

# Workshop on Interdisciplinary Methods for Therapeutic and Diagnostic Human Robot Interaction

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ERF 2016 - Ljubljana 23 March 2016

# Agenda of the workshop

- ▶ 10.45 - 10.55 Agnieszka Wykowska, Technische Universität München and Luleå University of Technology, "Objective methods of social cognitive neuroscience for robots better tuned to the workings of the human brain"
- ▶ 10.55 - 11.10 Hagen Lehmann, Istituto Italiano di Tecnologia, "Interdisciplinary robot assisted ASD Therapy: The application of humanoid robots in interaction games"
- ▶ 11.10 - 11.25 Andras Lorincz, Eotvos Lorand University, "Personalization as smart tool based co-annotated self-tracking"
- ▶ 11.25 - 11.40 David Vagni, Spazio Asperger, "Use and perception of humanoid robots for Autism Therapy"
- ▶ 11.40 - 11.55 Marta Capiluppi, University of Verona, "New challenges for robotics in therapy and diagnosis of cognitive impairments"
- ▶ 11:55 - 12:15 Round Table Discussion on possibilities for the application of robotic in therapy and diagnosis of different cognitive impairments

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and Diagnostic Human Robot Interaction

# New challenges for robotics in therapy and diagnosis of cognitive impairments

**Marta Capiluppi**  
University of Verona

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# Robot companion and robotic therapy

- ▶ What's the difference?



Pepper - Aldebaran



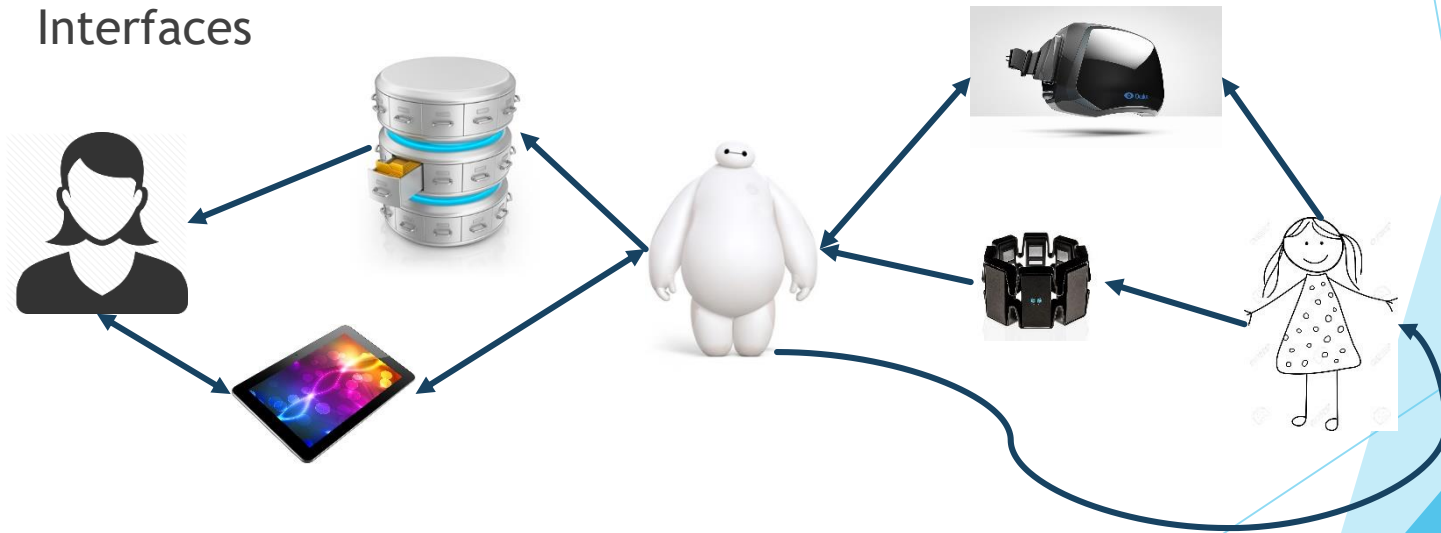
Baymax - Big Hero 6



# Therapy vs Diagnosis

- ▶ Does robotic therapy help diagnosis?
- ▶ Early diagnosis:  
in autism eye gaze and repeatability (for example)
- ▶ Do we need extra devices?
- ▶ Wearable devices
- ▶ Cloud data collection and sharing
- ▶ Interfaces

Physical  
rehab/help



# Is there anything new?

## Applications

- ▶ Autism
- ▶ Dementia
- ▶ Stroke

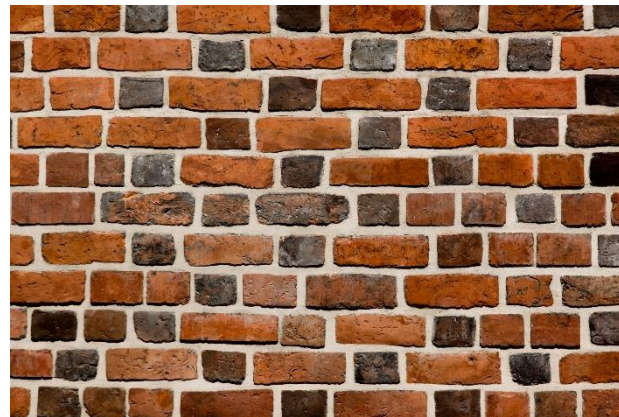
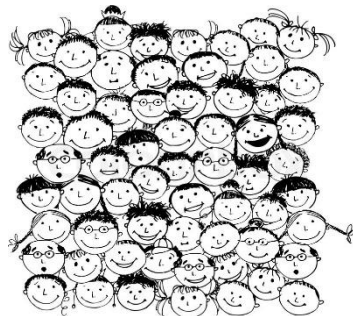
## New areas:

- ▶ depression,
- ▶ obesity/anorexia (food problems),
- ▶ criminal minds?

**IoT:** robots can connect to other devices!

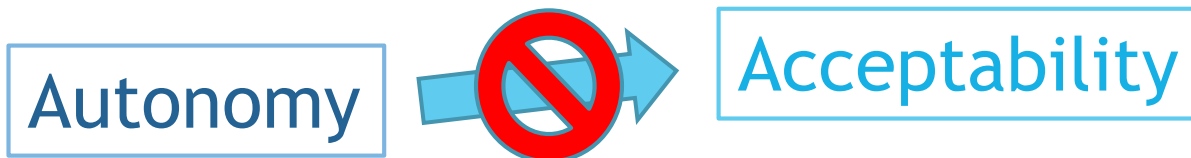
# Barriers

- ▶ **Acceptability:** usefulness, pleasure of interaction, safety, cost...
  - ▶ In personal robotics the researcher is developing the final product: task analysis, industrial design, reliability, safety must be included in the design phase
  - ▶ Success of personal robots: user-based criteria
- ▶ **Regulations**
- ▶ **Training** of the experts and families
- ▶ **Safety/security**



# Autonomy?

- ▶ Teleoperated
- ▶ Semi-autonomous
- ▶ Autonomous
- ▶ Autonomy? In which context? Repetition vs interaction (with humans) modular autonomy?





# Appearance

- ▶ Humanoid
- ▶ Animal
- ▶ Mascot
- ▶ Smart Toys (e.g. mobile robots, cars, balls)



NAO - Aldebaran



KASPAR



PARO



Pekee - Wany Robotics



RoBall

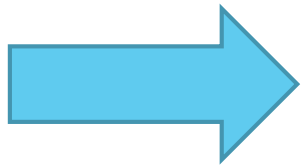
# End-Users perspective

- ▶ Lack of measures for clinical evidence
- ▶ Can protocols used for standard therapy/diagnosis be used for the robotic ones?
- ▶ Adaptation of therapies => difficult to make comparison
- ▶ Which experiments?
- ▶ Where?

Companies involvement?

# Technologies?

- ▶ Human-robot interaction (collaboration?)
- ▶ Cognition
- ▶ Perception
- ▶ (Mechatronics, Navigation)



- ▶ Natural language and interaction
- ▶ Understanding emotions and intentions
- ▶ Interpreting users needs

- ▶ Speech and tone recognition
- ▶ Fusion of information
- ▶ Virtual/Augmented reality
- ▶ ...

