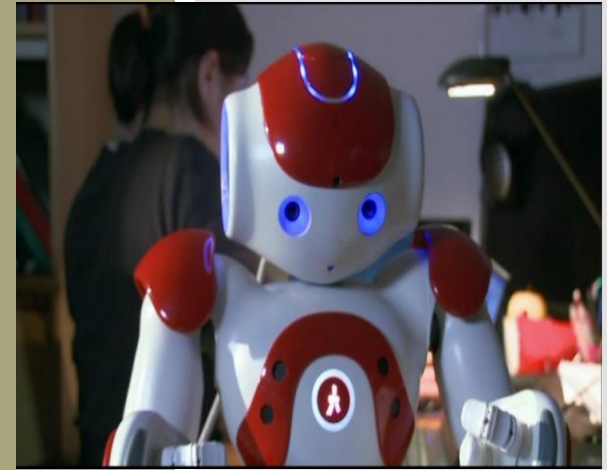
- French ROMEO2 2012-15 : Social interaction with Robot: application for dependent people and elderly but also children
- EU CHISTERA JOKER ..2014-117 : Explore advanced dialogue involving complex social behaviors such as humor

Laurence Devillers – LIMSI-CNRS Paris-Sorbonne IV

Discussion Session:

- Any question on the presentations?

- Any comment/view on Social Robots within (and beyond) the scope of today's workshop?

- Any aspect which the Topic Groups of Natural Interaction with Social Robot and Socially Intelligent Robots and Societal Application should take into account?

- Any aspect the euRobotics and its Multi-Annual Roadmap should consider about social robotics?

- …