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AI Robots in Elderly Care: Opportunities, Challenges, and Ethical Concerns

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Abstract

Despite the advances in Artificial Intelligence technology, its application in elderly care still presents many challenges and limitations, particularly compared to human caregivers. This synthesis reviewed empirical articles that examined the role of AI robots in elderly care, focusing on their potential benefits and drawbacks. It revealed that AI robots are not capable of replacing human caregivers due to high costs, technical limitations, and the need for human cooperation. Additionally, the study warns that using AI robots may pose potential safety, privacy, and ethical risks, including data security issues, privacy breaches, and negative effects from the incorrect use of the technologies. This paper argues that AI robots can significantly enhance elderly care by providing consistent support and reducing caregiver burden, yet they cannot replace the essential human elements of caregiving. The findings emphasize the need for ethical and legal standards in the deployment of AI robots in elderly care, to ensure that the quality of life for the elderly is improved with these advanced technologies, rather than diminishes.

Keywords: Artificial intelligence, robots, caregiver, elderly, caregiving technology

AI Robots in Elderly Care: Opportunities, Challenges, and Ethical Concerns

The aging population is increasing globally, and this trend indicates that the number of elderly needing care will also increase significantly. According to the United Nations Department of Economic and Social Affairs, Population Division (2022), it is estimated that by 2050, there will be twice as many people aged 65 and over globally as there are children under the age of five. This means that in the future, the number of elderly people will significantly outnumber the newborns. Consequently, such demographic shifts will lead to greater demand for care services, along with a decline in the young workforce and a shortage of care workers. This phenomenon will pose challenges to existing healthcare systems and caregivers, indicating the importance of finding solutions. Studies have shown that AI robots have the potential to help in various aspects of elderly care, such as providing blood pressure measurements and cognitive training (Yamazaki, Ishii, Ito, & Hashimoto, 2021). However, it is necessary to evaluate the effectiveness and limitations of these technologies before they can be applied on a large scale.

The purpose of this study is to explore the role of AI robots in elderly care, evaluating their potential advantages and limitations compared to human caregivers. This evaluation provides insights into the practical applications of AI in elderly care. It allows policymakers, healthcare providers, and technology developers to understand the potential benefits and drawbacks of integrating AI robots into care practices, and to respond and prepare accordingly in advance. Furthermore, this research could help identify which aspects of caregiving are essential, ensuring that AI technology complements human caregivers, rather than replacing them. In this paper, I argue that while AI robots could significantly enhance elderly care by providing consistent and effective support, they still have some limitations and problems to be solved. Therefore, AI robots are still a long way from completely replacing human caregivers.

Research Question

What are the potential benefits and drawbacks of using AI robots in elderly care compared to human caregivers?

Practical Benefits for Care Robots

In recent years, the development and deployment of AI care robots has brought about significant advances in the fields of health and elderly care. These robots are often categorized into socially assistive robots (SARs) and physically assistive robots (PARs), which are used to support communication and body movement, respectively (Nanavati et al., 2023). An example of PAR would be Obi, a robotic arm specifically designed to assist individuals who have lost the ability to feed themselves by delivering food directly to their mouths by user commands (Obi, 2024). Examples of SARs include Paro, a social baby seal robot, and Pepper, a humanoid robot designed for social interaction (Liao et al., 2023). In addition to these categories of assistive robots, health monitoring robots also play a crucial role in elderly care. Yamazaki et al. (2021) interviewed elderly people aged 60 to 90 in Japan's elderly facilities and homes about user-friendly design. In contrast to large, mobile AI robots, the survey results showed that most elderly people preferred their robots to be small, stationary, and with hands similar to those of humans. Thus the team developed the AI robot "AHOBO," a desktop-sized, stationary robot with touch display, designed specifically to assist elderly individuals to measure blood pressure and offer advice based on visualized measurement data to encourage health improvements. Their study confirmed that the blood pressure readings are reliable for daily health monitoring. Feedback from users also indicated that the system is easy to use and integrates into daily life. This type of simple design and small size robot is popular among elderly people living in smaller spaces. Elderly can measure their blood pressure by themselves, and the operation is simple. This

means that robots focused on specific tasks can effectively provide assistance to the elderly. It also reflects that factors such as age, lifestyle, and living conditions can influence the need for and effectiveness of caregiving robots among the elderly.

Challenges in Performing Complex Tasks

While AI robots can provide strong support in health monitoring and caregiving, they cannot yet completely replace the essential services provided by human caregivers. Currently, SARs are the main care robots in the market. They provide companionship, communication, social interaction, entertainment, and cognitive training for the elderly. These emotional supports can not only effectively reduce loneliness and depression in the elderly, but also enhance their cognitive ability through cognitive training to help maintain mental health (Ma et al., 2023). PARs are primarily designed to help with specific tasks, such as lifting or transporting patients. However, they are not currently capable of performing more complex tasks, such as washing or providing intimate hygiene care (Pfeifer-Chomiczewska, 2022). These procedures are difficult and require a high degree of sensitivity, thus still managed by a human caregiver is the best option. As a result, the use of robots in these areas of physical assistance is still significantly limited, and it may not be economical to buy or rent PARs for care services because they can only perform a certain number of tasks.

Care robots can alleviate the burden on human caregivers, and their collaboration can greatly improve the quality of life for residents. Arshia Khan, a computer scientist at the University of Minnesota Duluth, conducted practical research on care robots. Khan (2023) deployed two humanoid robots in eight different nursing homes. The robots were programmed to address the domains of physical, emotional, and cognitive well-being. Ultimately, annual surveys on resident satisfaction and quality of life shows that nursing homes that utilize robots reported higher levels

in both areas compared to those without. For example, the data indicates that after engaging with robots, residents feel happier, better cared for, less fatigued, and less depressed. Staff also report that with the help of robots, they have more time to handle their household duties. These data clearly indicate that robots significantly improve the lives of the elderly while also alleviating the burden on the caregiving system. However, we must also note that this survey was conducted in the presence of caregivers. Therefore, the results might be different if care robots take on the caregiving responsibilities alone, while not being able to handle tasks typically managed by the caregivers. This reflects that, at the current stage, robot caregiving depends on human cooperation in order to achieve maximum effectiveness.

High Cost of Adopting Care Robots

As previously mentioned, the high cost of a robot would be an economic burden on the elderly, which explains the low usage of caregiving robots. While these robots may reduce care costs in the long run, the initial investment and maintenance expenses can be high and unaffordable for some ordinary households and even nursing homes. Worth (2024) reported that “Ryan,” a third iteration caregiving robot developed by Professor Mohammad Mahoor and students at the Ritchie School, remains too expensive to buy. Thus, it is offered to elderly residents in nursing homes at a rental price of one thousand two hundred dollars (\$1,200) a month. The price of a care robot can run into tens of thousands of dollars, including “hidden” costs such as training, software, maintenance, and support. According to Indeed, a global job matching and hiring platform, the average income of a caregiver in California is about \$20.10 per hour as of November 24, 2024, which is approximately \$47,025 per year (Indeed. n.d.). By contrast, the cost of a social humanoid robot or SAR named NAO is approximately \$10,000, while the Pepper robot, also a SAR, ranges from \$22,000 to \$35,000 (Liao et al., 2023). This

means that the cost of two to three months' salary for a human caregiver could cover the expense of purchasing a SAR. Therefore, the government needs to provide substantial subsidies and sponsorship in order to integrate AI robots into elderly care. In the meantime, affordable human caregivers will continue to provide essential services to the elderly.

Potential Safety Issues with Care Robots

Caregiving robots are capable of taking on multiple caregiving roles, but they should be used with caution, as there are still potential risks in providing safe care. For example, the caregiving robot "Paro" can serve as a rehabilitation therapist, emotional supporter, social facilitator, and cognitive promoter. Other brands of robots may not be capable of performing as many caregiving roles, and those capable of fulfilling the role of a supervisor are even rarer. This is because the supervisor role requires using various sensors to collect large amounts of data, analyze and recognize conditions, and then provide personalized advice and warnings based on the user's health status (Ma et al., 2023). This means that the accuracy of the data and the reliability of the analysis must be ensured, as any false alarms or incorrect data could lead to harmful advice and other serious consequences. In contrast, human caregivers do not experience malfunctions or software breakdowns and can rely on their professional training and accumulated experience to make more flexible and accurate judgments when faced with complex or unexpected situations.

On the other hand, collecting and storing large amounts of user data (such as health conditions and living habits) also means there is a potential risk of encountering privacy leaks and hacking attacks. The software installed on robots is still vulnerable to various forms of hacking in the current technological environment. Even with anti-hacking software, the system may not be immune to all security threats and attacks on the internet. Robot systems can only try to prevent risks by updating antivirus software in real-time (Yadav, 2021). As mentioned above,

AI robots have the capability to influence users' decisions, so if a caregiving robot is maliciously hacked and manipulated, it could pose a significant threat to the privacy and personal safety of the elderly. Additionally, there may be incidents of unauthorized recording or photography, leading to data theft, which could then be uploaded to the internet or used for extortion or other illegal activities.

Ethical and Legal Issues

Besides the necessity to address safety concerns, the use of caregiving robots also raises ethical and legal issues. The purpose of caregiving robots is to accompany the elderly, reduce their feelings of loneliness, and take on some caregiving responsibilities that would otherwise fall on family members, thereby allowing these people more time and energy for work and other duties. However, if the idea that “having a robot is enough” arises, it contradicts the original intention. Wang (2018) argues that using robots might make the elderly feel even more lonely and isolated, reducing the time family members spend with them and weakening family connection, which goes against the initial purpose. Caregivers can provide not only basic daily life assistance but also emotional support and care, building deep connections with the elderly. These interpersonal interactions and personalized care are currently beyond the capabilities of robots.

In terms of the law, the attribution of responsibility is still very complex, and some issues caused by robots are difficult to effectively address. For example, when a highly autonomous, self-learning AI robot makes an incorrect decision based on the data it collects, causing harm or providing inadequate care, the victim may face difficulties in obtaining reasonable compensation. This is because the robot itself lacks legal personality or capacity, meaning it does not have independent financial status to compensate for the damage it causes, and current laws have not

clearly defined the allocation of these responsibilities (Eldakak et al., 2024). Because this type of error is not necessarily an issue with the algorithm, it cannot be blamed on software developers. Manufacturers may not need to bear responsibility either if it is not determined to be a hardware or software defect. In the United States, where product liability laws are determined at the state level, companies may argue against the liability if they can demonstrate that users were adequately warned with potential risks. For instance, according to California Civil Code §1714.45, a manufacturer is not liable in a product liability action if the product is inherently unsafe and the risks are known to ordinary consumers (Civil Code - CIV, 1714.45(a)). Companies could attempt to use this principle to mitigate their responsibility if they provide sufficient warnings to users. Therefore, to address this challenge, it is necessary to establish new legal standards and regulations for intelligent robots, such as determining standards of responsibility and liability, and creating accountability mechanisms to prevent users from bearing unreasonable risks. In the meantime, to help users feel more secure in using these technologies, companies that developed the robot could also require users to purchase insurance to provide compensation and protection in case of accidents and injuries.

Challenges in Integrating AI Robots in Elderly Care

Attempting to replace human caregivers by making AI robots more complex with numerous functions may backfire. Ma et al. (2023) noted that due to elderly's lack of confidence in their digital skills, integrating AI robots in caregiving may require prior training for the elderly to ensure they can use this technology effectively and achieve positive outcomes. This means elderly might have limited knowledge of new technologies that could lead to difficulties in using caregiving robots. For example, if a robot requires voice commands or a touchscreen to switch between different functions, older adults might forget the specific steps or find it hard to

understand how to set and adjust the functions. As a result, they may not be able to fully utilize all the robot's features and may even fail to use important functions (like emergency calls) correctly in critical situations. However, training could bring certain difficulties and challenges as elderly individuals tend to be forgetful and may find it difficult to learn new things and adapt to complex operations.

Another challenge is that over-reliance on robots may lead to a lack of independence and self-care abilities in elderly individuals, which can affect their autonomy and quality of life. Cheng and Yang (2024) points out that as elderly individuals become more dependent on smart elderly care technology, their ability to effectively respond to risks gradually diminishes. If there are system or technical failures, it can easily leave the elderly helpless in emergency situations, endangering their safety. Therefore, it is crucial to prevent elderly individuals from becoming overly dependent on the conveniences brought by artificial intelligence and to ensure the correct use of these technologies in their daily lives.

Conclusion

While AI robots have the ability to provide ongoing support and reduce the burden on caregivers, they cannot operate independently due to technological limitations, required for human cooperation, and the existing ethical and legal concern. AI robots can perform specific tasks like offering emotional support and help with physical tasks such as lifting or transporting patients. Their ability to provide consistent care and monitor health parameters can significantly improve the quality of life for elderly individuals, particularly those with chronic conditions. However, they lack the capability to perform more complex and nuanced caregiving tasks that human caregivers manage. Moreover, the high costs of AI robots limit their accessibility. AI robots' reliance on data collection creates risk for data breaches and hacking that endangers

privacy and safety. Ethical dilemmas also arise regarding the reduction in human interaction and overreliance, which could end up hurting family relationships. The legal issues surrounding AI robots are complicated, with unclear guidelines on responsibility and liability. Overall, while AI robots hold potential, they are not yet a substitute for human caregivers. It is necessary to establish ethical and legal standards, ensuring that AI technologies actually complement human caregivers and improve the quality of the elderly's life.

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Appendix

The following text contains the rough draft I originally wrote in Chinese, and I used ChatGPT for translation from Chinese to English.

1. Introduction

The purpose of this study is to explore the role of AI robots in elderly care, evaluating their potential contributions and limitations compared to human caregivers. 全球老龄化人口正在增加, 这趋势表明需要照顾的老年人数量也会有显著增长。 “根据联合国的数据, 到2050年, 全球65岁及以上的人口将是5岁以下儿童人口的两倍”, 而这种人口结构的转变将会导致对护理服务的更大需求的同时, 还会伴随年轻劳动力的下降, 和护工人手的短缺。此现象会对现有的医疗保健系统和护理人员构成挑战, 预示着寻找解决方法的重要性。 然而已有研究表明, 人工智能机器人有潜力在老年人护理的各个方面提供帮助, 比如提供血压测量, 认知训练等。然而, 在大规模实际应用前有必要对这些技术的有效性和局限性进行批判性评估。

This study is significant, 因为它为人工智能在老年人护理中的实际应用提供了见解。可以让政策制定者、医疗保健提供者和技术开发人员了解将人工智能机器人融入护理实践的潜在好处和缺点, 并提前做出相应的对策和准备。此外, 这项研究还可以帮助确定人类护理仍然不可或缺的部分, 确保AI技术在于补充而不是取代护理人员的基本要素。

In this paper, I argue that 虽然人工智能机器人可以通过提供一致和有效的支持来显着增强老年人护理。但他们仍存在者一些局限性和不少待解决的问题。因此, 人工智能机器人要完全代替人类护工还有很长的路要走。

a. Research Questions:

- i. How can AI robots contribute to the care of the elderly, and what are the limitations compared to human caregivers?

- ii. What are the potential benefits and drawbacks of using AI robots in elderly care compared to human caregivers?

2. 机器人造价高昂, 目前无法完全取代人类护工的基本服务 (**Robots are expensive and currently cannot fully replace the basic services provided by human caregivers**)

成本过高, 灵活性不够强。

机器人能做些什么 (物理和精神上, cite anotated)

近年来, 护理机器人的发展和部署为医疗保健和老年护理领域带来了重大进展。这些机器人分为社交辅助机器人(sar)和身体辅助机器人(par), 分别用于支持通信和身体移动。虽然这些技术创新为护理人员提供了强力的支持, 但它们还不能完全取代人类护理人员提供的基本服务。

当前市面上的看护机器人主要以SAR为主, 在于为长者提companionship, communication, social interaction, entertainment, and cognitive training。这些情感支持不仅可以有效地减少老年人的孤独感和抑郁情绪, 还能通过认知训练增强他们的认知能力, 帮助保持心理健康。而PAR主要是为了帮助完成特定的任务而设计的, 比如举起或运送病人。然而, 目前它们还不具备执行更复杂任务的能力, 如洗涤或提供亲密的卫生护理(2021年)。这些操作有一定的难度, 需要高度的敏感性, 仍然由人类护理人员来管理是最佳选择。因此, 机器人在这些物理援助领域的使用仍然有大幅度限制, 在护理服务方面购买或租用PAR也未必具有经济效益。

看护机器人能够减轻人类看护的负担, 两者配合能大大的改善居民的生活质量。Arshia Khan, a computer scientist at the University of Minnesota Duluth, 进行了看护机器人的实际研究, 她部署了Two humanoid robots in 8 different nursing homes. The robots were programmed to address the domains of physical, emotional/social and cognitive wellbeing.

最后,居民满意度和生活质量年度调查显示,与没有部署机器人的养老院相比,部署机器人的养老院在活动领域的满意度和生活质量有所提高。例如,数据显示,在与机器人互动后,居民感到更快乐,更受照顾,更少疲劳,更少沮丧。工作人员也反馈,在机器人的帮助下,工作人员有时间处理他们的家务。这些数据明确的指出了机器人的确对长者的生活有很大的改善,同时还可以减轻看护系统的负担。但我们同时也要注意,这项调查是在有看护人员的情况下进行的。因此看护机器人独自担起看护责任时,机器人未必能够胜任部分工作,导致结果可能会有所不同。这反映出,目前机器人看护在有赖于人类的配合下,才能发挥最大的效益。

目前,看护机器人尚未广泛应用的其中一个原因是其昂贵的价格。虽然从长远来看,看护机器人可能降低护理成本,但初期投资和维护费用可能较高,对于一些普通家庭甚至是养老院来说都难以负担。瑞安(Ryan)是由里奇学院(Ritchie School)的穆罕默德·马胡尔(Mohammad Mahoor)教授和学生们开发的护理机器人, the third iteration因为购买的价格过于昂贵,它以每月1200美元的租金提供给养老院的老年人。护理机器人的价格可高达上万,其中还包括“隐藏”费用如software, maintenance, training and support. 这意味着政府需要提供大量补贴和赞助,才能使人工智能机器人融入老年看护领域。与此同时,人类看护仍将继续为长者提供必要的服务。

需要政府支持, 提供补贴

成本问题: The UK moves one step closer to developing robots capable of providing support for Britons and making caring responsibilities easier, thanks to £34 million government investment announced today (Saturday 26 October 2019).

其次,可能影响老年人采用技术的一些主要障碍包括对自己的数字技能缺乏信心,对其可能对生活质量产生的积极影响缺乏了解(Bian等人, 2021;Radder et al., 2019)。为了更好的收养和积极的结果,对老年人进行干预前的相关培训是必不可少的。老年人的生活习惯或模式可能会影响科技产品的设计和使用。最后,与会者提出了许多宝贵的建议。这些观点和见解有助于改进老年人家庭虚弱评估技术的设计和采用

此外,需要考虑到并非所有长者都居住在养老院。不同的年龄层、生活习惯和居住场所都会影响长者对看护机器人的需求和使用。Yoichi Yamazaki, he is a Associate Professor from Kanagawa Institute of Technology,他和他的团队interviewed elderly people aged 60 to 90 in Japan 's elderly facility and elderly people'shomes about user-friendly design,有别于人们普遍使用的大型、能移动的AI机器人,调查结果显示多数的长者希望他们的机器人要small, stationary, and hands are similar to human。于是团队就 develop the AI robot "AHOBO", a desktop-sized, with touch display, stationary robot designed to assist elderly individuals to measure blood pressure and offers advice based on visualized measurement data to encourage health improvements. Their study confirmed that the blood pressure readings are reliable for daily health monitoring. Feedback from users indicated that the system is easy to use and integrates into daily life. 这种设计简单、体积小的机器人在房子空间较小的长者中很受欢迎。老年人能够自己测量血压,操作非常简单,这意味着,专注于特定任务的机器人可以有效地为老年人提供帮助。

日本有百分之96%为居家养老

但如果为了尽量替代人类,而搭载诸多功能使AI机器人的使用变得复杂,恐怕会适得其反。高龄长者容易健忘,较复杂的操作难以适应,他们学习和适应新事物的能力较弱,

这导致他们对自己的数字技能缺乏信心, 对新科技了解不多, 并在应用看护机器人时遇到困难。例如, 如果机器人需要通过语音指令或触摸屏来切换不同功能, 老年人可能会忘记具体的操作步骤, 或难以理解如何进行设置和调整。结果, 他们可能无法充分利用机器人的全部功能, 甚至在关键时刻无法正确使用重要功能(如紧急呼叫)。因此, 在看护中融入AI机器人可能需要提前对老年人进行相关培训, 以使他们能够熟练使用这类科技并获得正面的结果。然而, 这种培训可能会带来一定的困扰和挑战。

3. 使用机器人看护的安全问题 (Potential Safety Issues with Care Robots)

Caregiving robots designed to serve in the role of a Supervisor need to be used with caution, as there are still potential risks in providing safe care. 市面上有许多不同品牌的护理机器人, 它们能够扮演的护理角色也各不相同。例如, 护理机器人“Paro”能够担任多种角色, 如Rehabilitation therapist, Emotional supporter, Social facilitator, and Cognitive promoter。而其他品牌的机器人在护理角色上的表现则没那么全面, 能够胜任(Supervisor)角色的护理机器人更是稀少。这是因为担任监督者角色需要使用各种传感器收集大量数据, 进行分析和识别状况, 然后根据使用者的健康状态提供个性化的建议和警告。因此, 它们在某种程度上承担了部分替代人类看护的功能, 特别是在需要连续、精确监控和响应的情况下。这意味着数据的准确性和分析的可靠性必须得到保证, 因为任何误报或错误数据都可能导致有害建议等严重后果。相比之下, 人类看护不会出现故障和失灵, 他们在面对复杂甚至是突发情况时, 能够依靠其接受过的专业培训和积累的经验做出更灵活和准确的判断。

另一方面, 收集和储存大量用户数据(如健康状况和生活习惯)也意味着可能面临隐私泄露和黑客攻击的风险。安装在机器人身上的软件在当前技术环境下仍然容易受到各种形式的黑客攻击。没有任何防黑客的软件工具能够在网络上完全发挥作用, 确保系统始终安全。机器人系统只能通过实时更新防病毒软件尽量预防风险。需要注意的是, AI机器

人有能力影响用户做出决定, 因此如果看护机器人遭到黑客的恶意攻击和操纵, 可能会对老年人的隐私和人身安全造成重大威胁。同时, 还可能出现偷拍、录音等情况等数据窃取, 进而被上传到网络或用于勒索等不法行为。

影响社会运作, 比如窃取数据, 进行人身攻击

4. 伦理和法律问题

伦理问题(缺少对老年人的尊重, 依赖性问题, 法律问题如照料不当的责任)

除了需要注意安全方面的问题外, 使用看护机器人还会带来伦理和法律方面的顾虑。看护机器人的目的是陪伴老人, 减轻他们的孤独感, 并代替家庭成员承担部分照护责任, 从而让家庭成员有更多时间和精力从事工作和其他活动。一般是在家人没时间等情况下, 才会选择使用机器人。然而, 如果产生了‘有机器人在就足够’的想法, 这与初衷相悖。使用机器人可能反而让老人感到更加孤独和被孤立, 减少了家庭成员与长者相处的时间, 加剧了亲情的淡化, 这与最初的目的背道而驰。而护工不仅能提供基本的日常生活帮助, 还能够给予老人情感支持和关怀, 与老人建立起深厚的情感联系。这些人际互动和个性化照护是目前机器人无法实现的。

在法律方面, 责任归属目前依然非常复杂, 对机器人引发的一些问题难以有效解决。比如, 当一个自主性高、可以自我学习的智能机器人因其收集的数据而做出错误的决定, 并造成伤害或提供不充分的护理时, 由于机器人本身缺乏法律人格或能力, 且没有独立的财务状况来赔偿其造成的损害, 加上现行法律尚未明确定义这些责任的划分, 受害者可能面临无法获得合理赔偿的困境。这类错误不一定是算法的问题, 因此不能归咎于软件开发者, 也不算是硬件或软件的缺陷, 制造商也不一定需要承担责任。所以为了应对这种挑战, 有必要针对智能机器人制定新的法律标准和法规, 比如确定责任和责任的标准, 建立赔偿受害者的框架和问责机制, 以避免使用者承担不合理的风险。

最后, 过度依赖机器人可能会导致老人在某些情况下缺乏独立性和自我照护能力, 这可能影响他们的自主性和生活质量。Journal of Nanjing Medical University (Social Sciences) 指出老年人对智能养老技术的依赖性加深, 导致其有效应对风险的能力逐渐丧失, 一旦设备出现系统故障、技术故障等问题, 极易导致老年人在紧急情况下陷入无助状态。此外, 对于生活完全不能自理且长期依赖于智能养老技术的老年人, 过度依赖智能养老技术则可能危及生命安全, 面临的风险和挑战更加严峻。因此, 避免老年人过度依赖人工智能带来的便利, 同时确保这些技术在他们生活中的正确使用, 是至关重要的。

过度依赖风险。