Understanding the complexity of care in context and its relationship to technical content; the greatest challenge for designers of care robots

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This presentation

- My goal today is to describe:
  - A framework and methodology for the ethical evaluation of robots in care
  - How this framework sheds light on the greatest challenge for robot designers (the relationship between technical content and the manifestation of care values)

Background

- Foreseen lack of healthcare personnel and resources (difference between number of persons in each demographic)
- Robots seen as a way to mitigate these challenges while at the same time maintaining a high quality of care

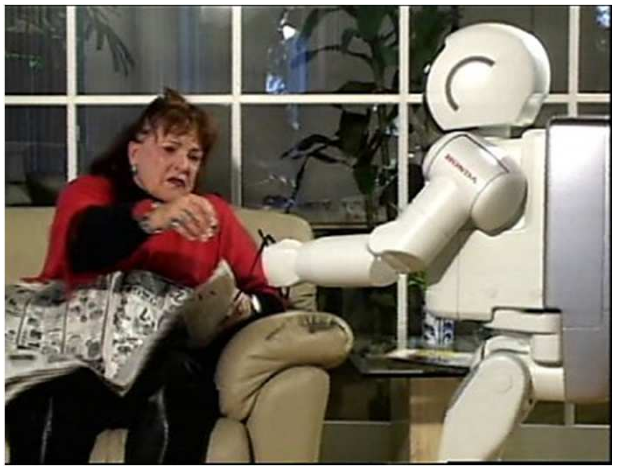
What is a care robot?

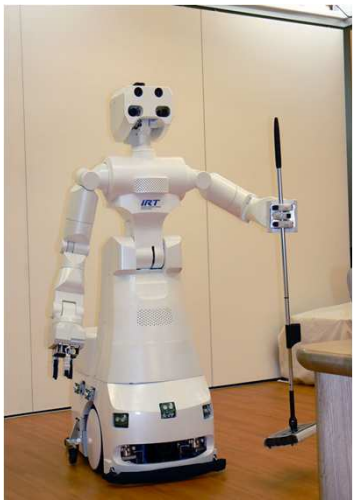
- No universal definition – interpretive flexibility (Howcroft et al, 2004)
- Any number of, and combination of, capabilities (locomotion, facial recognition etc)
- No common appearance (human-like, creature-like, machine-like)

Robots in Healthcare

1. Surgeon Console
2. Image Processing Equipment
3. Endowrist Instruments
4. Surgical Arm Cart
5. Hi-Resolution 3-D Endoscope

Photo courtesy of Intuative Surgical





Aim of healthcare

- Aim of healthcare is the good of the patient: physiological, emotional, spiritual, overall (Pellegrino)
- Increased sensitivity and vulnerability in elderly care
- Any new technology introduced must be evaluated accordingly

How to ethically address?

- Range of robots for a range of tasks makes a standard ethical evaluation difficult
- Aim is not to refute or accept care robots on a broad scale but to engage ethicists in design process along with designers
- The goal: how can care robots be designed in a way that supports and promotes the fundamental values in care?

Why design?

- Lack of (universal) standards or guidelines for robots outside the factory
- Interdiscplinary research
- Philosophy of Technology
  - Embedded values
  - Script theory
  - Engineers “materialize morality”

The solution

- Create a framework that can be used by both engineers and ethicists for ethical evaluations (retrospectively and prosepctively)
- Using the blue-print of Value-Sensitive Design (Friedman et al, 2003)

Value-Sensitive Design (VSD)

- Starting point – that technologies, through their use, promote or demote a value (causal relationship)
- Goal – to design systems in a way that systematically incorporates societal values (13 values)
- Tri-partite methodology; Conceptual, Empirical and Technological Investigations

My framework

- Understand the values both philosophically (care ethics orientation) and in context (Le Dantec et al, 2006)
- Not the standard values but values central to the care tradition

What is a value?

- “the principles or standards of a person or society, the personal or societal judgment of what is valuable and important in life” (Simpson and Weiner, 1989)
- Intrinsic or instrumental
- Personal or societal

Care Values

- **World Health Organization**; patient safety, patient satisfaction, responsiveness to care, human dignity, physical wellbeing and psychological wellbeing
- **Nursing home mission statement**; compassion, integrity, dedication, respect and accountability
- **Care ethics**; personalized care, care as a process, human contact, human presence, human touch

Care Values

- Top-down approach from World Health Organization values like **patient satisfaction** to nursing home values like **dedication** to care ethics literature values like **attentiveness**

Care values ethically understood

- Abstract values from mission statements take on meaning when in context with actors (value-laden milieu)
- Values are expressed through the interactions and actions of care-receivers and care-givers
- Not only is WHAT the care-giver doing important but HOW this happens

Care tasks understood as practices

- Care understood as a process (Tronto, 1993) within which many actions and attitudes take place
- All of the actions are linked through the process
- Values manifest through actions, which come into play later in the process (intertwining of values)

Bathing as an example

- Curtains enclose the patient (privacy)
- Care-giver speaks in social manner to care-receive (preparation, trust)
- Care-giver baths care-receiver: temperature of water, force used, soap, positioning (competence)
- Care-giver completes and moves on to the next practice

Bathing as part of the care process

- Trust required to begin bathing
- Trust established and strengthened during practice
- Moment for social interaction
- Moment for establishing a bond

Relevance

- Trust required for patient compliance with care plan, for patient to be honest about their symptoms, for patient to be receptive and to take their medication

A care practice

- Phases of a care practice (Tronto, 1993)
  - Caring about
  - Care taking
  - Care giving
  - Care receiving

Values of ethical importance

- Moral Elements (Tronto, 1993)
  - Attentiveness
  - Responsibility
  - Competence
  - Reciprocity

All of the values from the WHO, mission statements and hospital guidelines subsumed within, or analogous to, the moral elements

Creating the framework

- With the values and the concept of practices in mind we arrive at a selection of components that play an integral role in the ethical evaluation of a care robot

Components of the framework

1. Context
2. Practice
3. Actors
4. Type of robot
5. Manifestation of moral elements

1. Context

- Nursing home vs. Hospital (and the hospital ward) vs. Home setting
- Changes the interpretation and prioritization of values

2. Practice

- Lifting, bathing, feeding, delivery, social interaction, fetching items etc.
- Changes the interpretation and prioritization of values

3. Actors

- Nurse and patient vs. Patient vs. Other staff and patient vs. Family member and patient
- Care-receiver is engaged in relation

4. Type of Robot

- Enhancement vs. Assistive vs. replacement

5. Manifestation of moral elements

- Attentiveness, Responsibility, Competence, Reciprocity (Tronto, 2993)

Framework vs. methods

- Care centered framework is distinguished from the “Care centered value sensitive design” methodology
  - Method for retrospective ethical evaluation includes script theory
  - Method for prospective ethical analysis proceeds similar to VSD

CCVSD Methodology

1. Describe the current practice and the manifestation of moral elements in a specific context with specific actors
2. Describe the robot type and capabilities
3. Describe the practice and the (new) manifestation of moral elements with the new network of actors (the addition of the robot)

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The practice of lifting

- Context – nursing home
- Practice – lifting
- Actors – care-receiver, care-giver, mechanical bed, mechanical lift, curtain, room
- Manifestation of moral elements

The practice of lifting

- Using the mechanical lift for complete assistance, the patient is lifted using a remote control controlled by the nurse. The patient is then lowered into the chair. When the patient is being lifted there is no physical contact with the nurse, although the nurse is physically present there is no chance for eye contact (the patient is raised quite high and the nurse is paying attention to the remote control)

Manifestation of moral elements

- Attentiveness – to patient or to machine/remote?
- Responsibility – shared between care-giver and mechanical lift; patient trusts lift because of user and institution
- Competence – mechanical lift capable of lifting in a skilled manner according to angle, speed and duration (but not socially)
- Reciprocity – care-giver present and able to decide whether and when lifting has occurred; mechanical lift incapable of perceiving alone

Introducing the robots

- HAL (Hybrid Assistive Limb) – exoskeleton, human operated, displaces weight (enabling robot)
- RI-MAN – autonomous robot for lifting (replacement robot)

The Robots

- RI-MAN, Riken Institute, Japan: replacement

- HAL, Hybrid Assistive Limb, Cyberdyne: enabling

Lifting with RI-MAN

- All elements delegated to the robot
- Lack of human contact (human touch, eye contact, interaction)
- Trust is in the robot and not the person – will the care-receiver trust the human care-giver later on?

Lifting with HAL

- Attentiveness and reciprocity shared between the care-giver and care-receiver
- Competence and responsibility shared between the robot and human care-giver (nurse masters the technology and the technology masters a portion of the practice)

Suggestions

- Given the significance and the need for establishing trust between care-giver and care-receiver in the hospital and nursing home (and the needs of care-givers) HAL ethically sound
  - Based on all the components of the framework, the care orientation
- Therefore, context is important (RI-MAN in the home)

What I tried to do today

1. A proposed framework for orienting ethicists and designers to the components of ethical importance
2. A methodology for the ethical evaluation of care robots, retrospectively (prospectively)
3. How this methodology draws one's attention to the greatest challenge for designers, understanding the complex dynamics of a care practice - how values are manifest – and how a robot might alter this manifestation

Conclusion

- Only by understanding how the practice (not task) happens and the necessity of that practice for overall good care, can a designer understand the implications of their design

Dank u wel!

Questions, comments, suggestions?!

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