



 POLITECNICO DI MILANO



Artificial Intelligence and Robotics Lab



 Non-verbal affective expression and intrinsic adaptation as keys for successful interaction with low-cost robots

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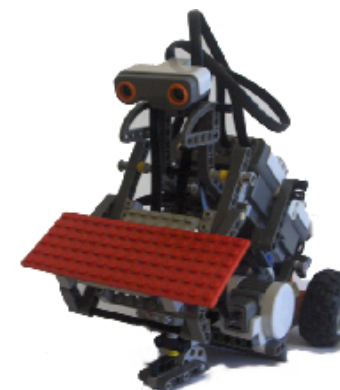
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# Applications for low cost robots only

Many applications would find their way to the market **only** with **low-cost robots**

- Toys and games
- Rehabilitation
- Social robots
- Appliances and objects



# Interaction with low cost robots

Most of the mentioned applications would benefit of emotional interaction

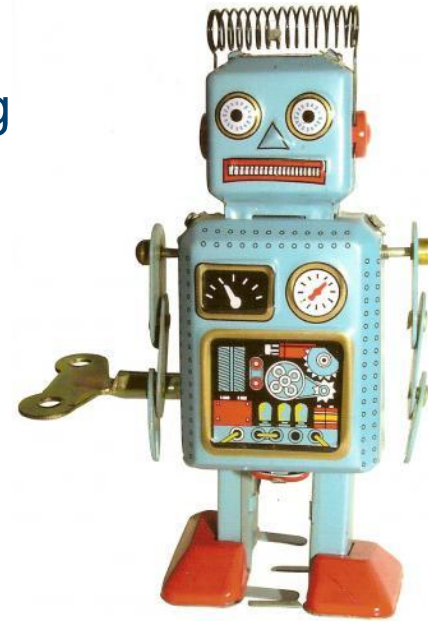
- acceptance
- goal achievement
- effectiveness
- ...



# Low-cost robots have to be cheap

## Low computational power

- no or poor natural language understanding
- no or poor image interpretation
- ...



# Exploitation of basic means

...possibly already on board

Most of the emotional communication goes through body language

- shape
- movement
  - what: body parts, body, mimicking humans/pets
  - how: rhythm, speed, acceleration (Laban)
  - when: choice of the right moment
  - why: right expression for the context, clearly recognizable

Sounds

▪...

Lights

▪...

## An example

Teo, a robot for playing with children with different abilities



# Intrinsic adaptation

Learning and adaptation might be hard tasks

In some situations it might be possible to obtain intrinsic adaptation, by designing interaction variability on features that could be detected online: speed, distance, rhythm, repeated actions...

E.g., the drone in Jedi Trainer can be more or less nervous just by reaction to the movements of the user



## Other ongoing activities

- **Robogames** - either direct interaction (Jedi Trainer, BasketBot, ...) or mediated by a robotic avatar (Robotower, Pac-Bot, Drone Laser Game, ...)
- **Robot actor** - the emotion is given, but expressed with different bodies: what are the basics of emotion expression?
- **Concierge** – a head checking people in front of a door, a set of heads, each with its own character, animating a passage
- **Objects** with a character – a naughty fan, an emotional jacket, a gruff gorilla, a cheerful trash bin, ...

