



Developing social robots for aging populations: A literature review of recent academic sources

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Abstract

The perception of aging populations is a key factor influencing the development of social robots. The increased interest in social robots is reflected in an increasing amount of research. The review is broken up into three sections: (a) **robots as a treatment help**; (b) **robots as social assistants and housemates**; and (c) **robots as custodial caretakers with regard to their ethical implications**.

This presentation discusses the problems with social, commitment, assistive, and companion robots used in hospitals, care facilities, private homes, and mental health and physical therapy settings. It discusses some of the ethical issues brought up by researchers and the media, such as control, privacy, permission, and the debate over artificial vs. genuine compassion in caregiving.

Robots as custodial caregivers that are viewed in terms of ethical implications

With the increasing ageing population in many countries, the demand for custodial caregivers has risen.

Custodial caregivers are individuals who provide basic assistance with activities of daily living such as bathing, dressing, and eating to individuals who cannot perform these tasks on their own. However, the availability and affordability of custodial caregivers have become a major concern. This has led to an urgent need for alternative solutions such as using robots as custodial caregivers.



Robots as custodial caregivers that are viewed in terms of ethical implications

Robotic custodial caregivers have been developed with the aim of providing assistance to the elderly and disabled individuals who need custodial care. These robots are designed to provide basic services such as meal preparation, medication reminders, and help with personal hygiene. They can also be programmed to make emergency calls, monitor health status, and communicate with healthcare professionals. With advancements in technology, robots have become more human-like in terms of appearance and behaviour, which makes them better suited to providing custodial care.



Disadvantages / Issues

Using robots as custodial caregivers can have significant ethical implications. The first issue is related to the risk of social isolation. One of the roles of human custodial caregivers is to provide social interaction and emotional support to their clients. The relationship between caregivers and clients often involves intimate interactions, which can create a sense of companionship and comfort. However, robots lack the emotional intelligence and empathy of human caregivers, which can lead to a sense of loneliness and isolation among clients.



Disadvantages / Issues

The second issue is related to the impact on employment opportunities for human caregivers. The implementation of robotic caregivers may be seen as a threat to jobs traditionally held by humans. This could lead to job displacement and increased unemployment rates for caregivers. Additionally, robots cannot replace the emotional connection and the empathy that human caregivers provide, which is crucial in building trust and providing quality care.



Disadvantages / Issues

The third issue is related to the quality and safety of care. Robots are not programmed to respond to unexpected situations. In the event of an emergency, humans can quickly and appropriately intervene. However, robots may not be able to respond effectively in such situations, leading to potential errors in care. Additionally, robots can malfunction or break down, leading to further complications.



Advantages

- 1. Consistent Care:** Robots do not tire, get sick, or have personal emergencies which make them more consistent than human custodians. This makes them more dependable with fewer errors in care.
- 2. Enhanced Safety:** Robots can improve the safety of patients by employing algorithms that detect potential dangers, such as falls or hazards. They have minimal risk of transmitting infections as they don't contract diseases.
- 3. Unbiased Care:** Robots will provide the same level of care to all patients regardless of their age, race, gender, or education level. This enhances inclusivity by ensuring that every patient receives the same experience.
- 4. Multifunctional:** Unlike human custodians, robots can perform multiple tasks simultaneously. They can detect spills, clean floors, and even mop without leaving any areas untouched. This ensures that the workspace is more hygienic and efficient



Robots as an aid in treatment

Robots are increasingly being utilized as an aid in treatment across various healthcare settings. Their ability to deliver consistent and precise care has made them appealing to healthcare providers. Here are some examples of robots being used as an aid in treatment:

- 1. Robotic Surgery:** In robotic surgery, a surgeon controls a robot that is equipped with surgical instruments. The robot carries out the procedure with greater precision and accuracy than human hands are capable of.
- 2. Rehabilitation Robots:** Rehabilitation robots are used to help patients regain lost functionality due to strokes, spinal cord injuries, or other types of trauma. Rehabilitation robots use feedback sensors to assess the progress of treatment.
- 3. Delivery and Transport Robots:** Hospitals often face logistical challenges when it comes to transporting samples, medication, and other medical supplies around the facility. Delivery and transport robots are being developed to take over such tasks.

Robots as an aid in treatment

4. Assisted Breathing Robots: In recent years, robots that assist breathing have been developed. These machines are usually used in pediatric care, where they can mimic the inhale/exhale rhythms .

Overall, robots are proving to be valuable assets in the healthcare industry, especially in areas such as surgical procedures and rehabilitation. However, the technology is still in the early stages, and researchers are working to improve and develop the robots so they can help more people receive better care.



Advantages

1. **Precision:** Robots can perform tasks with extreme precision, which can be especially useful in medical procedures that require high levels of accuracy.
2. **Consistency:** Robots are not as prone to errors as humans, and therefore, can perform tasks consistently with little variation, which is crucial in procedures that require repetitive movements.
3. **Reduced risk of infection:** Since robots can be sterilized easily, there is less risk of infection during medical procedures. This can be especially useful in surgery where open wounds need to be treated.
4. **Improved patient outcomes:** With greater precision, consistency, and accuracy, robots can improve patient outcomes by reducing the risk of complications during procedures and by improving the effectiveness of treatments.



Disadvantages

1. **High cost:** The cost of acquiring and maintaining medical robots can be exorbitantly high, which may limit their availability to only the wealthiest medical institutions.
2. **Lack of empathy:** Some medical procedures require the human touch of empathy and emotional support that robots may not be able to provide.
3. **Remediation:** In cases where robots fail or perform below expectations, remediation may require extensive reprogramming or repair, which can take time and may delay treatment.
4. **Reliance on technology:** There is always the risk of technology failure, which can cause delays and lead to the need for human intervention, and in some cases, this can even pose risks to the patient.



Robots as social assistants and home companions

The use of robots as social assistants and home companions has been gaining popularity in recent years.

These robots are designed to interact with humans in a social and emotional manner, providing companionship and assistance with daily tasks. They are often equipped with facial recognition and natural language processing software, allowing them to communicate with their human companions in a more human-like manner.



Advantages

1. **Assistance:** Robots as social assistants and home companions can assist people with various tasks, such as cleaning, cooking, grocery shopping, or even providing companionship to people who live alone or suffer from mental health issues.
2. **Efficiency and Precision:** Robots are unaffected by fatigue or repetitive motion injury, therefore they can perform tasks with great efficiency and precision.
3. **Accessibility:** Robots can help people with mobility issues or disabilities to access places, things and services that were previously not possible.
4. **Reduction in accidents:** Robots can perform tasks that are dangerous for humans, reducing the risk of accidents and injuries.



Disadvantages

1. **High Cost:** The cost of robots can be prohibitively high, limiting their accessibility to only a few people or households.
2. **Dependability:** Robots depend on technology to work effectively, which leaves them susceptible to breakdowns, requiring regular maintenance and repairs.
3. **Loss of jobs:** The growth of robots can result in job displacement for humans who cannot compete with the efficiency and precision of robots.
4. **Dependence on Technology:** Overreliance on robots can lead to desensitization to human relationships, emotions, and intimacy, weakening social connections.



Conclusion

These are some of important issues I found out by performing research on several articles. All the measures and issues have to be kept in mind while any one is implementing social robots for ageing population.

In conclusion, the use of robots as social assistants and home companions has the potential to provide individuals with companionship, assistance with daily tasks, and monitoring of their health and well-being.

While there are concerns about the ethical implications of using these robots, the benefits they offer cannot be ignored. As technology continues to advance, it is likely that we will see an increase in the use of robots as social assistants and home companions in the coming years.



Thank You

