

POPULAR SCIENTIFIC ABSTRACT

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[Responsible Application of Robotics in Health and Elderly Care – An Ethical and Technical Perspective]

We live in a world where robot technology has been emancipating humans in various tasks for a long time. Robots are found in many places in our society. The International Federation of Robotics reports that 2.7 million industrial robots are operating in factories worldwide today. Historically, robots have been relegated to highly controlled environments working alone and not in the vicinity of humans. In recent years, robotic applications have shown promising results operating in unconstrained areas of society, working in close proximity to humans, and even cooperating with humans

In contrast, many societies are foreseen to be challenged by a demographic shift. Human life expectancy is increasing due to advances in medicine, treatment methods, and disease detection and diagnosis. Expenses surrounding different healthcare services are expected to grow, and the patient-to-nurse ratio will decrease, which means we won't have the required workforce to sustain the system as we know it.

Robots have shown a high potential for creating value in the healthcare sector. They can mitigate the shortage of healthcare workers and resources, enhance the independence and autonomy of older adults, improve people's health and well-being, and aid care-personal and general staff. However, realizing the potential of robots in healthcare requires some technical innovation and insights into the effect robot technology will have when being injected into the therapeutic relationship conclave between nurses and patients.

This thesis investigates how we ensure responsible applications of robotics in healthcare. Ethical issues should be detected as early as possible – preferably in the design process – so these can be addressed and reflected into the actual design and technical solutions of a care robot or a service robot meant for the healthcare sector. Also, ethical risks are tried solved with technical solutions. Robots should indicate their intentions to decrease misunderstandings between humans and robots. In this way, the human user's social perception of the robot will increase. Likewise, by improving the robot's representation of its environment using computer vision, artificial intelligence, and different sensor modalities, we can make the robot better understand its world and build behaviors that are flexible and adaptable to uncertainties.