

Lecture 8: From a Clinical point of view

Human Robot Interaction

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1 Examples of successful HRI

- If we place eyes on a robot, then we have an intuitive place to look at the robot. That is a good way to use in the context of data acquisition of where the user looks.
- It does not need to look like person to feel like a person if we e.g. use eyes.

1.1 Design Affordance

- Designs impose expectations to objects, like we design a chair to look like a chair, then we expect that we can sit on it. This is called design affordance.
- It is a way of communication, (one way communication and reciprocal communication.)

1.2 Paro

People with dementia are attached to cats, and Paro the seal was a good substitute for a cat.

2 What is good Human Robot Interaction / What is good interaction

- Whenever something is done in a satisfactory fashion. But how is this done?
- It does not need to be super fast.

3 Medical robots

3.1 Prevention

- Mostly AI based → predicts diseases and spread.
- Decision support systems, that assists in making decisions.

3.2 Diagnosis

- Endoscopy robot (a small robot that goes into the throat e.g.) A pill sized robot. It can live stream, collect tissues, and report and mark lesion positions of interest. Magnetically controlled, but very difficult to control within human tissue.
- ION robotic lung biopsies. Difficult to navigate into a broncheous, which is very brittle and could be clogged.
- Magneto sperm. Can navigate in the bloodstream and in the bodily water. This somewhat limits the places where it can swim. Can carry radioactive material and carry it into e.g. cancer cells. Must navigate against flow of the bloodstream in the body. Injected very close to the area of interest. It works in a petridish but may not work in the body where it cannot be seen.

- Tumor targetting nanorobots. Can make small blood clogs around the tumor, which cuts off the bloodsupply to the cancer cells it dies. The blood clog can move, and may cause damage e.g. in the brain.

3.3 Treatment

- ROBERT for assistive robot therapy. Assist as needed. Use EMG and functional electrical stimulation to predict user intention. Increase training for bed ridden patients.
- REX Robotics which is a bipedal, crutchless exoskeleton, which allows for hands free walking.

3.4 Rehabilitation

3.5 Training robots

Robots that look like humans that can be used to train personnel.

4 Human Robot Interaction in the clinic

Usually two different interactions

- Operator interaction
- Patient interaction
- Patient families
 - Communication between patient and families.
 - Sometimes the familiy will not want to take on resposibility of taking care of the patient, likewise the patient wont want to be reliable on the family. → Independence.
- Other staff
- Tools, Medicin, etc
- Caregiver (doctor) / Therapist
- Environment
- Maintanance
- Nurse
- Machnines
- Management (we need the cheapest robot, which does not help.)
- ⋮

5 TEKU Model

Analysis of integration of a techonology in an organisation.