

# Ethically Integrating Robots in Elder Care

Suresh Lokiah, Samarth Suresh, Yashaswini Vismaya, Sudha Jamthe

**Abstract**—The emerging trend of integrating robots into elderly care, particularly for assisting patients with dementia, holds the potential to greatly transform the sector. Assisted living facilities, which house a significant number of elderly individuals and dementia patients, constantly strive to engage their residents in stimulating activities. However, due to staffing shortages, they often rely on volunteers to introduce new activities. Despite the availability of social interaction, the residents are in desperate need of additional support. Robots designed for elder care are categorized based on their design and functionality. These categories include Companion Robots, Telepresence Robots, Health Monitoring Robots, and Rehab Robots. However, the integration of such robots raises significant ethical concerns, notably regarding privacy, autonomy, and the risk of dehumanization. Privacy issues arise when robots need to continually monitor patient activities. There is also a risk of patients becoming overly dependent on these robots, potentially undermining patients' autonomy. Furthermore, the replacement of human touch with robotic interaction can lead to the dehumanization of care. This positional paper delves into the ethical considerations of incorporating robotic assistance in eldercare. It proposes a series of guidelines and strategies to ensure the ethical deployment of these robots. These guidelines suggest involving patients in the design and development process of robots and emphasize the critical need for human oversight to respect the dignity and rights of elderly and dementia patients. The paper also recommends implementing robust privacy measures, including secure data transmission and data anonymization. In conclusion, this paper offers a thorough examination of the ethical implications of using robotic assistance in elder care. It provides a strategic roadmap to ensure this technology is utilized ethically, thereby maximizing its potential benefits and minimizing any potential harm.

**Keywords**—Robots for eldercare, ethics, human-robot interaction, assisted living.

## I. INTRODUCTION

THE demands of daily life often leave little time for extended family responsibilities as the society continues to evolve and modernize. As a result, many families find themselves unable to provide the necessary care and support for their aging loved ones. The elderly population, the forgotten generation, are transferred to care centers when families are too busy to care for them [1]. Many of these people struggle with loneliness and depression. The sad reality is that as time passes, family members visit less often, and friends may pass away [1]. Moreover, their physical and mental abilities continuously deteriorate and push them further from involvement in society [2]. The elder care industry is also impacted due to staffing shortages arising from lack of skillful labor, poor pay and lack of opportunities [3]. The elder care market services are expected to grow by 6.5% in 2030 [4] and the industry is prime

Suresh Lokiah is with Santa Clara, CA 95051, USA (phone: +1 (408)-505-1148; e-mail: sureshlokiah@gmail.com).

Samarth Suresh is with Santa Clara, CA 95551, USA (phone: +1 (408)-444-0508; e-mail: samarthnsuresh@gmail.com).

for innovative transformation using technology to support the growing demands. The possibility to improve the lives of these individuals is endless. Nevertheless, deploying technology in elder care poses specific challenges that warrant careful consideration. This paper presents recommendations and guidelines aimed at ensuring the successful integration of technology into the elder care industry.

There are six forms of elder care:

- 1) In-Home Care.
- 2) Respite Care
- 3) Independent Living
- 4) Hospice Care
- 5) Palliative Care
- 6) Assisted Living

Assisted living facilities offer a comfortable living space and provide care and services to its residents. They host diverse sets of people having varying age groups, cultural, economic background, physical and mental health conditions [5]. Patients have different life experiences and varying physical and mental health conditions. Therefore, human caregivers need to be extremely adaptable, empathetic, social, and on standby 24/7. On top of that they must be able to meet the changing mental, physical and environmental demands. Assisted living facilities depend on caregivers to run smoothly, however due to the intensive nature of the job, caregivers are hard to come by. These facilities are terribly understaffed and struggle to create activities to keep the residents fully engaged and satisfied.

There are at least four primary entities that manage or deliver services for elder care:

- 1) Care providers
- 2) Insurances
- 3) Government – Policies, Resources [6]
- 4) Technology

### A. Robots in Elder Care

Recent advancements in the field of machine learning (ML) and artificial intelligence (AI) are propelling the development of intelligent robots that can perform complex tasks and interact with humans in a personalized manner. These advancements include:

- *Decision-Making Capabilities* – Robots can analyze the environment, interpret data, and make informed decisions, much like a human would. AI has equipped robots with decision-making capabilities, enabling them to respond to different situations in real-time [7].
- *Learning and Adaptation* – Machine learning allows robots to learn from their input and experiences. They can

Yashaswini Vismaya is with Bangalore 560041, India (phone: +91 7892457851; e-mail: yashaswini.cse@gmail.com).

Sudha Jamthe is with Cupertino, CA- 95129 USA (phone: +1 (510)-288-8702; e-mail: sujamthe@gmail.com).

improve their performance based on feedback, adapt to new situations, and even predict future events based on historical data. This ability to learn and adapt is a key aspect of human behavior that has been replicated in robots [8]. Machine learning in the elderly community can provide numerous benefits.

- *Emotion Recognition* – Some AI systems can identify and respond to human emotions by analyzing facial expressions, body language, and tone of voice. This emotional intelligence makes interactions with robots more natural and human-like [9]. Note that the emotion recognition by AI is biased and not fully developed.

Table I are current robots used in elder care, and how they aid and address some of the pressing problems seniors in assisted care face.

TABLE I  
 ROBOT TYPES USES AND EXAMPLES

Robot Types	Aids in	Product Examples
Assistive	Physical disability	Exoskeleton, Toyota Human support robot, Bestic Arm
Companion	Social interaction combat loneliness	ElliQ, Paro, Aibo, Kur
Monitoring	Monitor vital signs, and alert caregivers, detect falls, remained medication	Care-o-bot, Robear
Telepresence	Maintain connection with family	Double Robotics' Double and OhmniLabs' Ohmni.
Therapeutic	activities to enhance their mental health, such as music, light exercises, or cognitive games.	Paro
Domestic	Helps in home activities	Kuri, Roomba Robomow – mow the lawn
Service Robots	Cleaning, dispensing medication Medical, Hotel Retail	Roomba

## II. CHALLENGES

### A. Technologies in Assisted Living Facilities

Assisted living facilities offer general activities and entertainment to engage its residents. Entertainment through music and television caters to a segment of residents that speak a common language and only benefits those with little to no physical or mental challenge. The remainder of the population is forced to participate in an activity that is non-stimulating for them and is likely detrimental.

- 1) *Diversity* – Assisted living facilities, with their diverse demographics and resident health profiles, require mechanisms like media players or televisions for delivering diverse content. For instance, these facilities may accommodate individuals speaking various languages. However, they often face challenges due to limited space, resources, and mechanisms to meet these diverse needs adequately [10].
- 2) *Content consumption* – The aged demographic regularly consumes content passively from the media devices unlike the younger generation that interacts and receives improved content recommendations. As a result, the content is stale or obtusely general, and not very useful for this population [11].

- 3) *Proactive monitoring system* – Although devices like cameras and sensors have the potential to enhance personalized care, the current systems and solutions are not sufficiently advanced. This limitation raises ethical concerns regarding their implementation [12].

### B. Robots in Assisted Living Facilities

The development of robotics in assisted living contexts is progressing, however their complete adoption remains uncommon. This lack of integration can be attributed to various factors, including practical challenges and ethical issues:

- 1) *Ethical and Privacy Issues* – Ethical issues, especially related to privacy, autonomy, and informed consent, are crucial concerns. Fears regarding surveillance, data security, and the potential for robots to make significant decisions are major worries for residents and their families [13].
- 2) *Regulatory and Accountability Challenges* – The legal and regulatory framework for using robots in healthcare and assisted living is complex, marked by significant concerns over liability for malfunctions or accidents and the absence of thorough guidelines for these new technologies [14].
- 3) *Technical Challenges* – Many robotic units are in the nascent stages of development, lacking the refined functionalities necessary to meet the varied demands of assisted living residents. They often fall short in complex tasks such as nuanced human interaction, navigating unpredictable settings, or executing an array of activities proficiently [15].
- 4) *Financial Implications* – The costs associated with the development, upkeep, and deployment of robotic technologies can be prohibitive. Assisted living centers often work with limited financial resources, and the substantial investment required for sophisticated robotic systems poses a considerable obstacle [16].
- 5) *Acceptance by Users* – Hesitation to embrace robotic solutions in assisted living environments can arise from residents and staff feeling uneasy or unfamiliar with the technology, or from concerns about the lack of empathy, warmth, and personalized care typically provided by humans [17].
- 6) *Training and System Integration* – Implementing robotic systems requires training for both staff and residents to use the technology effectively. Additionally, integrating these systems into the current care framework, while maintaining existing routines and not reducing care quality, poses further challenges [18].
- 7) *Customization Needs* – The varied needs, preferences, and health conditions of residents in assisted living require robotic systems to be extremely adaptable and customizable, presenting a significant technical challenge.
- 8) *Cultural and Societal Considerations* – Societal and cultural perceptions of robotics, especially in caregiving roles, are pivotal in their acceptance. Attitudes towards caregiving, the value of human interaction, and worries about job loss for caregivers significantly influence the willingness to adopt robotic technologies [19].

Despite these hurdles, there is optimism that continued advancements in robotic technology will lead to greater acceptance and integration in assisted living facilities. With ongoing innovation and collaboration between stakeholders, robots may become valuable assets in providing high-quality care to residents.

### III. ETHICAL CONSIDERATIONS OF ROBOTS IN ELDER CARE

The introduction of robots in elder care raises important ethical questions that need thoughtful answers. The industry needs to make sure these robots respect the dignity, independence, and overall well-being of older adults. Here are some key things to consider:

- 1) *Privacy and Surveillance* – Let's consider the scenario where a robot equipped with cameras and sensors might compromise your privacy. It is crucial that such robots gather only essential data, secure it properly, and transparently inform individuals about the data being collected. Legal frameworks ensure the protection and confidentiality of personal data collected by robots. Consent is mandatory before data collection, and stringent data protection measures must be in place. Data privacy regulations act as safeguards for personal information, mandating responsible and secure data handling by entities. For example, Europe's General Data Protection Regulation (GDPR) mandates stringent data handling and transparency, California's California Consumer Privacy Act (CCPA) empowers individuals over their data usage, the US Health Insurance Portability and Accountability Act (HIPAA) protects medical information, Singapore's Personal Data Protection Act (PDPA) demands consent before data collection, and the US Privacy Act of 1974 safeguards personal data within government agencies. These laws are designed to ensure that personal data are managed with utmost care and respect globally [20].
- 2) *Autonomy and Independence* – Robots should be helpful without making older adults feel dependent. It is essential that they do not promote overreliance, instead promoting individual independence. Ensuring robots respect autonomy involves informed consent, user control, transparency, and supporting independence. It requires privacy protection, customizability, ethical programming, user training, feedback mechanisms, and regulatory compliance. These guidelines help empower users, maintaining their independence and decision-making authority in interactions with robotic technology [21].
- 3) *Dehumanization of Care* – Caring for someone involves more than just tasks—it is about warmth and empathy. It is imperative that robots do not make caregiving feel cold or impersonal. To prevent the depersonalization of care with robots, guidelines should ensure human-centric design, complementarity with human caregivers, emotional intelligence, personalization capabilities, user-involved feedback, ethical adherence, transparency, ongoing adjustment, caregiver training, and respect for human caregiving roles. These measures help maintain

personalized, empathetic care that values human interaction even in technologically advanced care settings [22].

- 4) *Social Isolation* – As humans are social animals, human interaction is necessary to mental well-being. If the elder demographic was to develop an overreliance on new technologies, the social aspects of their life may decline as a byproduct. Therefore, robots should complement human companionship, not replace it.
- 5) *Bias and Fairness* – Robots learn from data, but sometimes that data can be biased. The possibility of bias can negatively impact autonomous decision making, making it crucial that machine learning does not develop said bias. Robots must treat everyone fairly and must not discriminate against any community or individual [23].
- 6) *Consent and Understanding* – It is important for older adults to fully understand how robots work and what they are used for. Individuals in the elder community must agree to use them, which may prove difficult, especially if they have trouble understanding or making decisions [24].
- 7) *Safety and Trust* – Robots should be safe to use and reliable. A possible injury could spark conflict over the trade-offs of robots in assisted living spaces. Thus, it is imperative that robots will not cause harm or distress to the people they serve.
- 8) *Accountability* – If any issue arises with a robot, the entity at fault must be identified and held responsible [25].
- 9) *Training and Help* – Individuals operating robots must be trained to use them safely and effectively, and there should be prompt support available to address and resolve any issues, ensuring continuous smooth operation.

These are tough questions that need deliberate and meticulous answers. By thinking about them and working in tandem with others, the industry can make sure that robots in elder care are safe and useful to the assisted living community.

### IV. RECOMMENDATION FOR ETHICAL PLAN DEVELOPMENT OF ROBOTS IN ELDER CARE

Despite the ethical concerns associated with their use, robots, when deployed responsibly, have the potential to significantly benefit the elder care industry. They can assist in providing dignified care to elderly patients, help manage staffing limitations, and enable personalized care tailored to the diverse needs of elders within the care system. To do this ethically these are the guidelines:

Firstly, specific and clear guidelines must be created that ensure all decisions made about using robots in elder care are based on values like privacy, respect, and equality. In this manner, the provider can ensure that robots are used in ways that benefit the elderly without harming them or affecting their relationships.

Talking to the people involved, including the elderly themselves, their families, caregivers, and experts, is crucial. Their input helps providers understand what they need and want from robots in elder care. It also helps providers identify any potential problems or concerns.

Before bringing in robots, providers must carefully study the risks involved to make sure they are handled effectively. Then, detailed plans must be developed to deal with these risks, like making sure robots protect people's privacy and are transparent in how they make decisions.

When it comes to using robots, permission must always be asked from the elderly and their families. Providers must respect their user's right to choose whether they want robots involved in their care.

Robots must be designed to be friendly and easy to interact with. They must be programmed to be sensitive to people's emotions and cultural differences, making sure they fit into the elder care environment smoothly.

The privacy of all parties involved must be maintained to keep people's personal information safe and follow all the rules about data protection.

Everyone involved, from the caregivers to the elderly themselves, should be trained in how to use robots properly and ethically. Open discussions about any concerns or issues that come up along the way should be encouraged.

Regular checks should occur to make sure using robots is ethical and beneficial. Listening to feedback from everyone involved and making necessary changes to the plans must be implemented.

Working with the wider community to raise awareness about the ethical use of robots in elder care can help promote the growth of this field. This includes advocating for rules and standards that protect the rights and well-being of the elderly.

Lastly, experts in the field should be consulted to make sure that ethical decisions about using robots in elder care are always being made. They would provide help to think through any tricky ethical questions and make sure the industry overall makes the correct decisions.

Following this plan helps the assisted living industry make sure that using robots in elder care is not just helpful, but also respectful and fair to everyone involved.

## V.CONCLUSION

This positional paper explores the promise of employing robots in elder care. It discusses the challenges and ethical considerations of the integration of robot technology into the elder care landscape, and finally it proposes a series of recommendations to increase the adoption of robots in to help the aging population in assisted living facilities.

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