

# Machine Ethics in Health Care

Öffentliche Sitzung der Bioethikkommission:  
„Von Mensch und Maschine: Roboter in der Pflege“

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# Thinking about machines

## Philosophy

### — Philosophy of Technology

- Thinking about our relation to technology
- Ethical questions
  - MACHINE ETHICS, ROBOT ETHICS
    - » Health Care

## **IMAGES AND VISIONS**

- The future of health care: doom scenarios and fantasies

## **ARGUMENTS AND ASSUMPTIONS**

- Machine ethics: good care with machines as artificial agents?

## **OBSERVATIONS AND INTERPRETATIONS**

- Thinking about cyborgs, engagement, the social and modernity, economy, culture

# IMAGES AND VISIONS

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## **Polarization in the public imagination:**

- Technology optimists: technology as a „technology fix“ for problems such as ageing of the population
- Technology pessimists: doom scenarios

## **Need to go beyond this polarization:**

- What kind of machines have what kind of effects on the practice and values of health care?

## The future of robotics in health care:

- Public imagination, needs to be taken seriously; analyze emotions – important to know the values
- Fear: hospitals and homes for the elderly without human care givers
- Assumption that “care” and “technology” don’t go together very well:
  - Care = attention, love, empathy, personal, human
  - Technology = efficiency, distance, not personal
- But will robots replace human care givers?

# Just wait?

**Lessons from the introduction of other technologies:  
First a lot of fear, then integration in lifeworld?**

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# New technologies

## ... and new practices:

- Robot assisted surgery
- Telemedicine
- Assisted living: assist patients with eating, walking etc.
- Robots that monitor elderly people
- Robotic companions
- Robot assisted therapy (cognitive but also physical)



## Scenarios can be helpful:

- They can reveal our values, what we really care about, what we think is important in health care

## e.g. Story about robot dog

- Coeckelbergh, M. 2012. "How I learned to Love the Robot": Capabilities, Information Technologies, and Elderly Care. In: Oosterlaken, I. and van den Hoven, J (eds.) The Capability Approach, Technology and Design. Dordrecht: Springer, 77-86.

**Note: the elderly people of the future are *we*, the digital natives or habitual users of digital technologies, not our grandparents**

# ARGUMENTS AND ASSUMPTIONS

**Beyond Science Fiction:**

**Some questions and concerns relevant to the near  
future of health care**

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## Replacement and its implications for labour

- Presented as response to demographic challenges
- But is that the problem?
- Is robotics really a threat to employment?
- What are the consequences for health care work?
  - Do robots threaten ‘care craftsmanship’? (Coeckelbergh 2013)

## Replacement and the quality of care

- De-humanization and “cold” care
- Could robots ever be empathic? Could they ever have feelings?
- Does machine care lead to abandonment of children, sick and elderly?

## Autonomy (technical)

- Even if robots do not replace human care workers, how autonomous should they be?
- What does autonomy mean in context?
- What exactly should the robot (not) do, what should be left to humans?
- Should robots be supervised?
  - E.g.: therapy without direct human intervention? (Coeckelbergh et al. 2015)

# Ethical concerns

## Roles and tasks

- If humans and robots part of care process, which tasks should be delegated to robots?

## Moral agency

- Do robots have capacity of moral reasoning?
- Can robots deal with ethically problematic situations?
- Problem: gap between increasing autonomy (in the sense of doing tasks by itself, without direct human intervention) and no capacity of moral agency
- Some propose building-in capacity for moral reasoning, others think this is not possible or insufficient for dealing with complex ethical issues in health care

# Ethical concerns

## Responsibility

- If robot takes over human tasks, who is responsible? Human? Robot? Both? None?



## Deception

- Social roles
- “Pretending” to be pet or companion, “faking” to give care or need care
- Justifiable? (see Coeckelbergh 2012, Sparrow & Sparrow 2006)

## Privacy and data protection

- Which data are collected?
- How are the data collected?
- How are the data stored?
- Who has access to the data?
- Who owns the data?
- What happens to the data after the project?
- Etc.

# Ethical concerns

## **Safety and avoidance of harm**

- Robots should not harm people
- Robots should be safe to work with

# Main question in this talk

**Is it acceptable and good to use machines in health care?**

- Robots
- Other artificial agents

**To evaluate the introduction of new technologies in health care  
we need to first think about  
what we mean by good health care.**

# Approach: Good health care

**Articulate criteria of good care, then apply to machines**

**Reflect on machines and health care in societal and cultural context**

- Science-fiction
- Financial issues
- Modernity

## Good Care

- Involves significant amount of human contact
- Not only physical care but also psychological (emotional) and relational dimensions (e.g. talk with patient part of it)
- Not only professional care, also involve relatives, friends, loved ones
- Not only experienced as burden but also meaningful and valuable
- Involves skilled engagement with patient (know-how) next to formal forms of expertise

# Good health care: Criteria

## Good Care

- Requires organizational context in which there are limits to division of labour in order to meet previous criteria
- Requires organizational context in which financial-economic considerations are not the only or not even main criterion in organization of care
- Requires that patient accepts some degree of vulnerability and dependency on others

# Enter the machines

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# Different human-tech relations

## **Tool for humans to use**

- A hammer, surgical instruments, bed

## **Artificial agents that do things on their own, without direct human involvement**

- Robot pet, robot that brings your medicine

## **Hybrid human/non-humans, cyborg relation**

- Pilot/autopilot, surgeon/robot, patient/machine

## If human contact necessary and if emotional and relational contact necessary, then

- Not only machines
- Not acceptable if machines take over this “human contact” task
  - This happens when robot is perceived as agent rather than tool; mediation is ok, doing things with the technology, but if appears as taking over this task then
    - SOMETHING IS EXPECTED FROM MACHINE THAT MACHINE CANNOT GIVE
    - TIME IS TAKEN AWAY FROM HUMAN CARE GIVER

# Artificial agents and care

## Note

- Assumption: machines do not have emotions
- Robotic pets or similar artefacts do not take role care giver, they are recipient of care

## Organization of health care

- Professionalization
- Experienced as burden
- Emphasis on formal forms of expertise rather than on know-how and craftsmanship (see also other paper)
- High degree of division of labour
- Discussion focuses on financial-economic terms alone

# Modernity and work

## Modern work

- Work divided, calculated, professionalized, formalized, regulated
- Marx, Weber, ect.: objectification and alienation

## Modern health care

- Care has become “labour” and involves an employment relation
  - **Care giver – employer:** disciplining, management
  - **Care giver – care receiver:** care receiver appears as object
  - Care becomes a product or service; patients and other vulnerable people are managed and processed
    - DEGRADES CARE **RECEIVER** AND ALIENATES CARE **GIVER** FROM WORK AND FROM CARE RECEIVER (AND OTHER CARE GIVERS)
  - We already have “robot nurses” and “robot doctors”; the care “machine”
  - Conclusion: quality of care jeopardized

## Machine (robot) used to automate the “production” or the “service”

- Division of labour, small units of work
- Workers replaced by machines
- Assumption: machine takes up role of care agent
  - Then criteria good care not met
  - Give machine different role

# Modernity and dependency

**Accepting vulnerability and dependency on others precondition of human care**

**But in modernity autonomy; prefer “machine care”**

**We risk to lose the humanity and dignity we were seeking to preserve**



## Using machines in health care is

- in principle **acceptable** if and in so far they meet the criteria of good care articulated, e.g.
  - function and appear as tools that mediate good care work
  - do not reduce health care product/service and do not reduce health care work to labour
- **problematic** if and in so far they make meeting these criteria difficult, e.g.
  - function and appear as care “agents” which take over “human contact” dimension of care
  - promote the further modernization of health care

# Observations and Interpretations

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# More research needed

**This was a general argument, focus on technology as agent**

**Needed: more refined analysis of human-technology relation in specific contexts and practices**

- (Post)phenomenology and hermeneutics
- Anthropology: ethnography

**Financial and economic context**

## Embodiment & “cyborg” relation

– Using a tool vs. embodied relation:

- Technology not present-at-hand but ready-to-hand
- Technology part of body/hands
- Being “in” the body of the patient

**> what is good care?**

# What is the role of the machine? Replacement vs. Assistance

**Main point: value of “warm”, emotional care (see also Coeckelbergh 2010: deep care)**

– Replacement, substitution of caregivers: very problematic

**But robots and (other) cognitive systems can assist**

– What role should they have? what role machine, what role human?

- In care: humans + robots: joint care. Then the question is: HOW should humans and robots care?

– Depends on what kind of skill/knowledge needed...

- In medicine: What kind of “expertise” do “expert” systems give us? What role do we want to give them? And: How exactly differs robotic surgery from non-robotic surgery? In which cases and situations is it better to use the one rather than the other?

## Levels

- Society at large
- Health care system
  - Various parties and processes
- A specific health care/assisted living *practice*
  - E.g. care for elderly with Alzheimer disease, therapy for autistic children, emergency intensive care, ...
- A specific (type of) action and task
  - E.g. a specific diagnosis procedure, a specific treatment, washing patient, feeding elderly person, etc.

# Levels and stakeholders

## Parties/ stakeholders

- Patients, care givers, government, companies (insurance, technology, ...), etc.

# What changes when machines are used?

## Different role of care giver, diff. skills, diff. care experience

- For example in telecare

## Different role care receiver, diff. skills, diff. care experience

- For example assisted self-care at home

## Different role government, insurance companies, professional organizations, etc.?

- Institutional changes, financial & economic context, different responsibility for health care?



## Automation technologies render us

### – Vulnerable

- Less vulnerable to nature, perhaps, but now vulnerable to the machine (see also Coeckelbergh 2013)

### – Alienated

- Robot works for us, but this means that we have less direct connection to material-physical reality (“nature”)

### – Automated

- Practice needs to be adapted to robot, therefore humans also have to adapt to robot

## Knowledge/experience problem

- Loss of know-how, loss of skill
- Machine workers take over, this means *the end of the worker*
  - Operators
  - Supervisors
  - Managers
  - Owners
  - Consumers and patients
- are alienated, lack direct contact with environment

# Implications for health care

## If robot were to replace care worker, then

- Care worker becomes operator, no longer worker, therefore **loss of skill** and alienated from patient/child/elderly person and health problems
  - Nurses and doctors become (remote) operators/supervisors

## If robot does not replace care worker

### – Better, but still

- Loss of skill with regard to certain tasks
- Part of practice more remote
- Practice might change since the machine requires the worker to do things in one way rather than another – necessarily good?

# Care givers and receivers

## Issue of (dis)engagement relevant for

- Care receivers, e.g. elderly people using devices at home (see also internet of things): consumption, entertainment, easy, no ‘focal practice’ (Borgmann)
- Care givers: loss of craftsmanship
  - But what about e-craftsmanship?

## What kind of knowledge in care work?

- Know-that
- Know-how
  - How to do particular tasks, how to do the work and deal with things, bodies, etc.
  - How to work together – SOCIAL aspect

# E-craftsmanship?

## Good work

- Involves know-how, skill, virtue
  - Aristotle: practice, virtue
  - Dewey on habit
  - Dreyfus on skill
  - See also Borgmann: focal practices: ‘The machinery makes no demands on our skill, strength, or attention, and it is less demanding the less it makes its presence felt’ (Borgmann 1984, p. 42)
    - SKILL, ENGAGEMENT WITH MATERIALITY
    - TOGETHER WITH OTHERS – SOCIAL ASPECT

# E-craftsmanship?

**What about e-care? disengaging work? or can it also be engaging?  
can it be focal?**



# E-craftsmanship?

## The care worker (care giver) as craftsperson

- Care work as a physical, bodily, and material practice that requires know-how and skill
- Learning (see also again Dreyfus)
- Tacit knowledge

### **But modernity:**

- Threat to personal meaning, bureaucracy, etc.
- Do people still **care** about their work and about the people they deal with

# E-craftsmanship?

## Objections

- What about outcomes?
  - yes, but there are also goods internal to a practice (see MacIntyre)
- What about the patient? patient-centred care?
  - yes, but quality of the care work needs to be good
  - against patient as consumer, against catering for every wish; and what about the skills of the **patient**? new models of health care, co-responsibility

# E-craftsmanship?

## Case *telecare*: disengaging?

- Yes, because of distance
- No, not necessarily,
  - New kinds of personal contact?
    - THE FACE OF THE OTHER?
  - Care givers and patients can take responsibility for what happens or should happen, actively shape their relation, etc.

## Future of (elderly) care

**Some real problems, partly has to do with modernity**

**New technologies not necessarily disengaging, but make sure the technology does not erode engagement, skill, know-how etc**

– In other words make sure that there are appropriate epistemic and moral relations

**Create social-institutional and financial conditions for care givers (and care receivers) to engage and respond**

# Modernity and the Social: „The automation of the social“

## Human-like robots and automated humans?

- Models of the human: human as robot?
- Models of the social
  - The social is not just routine and always interpretation and understanding (Verstehen); with automation, is there still room for improvisation and interpretation?
  - Automation: operationalization and quantification
- Humans (and their environment) adapt to the technology in health care practice and other social practices

- 1. Social relations change as a result of robotics and automation**
  - Danger: “cold” relations, de-skilling, “the automation of the social” (behaviour + thinking)
- 2. This was already going on even before robots and automation**
  - Modernity: already automation of people
- 3. Implications for ethics of robotics: take into account social context and culture**
  - This requires broader range of resources: include social science and humanities

## **Problems in modern society and culture, in which modern technology plays a role:**

- Already less time for “warm” human relations and human care
- Already de-skilling and alienation because of specialization of labour and professionalization
- Loss of community, formal social organization, anonymity
- Breaucracy, dehumanization >>>

# Modernity

**Problem, if any, is not the robot**

**Problem is the “machine” we’re living in, with its bureaucracy, anonymity, surveillance, and suppression of human feeling**



**Context of innovation (the lab)**

**Context of use (the surgery room, the bed of the patient, etc.)**

**But also: where are decisions taken about use of machines?**

- Policies: EU, national
- Management of health care institutions
- Companies, marketing
- Surgeons, doctors, nurses etc. and their education

**COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN  
PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND  
SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS  
eHealth Action Plan 2012-2020 - Innovative healthcare for the 21st  
century**

# Controversies and Other ethical and political issues

## **Automation and unemployment: controversial**

- Short term or long term unemployment?
- Unskilled or also skilled? which jobs?
- Entire job or just certain tasks?

## **Smart devices always raise privacy issues**

- Internet of things in health care: where are the data going?

# Proactive ethics at innovation stage





## Development of robot-enhanced therapy for children with autism spectrum disorders



**7 European Partners**



**Project duration: 54 months; starting in 2014**

**Grant agreement no: 611391**

**EC contribution: 6.69 M€**

	<b>Acronym</b>	<b>Partner name</b>	<b>Country</b>	<b>Key persons</b>
2.2.1	HIS	Högskolan i Skövde (University of Skövde)	Sweden	Prof. Tom Ziemke (project coordinator) Prof. David Vernon (research director)
2.2.2	VUB	Vrije Universiteit Brussel	Belgium	Prof. Bram Vanderborght (PI)
2.2.3	UBB	Universitatea Babes Bolyai	Romania	Prof. Daniel David (PI)
2.2.4	PLYM	Plymouth University	UK	Prof. Tony Belpaeme (PI)
2.2.5	PORT	University of Portsmouth	UK	Prof. Honghai Liu (PI)
2.2.6	TWENTE	Universiteit Twente	Netherlands	Dr. Mark Coeckelbergh (PI)
2.2.7	ALD	Aldebaran Robotics S.A.S.	France	Dr. Olivier Joubert (PI)

- 1. We decided to do our own survey to find out more about what stakeholders (i.e. parents, therapists, students and researchers, etc.) think about using robots for autism therapy**

# Some preliminary results from our survey

## In general, respondents find it ethically acceptable to use social robots for therapy for children with autism

- Difference with Eurobarometer! we did not ask about robots in general but very specific type and use

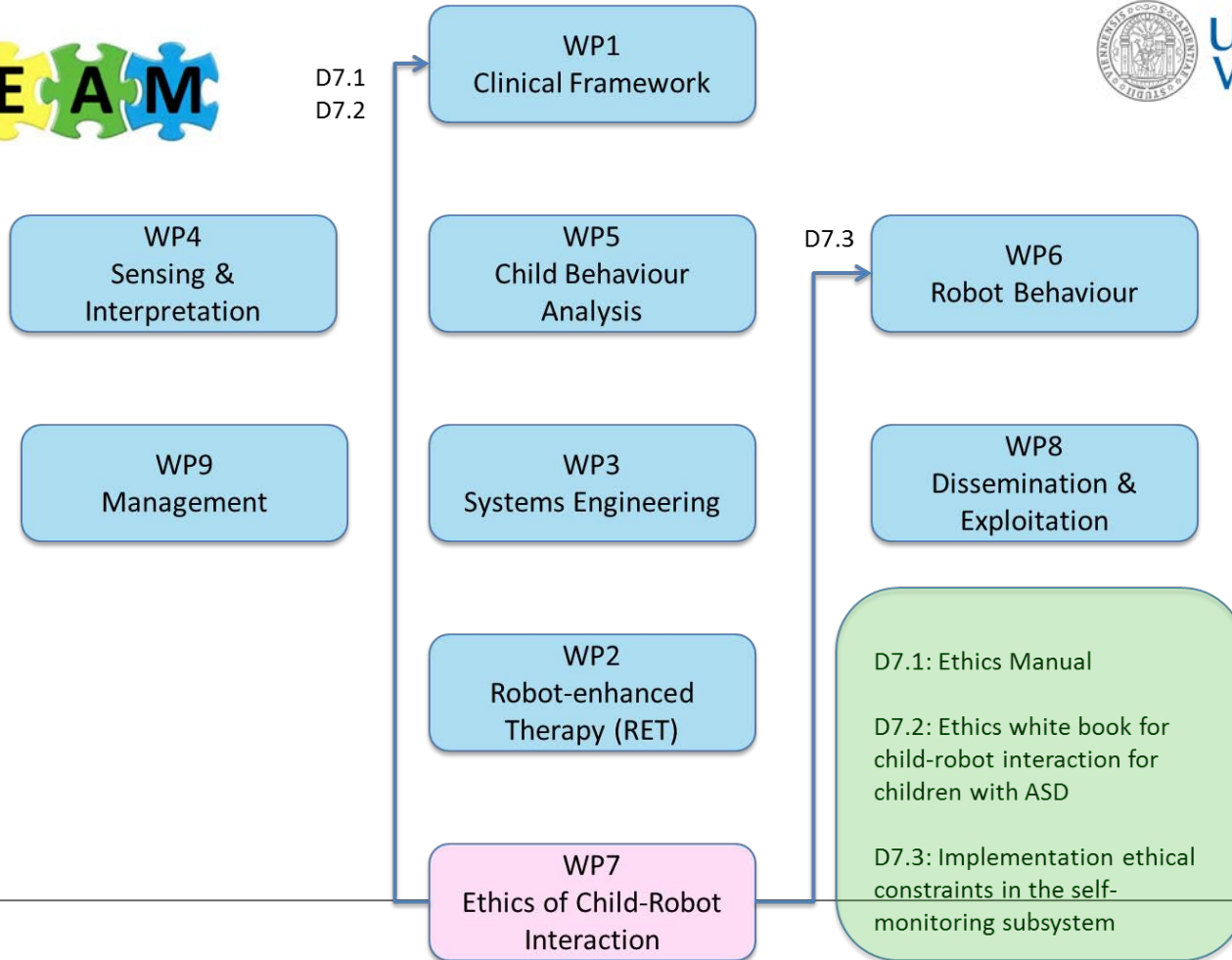
## **But: hesitant about robots replacing therapist, instead**

- Robot should support interaction therapist-child, under supervision of the therapist
- Preference for tele-operation, rather than robot automatically responding to child

## **Not positive about robots as friend or human-like robot; more positive about robots that look like an animal, a tool, etc.**



1. We decided to do our own survey to find out more about what stakeholders (i.e. parents, therapists, students and researchers, etc.) think about using robots for autism therapy
2. **We decided to integrate ethical reflection into the project**
  - Learn from survey and from ethical reflection (in the literature and within the project)
    - E.g. give robot SUPERVISED autonomy, acknowledge role and contribution therapist, take into account issues of trust, etc.



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