

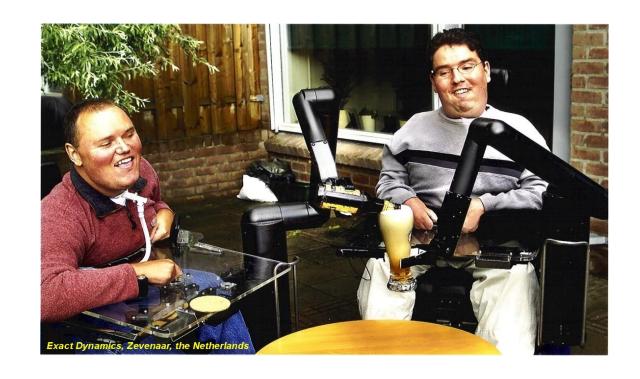
ROBOTICS FOR CHILD HEALTH AND CARE: current practice and future perspectives

The Hague University of Applied Sciences, The Netherlands

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This presentation

- What is a robot and why are they interesting for health and care?
- What can robots do in health and care?
- How are they currently being used in child health and care?
- Some examples of promising applications
- The future potential: where will it go?





What is a robot?

Sensors
Actuators
Intelligence
Embodiment
Force or movement

Autonomy





Strong sides of robots

- Exert force
- Repetitive tasks
- 24 hours a day (if power allows)
- Impersonal assistance
- Continuous care
- 'Intelligence'
- Customizable, personalisation, programmable
- Can be embedded in a 'smart' environment



ROBOTS Our typical views





















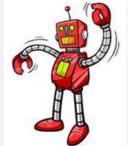












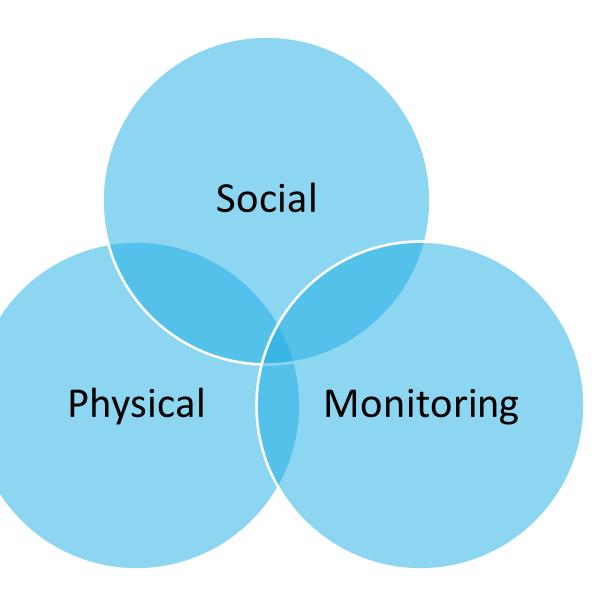






Robots in healthcare: potential roles

- Nursing tasks
- Companionship
- Physical assistance
- Surgical/therapeutic procedures
- Training/rehabilitation
- Monitoring
- Reminders, day structure etc.
- Intermediary role
- •





Robots in child health and care: current status

- Examples of promising applications in almost all roles mentioned
- Strong emphasis on social robots
 - Companionship
 - Communication
 - Information / teaching assistance
 - Leisure and play
 - Training / support with activities
 - Day structure support
- Only very few applications in actual use: mostly only studies/pilots



An example: children with autism



- Simple, predictable, safe
- Experience with a robot can be less complex and intimidating
- Intrinsic appeal and motivation for technology
- Robots enable embodied (social) interaction
- Robots can offer individualised care for specific child's needs





An example: play for children with physical disabilities





Playing for children who cannot participate in 'normal' play with peers

Simple individual or group Games

Setting: rehabilitation, school











An example: managing anxiety in the hospital



Miro

Pepper



Reducing negative emotions in children using social robots: systematic review

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Background For many children, visiting the hospital can lead to a state of increased anxiety. Social robots are being explored as a possible tool to reduce anxiety and distress in children attending a clinical or hospital environment. Social robots are designed to communicate and interact through movement, music and speech. **Objective** This systematic review aims at assessing the current evidence on the types of social robots used and their impact on children's anxiety or distress levels when visiting the hospital for outpatient appointments or

Methods Databases such as MEDLINE, PubMed, IEEE planned admissions. Xplore, Web of Science, PsychINFO and Google Scholar were queried for papers published between January 2009 and August 2020 reporting the use of social robots interacting with children in hospital or clinical

Posults A total of 10 studies were located and sees these 10 studies, 7 different types of and distress were found to and with a social

What is already known on this topic?

- Social robots have a positive impact on supporting an ageing population with dementia.
- Socially interactive robots have proven to be a useful tool when conducting therapy in children with autism.

What does this study add?

- ► Compiles published studies on the use of social robots in clinical and hospital environments, showing their potential to reduce anxiety and distress in children undergoing painful and distressing procedures.
- ➤ A variety of social robots exists with different functionalities.
- ► Further and more in-depth research is require to understand the role of social robots in paediatric healthcare.

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Some More examples



Future potential

- There is a massive amount of R&D in this field
- Robots are rapidly becoming smarter:
 - More adaptable, able to recognise people, adapting their behaviour
 - Able to recognise emotions
 - Learning faster, connected to the environment and using large language AI models etc.
 - Speaking different languages
 - etc......
- Most promising fields: information / education support / companionship / monitoring / supporting day structure / remote care / social contact
- Go for it! Robots are there and can be of great help

