

Robots in Society

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HRI Week 2

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Overview

- Robots in the Wild
- Expectations vs Reality
- The Uncanny Valley
- The Ethics of Robots in Society

Miro board link <https://bit.ly/RobotsInSociety>

. Robots in the Wild: At Home

- Domestic Assistants



- Social Robots



. Robots in the Wild: At Work

- Telepresence Systems



- Industrial Robots



Robots in the Wild: Jobs

- In some industries, particularly manufacturing, robots have reduced the quantity of people needed to do the job, this has resulted in the shift of workers to other sectors.
- In many areas robots have improved working conditions and productivity, and required reskilling of workers rather than making them unnecessary.
- As with the computer revolution, technology can be disruptive to ways of working but can create different jobs for those it might replace.



Robots in the Wild: Studies

- Running HRI studies *in the wild* (i.e., outside the lab) is a challenging, but rewarding proposition.
- Pros:
 - High ecological validity.
 - Large participant numbers.
 - Reduce response bias.
- Cons:
 - Difficult to control study flow.
 - Requires highly reliable system.
 - Limited scope for instruction.

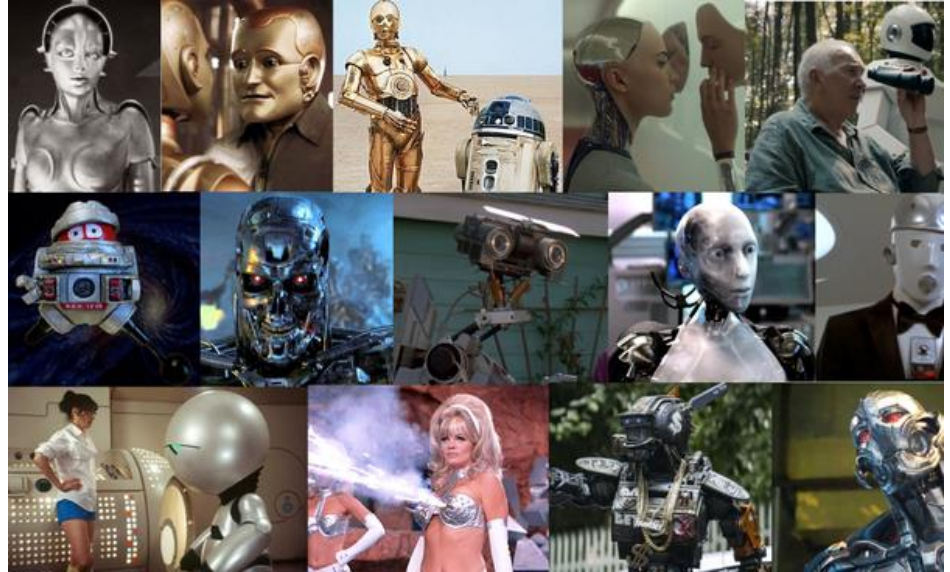


Expectations of Robots

- What are peoples expectations of robots?

- Logical
- Strong
- Highly Capable
- Intelligent

- What drives these expectations?



Reality of Robots

- What is the reality of robots?
 - Limited intelligence/common sense
 - Limited sensors
 - Typically only 'advanced' in one area
 - HRI suitable systems are low power to ensure safety.



Impact of the Mismatch

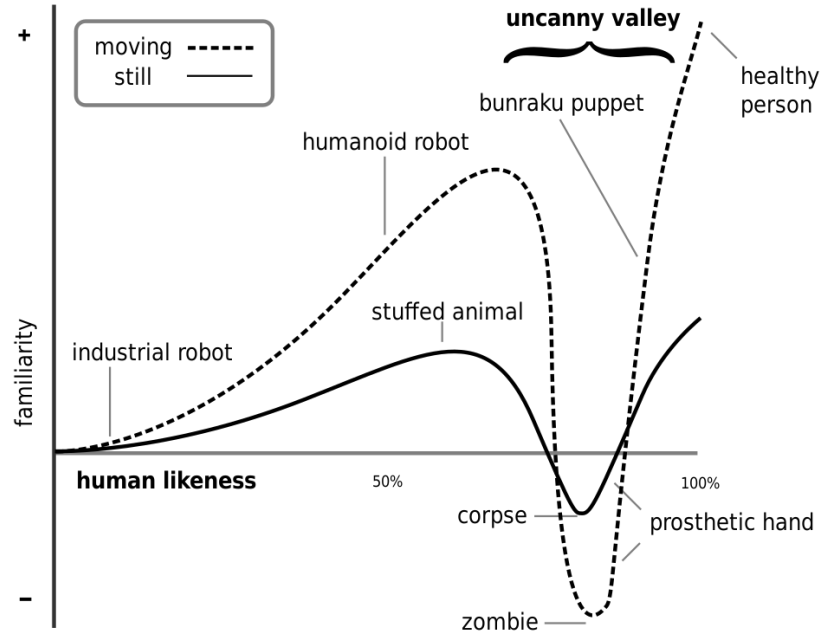
- What is the effect of the differences on HRI?
 - Subjective evaluation can be impacted.
 - Observers 'fill in the gaps' when behaviours are not perfect.
 - Unexpected capabilities can be ignored (e.g., emotion portrayal).
 - Robot appearance and behaviour design can be used to reduce the mismatch – don't try to be too good.
 - The Wizard of Oz experimental protocol can take advantage of the over estimation of capabilities.



Uncanny Valley: Definition

- The uncanny valley is a concept proposed by Masahiro Mori in the 70s:

As human-likeness increases familiarity/comfort increases up to a point when feelings of uncanniness and unease increase rapidly, which only go away when something is perfectly human-like (i.e., a human).



Uncanny Valley: Reasons

- Proposed reasons for its occurrence:
 - **Violation of human norms:** If an entity looks sufficiently nonhuman, its human characteristics are noticeable. But, if the entity looks almost human, it elicits our model of a human other so the nonhuman characteristics are noticeable.
 - **Conflicting perceptual cues:** Conflicting cognitive representations occur when an individual perceives conflicting cues to category membership, such as when a humanoid figure moves like a robot.
 - **Mortality salience:** Robots make our mortality more salient, and so elicit an innate fear of death.



Uncanny Valley: Impact

- Impact on HRI:
 - Negative impact on subjective evaluation.
 - Select a robot platform and design behaviours with it in mind – don't try and be too humanlike.
 - Some elements of it can be tested for.
 - While evidence for it is growing, it is far from completely proven.



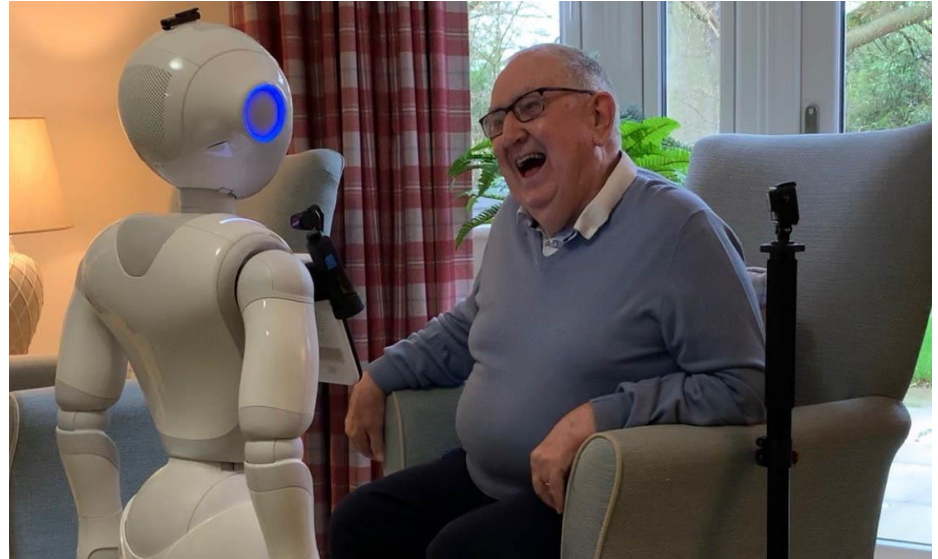
Ethics of Robot Deployment

- When developing a robot for deployment in the real world there are additional ethical considerations that must be made.
- BS 8611:2016 Robots and robotic devices. Guide to the ethical design and application of robots and robotic systems. Gives guidelines for doing so.
- What is ethically acceptable to users is still an open research question.
- What are the key ethical issues?
 - Deception
 - Attachment
 - Persuasion
 - Privacy
 - Liability



Ethics of Robot Deployment: Deception

- A robot behaviour could be deceptive if it does not portray actual internal robot states, and the underlying motive for its expression is to gain some benefit for the robot or its designer. For example, a display of emotional behaviour that is not accompanied by the actual feeling of this emotion could be perceived as deceptive in nature.
- Deception can be problematic as it can result in false beliefs about the robot's capabilities.
- People may object to being deceived by a robot. What deception is acceptable to people needs more research.
- There is evidence that some behaviours that could be considered deceptive are acceptable to observers, motivation and likeability could be causal factors.



Ethics of Robot Deployment: Attachment

- Emotional Attachment is the emotional connection you receive from being attached. We are attached to people, pets, relationships, places, objects. Attachment can form with robots.
- It has ethical concerns as the robot may break or be taken away.
- Attachment can also impair judgement and have psychological implications due to the artificial nature of a robot.



Ethics of Robot Deployment: Persuasion

- Persuasion is an underlying necessity of socially assistive robots (robots designed to provide assistance through social interaction).
- Systems that are designed to persuade people to do things, need careful consideration, more so when deception might be employed by such systems.
- SARs need to be designed with these concerns in mind as they should not be persuading humans to undertake harmful activities.



Ethics of Robot Deployment: Privacy

- As robots are equipped with a large array of sensors, how to protect privacy becomes an immediate issue.
- This issue is exacerbated when a human observes the data, such as in a telepresence robot.
- Robust privacy policies are needed for how to handle robot data.



Ethics of Robot Deployment: Liability

- In an accident involving a robot, should blame be apportioned to the robot designers, the owner, the legislator etc.
- It is proposed that robots be equipped with an ethical black box (the equivalent of a Flight Data Recorder) to continuously record sensor and relevant internal status data. It would enable the process of discovering why and how a robot caused an accident, and thus an essential part of establishing accountability and responsibility. (Winfield and Jarotka 2017)

