The Interweaving and Challenges of Ethics and Technology in Intelligent Elderly Care Robots

Can Fang[1,a], Ji Wu[2,b,*], Xinyu Du[3,c], Ying Xiong[4,d]

[1]Department of Nursing, Wuhan City College, Wuhan, China
[2]Department of Medicine, Wuhan City College, Wuhan, China
[3]Department of ICU, Zhongnan Hospital of Wuhan University, Wuhan, China
[4]Department of Neurosurgery, Zhongnan Hospital of Wuhan University, Wuhan, China
[a]m18827279033_1@163.com, [b]wujimike1978@163.com, [c]duxy19@163.com, [d]419354781@qq.com
[*]Corresponding author

Abstract: The use of intelligent elderly care robots has rapidly increased due to the severity of the aging problem. However, this has brought about potential risks, ethical and legal problems. When considering the deployment of intelligent elderly care robots, it is crucial to determine whose liberation is being pursued - the liberation of humans or dependence of humans. Additionally, the responsibility for deploying such robots should be considered. Furthermore, whose ethics should be taken into account - the ethics of machines or human ethics? An ethical review of intelligent elderly care robots is also warranted. Alongside these considerations, it is important to regard the elderly robot as a "human" entity and ensure the freedom, dignity, and privacy of the elderly personnel. Through emphasizing synchronization of social policy and ethical planning, as well as human dignity and social equity, moral construction and family care, the healthy development of the intelligent elderly care robot industry can be realized, and a balanced development of human beings and society can be promoted.

1. Background of the Development of Intelligent Elderly Care Robot

With the publication of the seventh national population census, the problem of aging has once again attracted wide attention. Statistics show that the population aged 65 or above accounted for 13.5 percent, 12 provinces even exceeded 14 percent, and Anhui province was more than 15 percent[1]. According to the United Nations criteria, this figure means that China is very close to the "rapidly aging". The fifth Plenary Session of the 19th CPC Central Committee will actively address the aging of the population as a national strategy, and artificial intelligence technology provides a new idea to solve the pension problems brought by aging. The application of nursing robots in the field of elderly care is becoming more and more common, and it has become an important means of intelligent elderly care. This trend is in line with the increasing demand for care in the global aging population and the rapid development of AI technology itself. The development of intelligent elderly care robot is also a reflection of the rationality of care practices. However, there are also some subsequent problems, which need to be analyzed and suggested from an ethical perspective to

ensure the healthy development of intelligent pension robots and the active aging practice.

1.1 The Real Need of the Growing Aging Problem

With the advancement of society, the level of social development is increasing day by day, and the average life expectancy of people is also rapidly growing. Therefore, the phenomenon of aging has become a global trend. By 2050, the global proportion of the population aged 65 and over is expected to rise to 20%, equivalent to 1.6 billion [2]. As a major global issue, aging is even more complex in China. On the one hand, China's elderly population has a large base and is growing rapidly. In 2000, China's elderly population was about 88.27 million, accounting for 7%; in 2020, the figure was 190 million and 13.5%, respectively [3]. On the other hand, China's aging is also accompanied by phenomena such as living alone, empty nest, and disability, which are showing a geometric climb. For example, the number of elderly households living alone aged 65 and above increased from 17.54 million to 25.4 million from 2010 to 2020 [4]. With the aging of the population, the challenge of disabled aging is becoming increasingly prominent. According to a study by Peking University, it is estimated that by 2030, China's disabled elderly population will exceed 77 million, accounting for more than 57% of the total disabled population, and they will experience a disability period [5] of 7.44 years. According to the international standard ratio of 1:3 for caregivers and disabled elderly people, China's demand for elderly care services is huge, requiring at least 25.6 million nursing staff. However, there are only more than 500,000 service personnel engaged in elderly care in China [6]. The number of people needing elderly care services is increasing year by year, but the supply of nursing staff cannot keep up with the demand, leading to a huge gap and contradiction. At present, there are some problems in the nursing staff, such as low educational level, high age structure, unreasonable gender structure, large mobility, and relatively simple career development and rising channels, all of which affect the quality and efficiency of elderly care services. Additionally, due to the physical contact and private living space involved in nursing work (such as bathing, cleaning, etc.), some people have a cognitive and emotional deviation of nursing work, viewing care simply as "dirty" or "low-end" work, or thinking that people engaged in nursing work are "inferior". The existence of this concept not only reduces the social status and professional image of nursing work, but also affects people's recognition of nursing career and respect for those engaged in the profession. The low social status of nursing profession makes it difficult to recruit high-quality young people, which leads to a lack of successors. Considering China's "getting old before getting rich" population structure and the "8421 family structure"-- the traditional family pension model -- this problem becomes more urgent. At the same time, with the development of urbanization, the demand for diversified, multi-level, and personalized services for the elderly will continue to grow, and the task of elderly care is becoming more and more difficult. Traditional nursing methods and maintenance systems have been unable to meet the needs of the elderly population for a better life. The application of artificial intelligence technology, the integration of intelligent elderly care technology with robots as the core into the field of pension, has become an important means to alleviate pension problems in China, improve the nursing quality of the elderly, and meet their needs for a better life.

1.2 The Rapid Development of Information Technology and Intelligence

The breakthroughs and exponential development of artificial intelligence (AI) technology have profoundly impacted human society by providing strong support for solving pension problems. Nowadays, AI technology has been widely utilized in various fields of elderly care services, greatly improving both the efficiency and quality of service while reducing labor costs. This has accelerated the intelligent transformation of the elderly care service industry. Presently, the field of elderly care

services presents intelligent service products, intelligent service management, accurate supply and demand docking, and the platform of resource integration[7] The use of intelligent robots as the core of elderly care has boomed worldwide. In fact, as early as the 1980s, the United States, Japan, the Netherlands, and other countries began to research and develop nursing robots for social application. These countries have among the highest technological advancements in the field of nursing robots. The United States was the first country globally to engage in research and production of nursing robots. Back in 1984, a typical nursing robot named HelpMate was invented. It was equipped with a variety of sensors, including obstacle avoidance and autonomous navigation functions, with the capability to effectively complete the delivery of drugs, food, medical records, and other tasks. Known as the "kingdom of robots," Japan has always been a world leader in the development and use of nursing robots. Japan not only promotes the development of robots as a basic national policy, but also creates a blueprint for technological development, and details a plan for the future development of robots.

Research on AI technology in the field of geriatric care started relatively late in China, but it has developed rapidly in recent years. Currently, numerous intelligent nursing robots have been developed and applied, enabling automation and intelligence in elderly care work. The Institute of Automation of the Chinese Academy of Sciences developed China's first multi-modal interactive intelligent wheelchair as early as 2000, which can control walking through man-machine dialogue and voice control.In 2010, China's first personal hygiene care robot was created, which can help the elderly with shampooing, bathing, pneumatic health massage, and real-time measurement of physiological parameters. In May 2016, the Social Welfare Center of Hangzhou, Zhejiang Province, introduced a number of service-oriented robots, turning "robot pension" from a concept into a reality. The 2017 World Robot Conference showcased several nursing robots that can assist the elderly. For instance, Bestic's feeding robot enables users to eat independently through a small remote control, and Sharp's mini RoBoHon robot can help the elderly get online, send text messages, take selfies, and even "communicate with people" through sitting, walking, and dancing. In 2018, Shenzhen's first public nursing home was opened, which uses nursing robots to provide defecation care and vital signs monitoring services for disabled elderly. Meanwhile, face recognition and alarm monitoring technology are used in the hospital to better manage patients with Alzheimer's disease. The nursing home also cooperates with third-class A hospitals to provide efficient medical services through online consultation. The application of these technologies will improve the level and quality of geriatric care, providing better care. "Made in China 2025" emphasizes the need to promote the wide application of nursing robots in the elderly care industry, considering it an important way to solve the plight of China's elderly care work. Currently, the application methods of intelligent robots in elderly care mainly include monitoring the health status and behaviour of the elderly, assisting them in completing daily tasks, and providing entertainment. Countries actively promote the innovative development of the smart health and elderly care industry, which has opened up a broad development space and new scenes for nursing robots. Nursing robots have increasingly become the pioneer field for the comprehensive marketization of service robots.

1.3 Subject Reflection of the Relationship between People and Machines

Subjectivity is a fundamental concept in philosophy. From the Marxist perspective, subjectivity is the essential characteristic of humans as subjects in practice, serving as the basis and condition for humanity as the subject, which is primarily expressed through consciousness, initiative, and creativity. As Heidegger noted, subjectivity constructs the subject.

As a practical existence of humanity, the development of artificial intelligence increasingly exhibits a tendency towards subjectivity. Eli.Q, a companion robot developed by Israel, is an

intelligent robot that can not only understand context but also make decisions automatically based on preset goals. It can remind the elderly to take walks, take medicine on time, entertain themselves, monitor their health and give exercise advice, and ask the owner if they wants to contact their family or friends. These functions can provide more companionship and care for the elderly, allowing them to feel more warmth and care. The European Parliament has proposed a draft proposal that gives robots basic "labor rights" for compensation, copyright protection and social insurance. Saudi Arabia has granted robot Sophia citizenship, making it the first robot ever to gain citizenship. Sophia It also became the first robot ever to gain citizenship. The Shibuya government in Tokyo, Japan, granted the robot ShibuyuMirai residency of its service to local residents and tourists. In the era of strong artificial intelligence, robots are not only the partners and members of human life, but also have certain risks. Humans need to be alert of the uncontrollability of robots and the possibility of replacing humans. Just as "Homo sapiens" has defeated other species in history, robots may also develop their own intelligence and capabilities to become the "master" on our earth and control the fate of human beings. Therefore, we need to treat and manage the development of robots carefully to ensure the survival and development of humanity. Robots constantly approach humans and acquire some basic characteristics and rights unique to humans. And human thinking and behavior are increasingly coordinated or integrated with various intelligent systems. This not only blurs the principled boundary between "man" and machine, but also poses a serious challenge to "what is man". Yuval Herali[8] bluntly said: " These changes will touch the essence of human beings, and even the definition of 'man' may be different."

The subject and rights of artificial intelligence have been debated by academic circles at home and abroad for decades. However, a convincing demonstration and explanation have not yet been put forward. However, it is imperative to "bring artificial intelligence into the category of human morality" [9], especially under the framework of normative ethics. Evan Dashevsky [10] believes that whether or not to give robots an "electronic personality" or "subject" can be seen as a reflective care for people themselves, which still represents human-centric thinking in essence. In other words, the key to the subject relationship between humans and robots is whether humans can break through the subject-object binary structure of anthropocentrism. Marcuse [11] believes that to overcome the dilemma of subjectivity, contemporary humans cannot rely on scientism anymore, but need to rely on humanism, which requires improving the value orientation and ethical care of the self, to form a sense of community.

2. Ethical Reflection of Intelligent Elderly Care Robot

Intelligent elderly care is an immensely promising area of application for artificial intelligence. However, due to the unique characteristics of the service recipients, diverse service modes, and heavy service workload, the ethical issues of intelligent elderly care possess certain peculiarities beyond the universal ethical issues of artificial intelligence itself. In order to provide better services for the elderly, intelligent nursing robots often need to collect more user data. However, the more data is collected, the greater the risk of data leakage, which not only infringes on the privacy of the elderly, but also pose potential harm and risks.

In the field of elderly care, intelligent robots are designed in a humanoid form, which raises a series of ethical issues beyond instrumentalism. There have been many studies in China exploring these ethical issues. However, there is not enough emphasis on the value dimension of the subject, especially regarding the rights and responsibilities of the subject. Therefore, this article mainly reflects from one dimension of subjectivity research: rights and responsibilities. Rights and responsibilities are key issues of subjectivity, and without reflecting on them, subjectivity cannot be discussed. Subjectivity is based on the premise of human independence and freedom. Therefore, the

author reflects on the premise of subjectivity and discusses whether intelligent nursing robots enhance or alienate human autonomy, create dependence, and further discusses the attribution of rights and responsibilities in subjectivity. Understanding subjectivity, rights, and responsibilities is a major difference in different ethical theories.

2.1 Whose Liberation: Human Liberation or Human Dependence

Marx long ago recognized that the technical paradox would have a dual impact on human society. He points out that everything has its opposite. The victory of technology seems to be at the expense of moral decay. On the one hand, machines have the incredible power to reduce human labor and make labor more effective, but on the other hand, they also cause problems such as hunger and excessive fatigue [12]. The development of intelligent elderly care robots also exhibits the technological paradox. On the one hand, the advantages of care robots lie in their ability to transcend temporal and spatial limitations, and provide monitoring services for the elderly day and night, day and night. It can assist the elderly to complete various auxiliary activities, such as getting up, passing objects, setting reminders, etc. And can also engage in programmatic interaction and communication with the elderly. This greatly liberates people's labor, reduces the burden of caregivers reduces the human resources of elderly care services, and improves the quality of life of the elderly. However, the contractual "calculative thinking" of robots in care is far more than caring thinking, which will inevitably have an impact on China's traditional morality, especially on elderly care ethics, and risk weakening filial piety. In traditional Chinese ethical culture, elderly care is mainly a feedback mode of family care. I raise you to grow up, you accompany me to grow old, filial piety is one. This kind of care not only requires care and maintenance, but also has the emotional expectation of communication and companionship. Therefore, the positioning of care robots should be as helpers and collaborators in filial piety, not substitutes. It can help children take care of the elderly, but cannot replace them in their filial piety. As Sharkey et al. pointed out, we must "ensure that robot applications in the field of elderly care are beneficial to the elderly themselves, rather than just used to reduce the care burden for other members of society." On the other hand, in the absence of a malfunction, robots have the characteristic of unconditional obedience to commands, which largely satisfies the care and emotional needs of the elderly. This makes the elderly, especially those living alone, may develop a feeling of "unidirectional emotional connection" or "unrequited love" to the robot, thereby forming dependence on the robot. Excessive dependence will make the elderly more likely to live alone, affecting the already scarce interpersonal interactions between the elderly and others and society. Human-machine interaction, even if benign, is only a pretense of interpersonal communication. Because no matter how realistic care robots are in appearance or behavior, they cannot form truly meaningful relationships with humans, namely social relationships. The lack of social interaction will increase the risk of cognitive function decline and dementia in the elderly, posing a great threat to their physical and mental health. The excessive dependence on robots is not only social phobia of real interpersonal relationships, but also an inevitable transfer of helplessness. Shirley Tickle [13] found in her studies of nursing homes that the important motivation for older adults to participate in robot studies is that they have the opportunity to interact with those friendly and beautiful research assistants. In fact, the elderly are not so concerned about robots, but what they really care about is the real person who brings the robot.

2.2 Who's Responsibility: Human Responsibility or Machine Responsibility

Despite intelligent robot manufacturing becoming a strategic emerging industry developed and cultivated by countries around the world, robot safety problems caused by technology, design, and

operation factors will inevitably occur. People's acceptance of nursing robots is not high, and there is also a certain degree of distrust regarding the safety of robots. Scholars believe that without the guidance of medical staff, safety will be an unavoidable problem in the application of home robots, and it may even bring a series of legal issues [14]. The robot can act according to the principles set by the technology, or it can accept the command of human beings, but can the robot take responsibility for accident? For example, in the creative animated short film "Changing the Battery", an old grandmother dies unexpectedly at home, but the robot thinks the owner is out of power, and is eager to help the owner change the battery, and continues to accompany the elderly until the battery runs out. Is the robot responsible for the old man's accident? What should the robot do when the elderly refuse to nurse the robot to eat or take medicine? In reality, the subject status and responsibility boundary of nursing robots cannot be fully determined. With the improvement of the intelligent level of robots, intelligent machines can bear legal responsibility for their behavior to a certain extent [15]. UNESCO has proposed two options. One is undertaken by the intelligent robot, and the other is shared by all people involved in the process of invention, licensing and distributing the robot. The premise of making intelligent robots take responsibility is to recognize their subject status and rights. However, there is no unified understanding of the subject proposition whether at home and abroad, theoretical or practical. In the author's opinion, when the main body status of the intelligent robot cannot be determined, it is a solution to shelve the dispute and share it by the relevant parties. This is also more in line with the technical conditions of the current robots. At the same time, in order to avoid shirking responsibility, we suggest promoting the use of the insurance system so that users, distributors, manufacturers and designers involved can share the responsibility. However, more importantly, we should fill the gap in responsibility through the continuous improvement of laws and regulations, so as to clarify the attribution of responsibility and find an appropriate solution. In this way, we can better enjoy the benefits and fruits brought by technological progress.

2.3 Whose Ethics: the Ethics of Machines or the Ethics of Robots

Ethics generally refers to thenormative behavior standards that govern the relationships between individuals, individuals and society, and individuals and nature. However, as intelligent elderly care nursing robots become increasingly integrated into our lives, we must face a new line of thinking in which this new "electronic component assembly", will develop a new ethical relationship with humans, and even robots will form a new ethical relationship with each other. This has led to the emergence of the field of "robot ethics" with the first mention made in 2002 by Marco Wollschlaeger. In 2005, the European "Robot Ethics Studio" project was launched, aiming to develop the world's first blueprint for robotics ethics. There is still controversy in the academic community as to whether robot ethics is the ethics of machines or robot ethics, both of which are related but different. They differ in their scope of study, definition, and responsibility. Robot ethics takes humans as the responsible subject and studies the ethics of how humans design, deal with, and treat robots, while machine ethics takes machines as the responsible subject and studies the ethics of how machines behave morally towards humans[16]. Both perspectives explore how machine technology interacts with human society in order to better manage machine behavior and achieve symbiosis between humans and machines. The ethical issues related to intelligent elderly care robots cannot simply be attributed to the controversy between machine ethics and robot ethics, but rather the issue of constructing human-machine interaction relationships using intelligent tools or technologies in the field of elderly care. Coexistence and collaboration between humans and machines should be the future development trend and the most desirable outcome of human technological development. As M. Mara said, "How should people construct artificial intelligence

(products) to make it a satisfying interactive partner for different target groups? How can we use intelligent technology to avoid feelings of being dominated or afraid?"[17] The "satisfying interactive partner" relationship between intelligent elderly care nursing robots and humans helps adjust the reasonable expectations of relevant interest groups for nursing robots, thus reducing or avoiding ethical risks arising from inappropriate expectations of nursing robots. As Robert Sparrow and Linda Sparrow have said, most of the apparent benefits that nursing robots bring to the elderly are based on mistaken or vague understandings of their nature and relationship with humans, which not only do not bring any substantial improvement to the elderly's lives, but may also harm them. To reduce or avoid these harms, it is necessary to increase the elderly and related nursing staff's understanding and appreciation of the nature of elderly care nursing robots and their relationship with humans[18]. Therefore, rational thinking about the relationship between humans and nursing robots, including both humans and robots within a comprehensive target value, that is, starting from the "human-machine relationship" as a whole rather than from the fragmented and independent value properties of humans and robots, is essential for exploring a new ethical thinking and building a mutually beneficial and cooperative symbiotic community of humans and machines.

3. Ethical Suggestions for Intelligent Elderly Care Robots

3.1 Policy Stance: Social Policy is Synchronized with Ethical Planning

The development of intelligent elderly care nursing robots relies not only on technological advances, but also on ethical planning. In the face of advanced artificial intelligence, regulations and guidance through legal and policy means are necessary. At the same time, civilized and ethical guidance is needed to ensure that robots have more openness and flexibility. Peggy Hicks, head of the theme promotion department of the Office of the United Nations High Commissioner for Human Rights, has emphasized that excessive reliance or abuse of technology may lead to impersonal care practices or new forms of neglect and alienation. We must ensure the safe design and deployment of technology[19]. The design of technology is not completely value-neutral. The development of modern technology has a direct and systemic impact on social, ethical, and political values. Technological boundaries and potential risks often involve ethical issues, and there is an inherent contradiction between the possibilities of technology and the constraints of ethics. In a sense, we can say that any technical design is a moral endeavor.

Therefore, regulators and enforcers need to be prepared and cautious in dealing with these issues, while also considering the development of social policies and ethical planning. Through in-depth discussion of the relevant policies, laws, ethics, and social issues related to artificial intelligence, the boundaries of development and limits for an intelligent society are set, which is a consensus worldwide. The International Association of Gerontology and the European Union have successively issued relevant documents to regulate intelligent robots engaged in health care and medical services, emphasizing the social responsibility of researchers in the field of intelligent elderly care, and providing guidance for the reasonable development of the intelligent elderly care service industry. In 2021, the World Health Organization officially released the "WHO Guidelines on Ethics and Governance of Health Artificial Intelligence," aimed at providing valuable guidance for different countries to maximize the benefits of artificial intelligence, minimize its risks, and avoid harm[20].

China has successively promulgated relevant policies and plans at the central and local levels to promote the development of intelligent elderly care and intelligent elderly care equipment, while also strengthening ethical norms for artificial intelligence. As of September 2021, 27 provinces and cities in China have issued guidance and supporting measures for the development of intelligent elderly care, and have successively introduced local intelligent elderly care policies to support

industry development[21]. In 2017, the State Council of China issued the "New Generation Artificial Intelligence Development Plan," which clearly stated the need to conduct research on artificial intelligence behavior science and ethics, establish a multi-level ethical judgment structure and an ethical framework for human-machine cooperation, and proposed to "preliminarily establish a legal and regulatory, ethical normative, and policy system for artificial intelligence by 2025, and form the ability to evaluate and control artificial intelligence security," [22]to ensure that basic ethical norms that are universally recognized and followed internationally can be implemented in China's artificial intelligence elderly care services.

3.2 Value Pursuit: Human Dignity and Social Equity are Together

Intelligent elderly care nursing robots were originally created as "tool-like" products to meet the nursing needs of the elderly. Based on the objects of intelligent elderly care nursing robots, Luo Dingsheng et al. [23] classified the main ethical issues related to intelligent nursing robots into two categories: one is based on the individual level and involves ethical issues related to the personality and dignity of the nursing object, including the protection of various rights such as autonomy, informed consent, and privacy. The other is based on the social level and concerns social justice issues for different social groups, including corresponding justice and fairness issues related to social resource allocation and consideration of differences among different groups. Dealing with these two types of issues requires us to coordinate the value pursuit at both the individual and social levels in the development and application of intelligent elderly care nursing robots, ensuring that highly automated artificial intelligence systems adhere to goals and actions that not only reflect respect for individual dignity and rights, but also contribute to social fairness and harmony during their operation.

We need to strengthen ethical scrutiny of intelligent elderly care nursing robots. During the design, development, and specific application of robots for elderly care, relevant units and researchers need to always follow scientific ethics, comply with relevant laws and regulations and ethical guidelines, and consciously accept ethical scrutiny and supervision in order to minimize the ethical risks brought about by robot technology. For example, the appearance design avoids gender discrimination and racial bias. When using elderly care nursing robots with monitoring and management functions, the goals of meeting and enriching human needs should be taken into account, while also limiting the monitoring time and scope of collection and use of personal information to reduce or avoid excessive infringement on the privacy of the elderly. Even in the case of the declining capacity of the service subject, a balance should be found between respecting people's autonomy and providing reasonable services.

We need to strengthen the promotion and application of elderly care nursing robots. To date, there are still relatively few smart nursing robots that have truly entered households, and one important reason is their price. High prices hinder the marketization of nursing robots and further universal application in households. Taking the Japanese care robot "Robear" as an example, the market sales price of the robot is about 20,000 RMB, and additional daily maintenance costs must also be borne. At present, most elderly care products are used in rehabilitation institutions and hospitals, with services mainly targeting middle-to-high-end consumers. Of course, the price of elderly care nursing robots is also related to the immature technology, single function, weak coordination, and failure to achieve mass production of existing nursing robots. Considering that elderly care is a universal problem faced by the whole society, and nursing services involve the most basic health rights of people, nursing robots should help eliminate health disparities, create and comprehensively promote health equity, differentiated from general commodities and services. Governments can use preferential policies such as incentives for the elderly to support technology

and intelligent elderly care products and services through various means such as purchasing services and venue support. Through cooperation and collaborative innovation with service intermediaries, internet companies, and relevant social organizations and research institutions in various forms such as service outsourcing, acceleration of industrial upgrading and transformation, promotion of the marketization of intelligent nursing robots, and necessary regulation of the intelligent nursing robot market can be achieved. These robots can be considered as a social resource for allocation and market regulation to promote social fairness and stability.

Strengthening AI technology education and training can help the elderly enjoy a smarter life. The rapid development of information technology has brought convenience to more people, but it has also exacerbated the "digital divide" for the elderly. The elderly have difficulty using robot care and adapting to smart devices and internet-based, AI-related technologies for elderly care services, making it easy for them to fall into digital poverty and exacerbate social inequality. Therefore, relying on various forces such as community schools, vocational schools, senior universities, and volunteers, using intergenerational cultural feedback, family and friend mutual assistance, etc., to provide elderly AI technology education and training, helping the elderly understand and use various intelligent care products and robots, in order to better adapt and integrate into a smarter life.

3.3 Ethical Care: Moral Construction goes together with Family Care

Filial piety is a core component of Chinese traditional culture and a traditional characteristic of Chinese nursing ethics. The application of intelligent elderly care robots will inevitably change our interpretation of traditional filial piety and interpersonal relationships. Therefore, in exploring the ethics of intelligent elderly care robots, we cannot ignore the influence of Chinese traditional culture, but should analyze it within the framework of modern concepts. This analysis not only requires the integration of intelligent care with family care and long-term care but also needs to promote the complementarity of moral development and family care, in order to actively implement the national strategy of ageing population. It is necessary to strengthen the combination of intelligent companionship and family care. Family care is a deeply rooted emotional demand and value in Chinese culture. The non-linear characteristics of emotions make it difficult to fully understand them through mathematical models and algorithms of human-machine interaction. Even advanced elderly care robots cannot replace the family's affection for the elderly. Therefore, intelligent elderly care must be complementary to human companionship, making the machine companion an amplifier of human caring rather than a cold cage. Families and society should not use robot companionship care as a reason to reduce or evade necessary care for the elderly, nor should they replace family affection, professional services, and social care with robot companionship care. Family members, children, or related caregivers can intervene and regulate the behavior of robots and interact with the elderly through remote communication and virtual reality technologies. At the same time, in terms of social construction and relevant systems, it is necessary to strengthen the protection of the rights and interests of the elderly, and promote family care for the elderly. For children with disabled elderly parents, care leave and appropriate cash subsidies should be provided. The government should actively commend those who show filial piety in their families, promote the establishment of a system for rewarding and supporting family members who take care of the elderly, and strive to create a social environment where elderly care, filial piety, and respect for the elderly are integrated, so that family care can warm up intelligent care and make the elderly well-cared for and happy.

We need to strengthen the combination of intelligent care and long-term care. In 2000, the World Health Organization proposed "establish a global consensus on long-term care policies for the elderly". Long-term care for the elderly is to ensure that those who lack personal care maintain the

highest possible quality of life and enjoy the greatest possible share of independence, autonomy, participation, personal enrichment and human dignity [24].Intelligent elderly care robots, with their intelligence and multifunctionality, are bound to become an important reliance and pillar for long-term care. In 2019, the "National Medium- and Long-Term Plan for Active Response to Population Aging" clearly stated that it is necessary to actively promote the construction of a healthy China, establish and improve an elderly health service system including rehabilitation care and long-term care[25]. To improve the multi-level elderly care service system based on home care, supported by the community, with full development of institutions and organic combination of medical care and elderly care, and to expand the scope and diversity of elderly products and services through multiple channels and fields, this provides a guarantee for promoting the combination of intelligent care and long-term care at the national level.

Intelligent elderly care robots can build social relationships by helping people understand and regulate nursing work and provide necessary care. The ethical reflection on the intelligent elderly care robot is not to deny its development and use, but to remind us to reduce its ethical risks as far as possible and install a "safety engine" for its development. This is not the responsibility of some people, industries or groups, but requires us to examine and coordinate the social relations among relevant stakeholders including the elderly with a sense of community, in order to achieve the healthy development of people and the harmonious progress of the society.

Acknowledgement

References

[1] Boudrillard. Reading the Brain Surgery [M]. Translated by Wu Shi Yi. Beijing: CITIC Publishing Group, 2020: 4.

[2] Mecacci G, Haselager P. Identify criteria for the evaluation of the implication of brain reading for mentel privacy [J]. Sci Eng Ethics, 2019, 25(2):212-216.

[3] Meynen G. Author's response to peer commentaries: Brain-based mindreading: Conceptual clarifications and legal applications [J]. J Law Biosci, 2018, 5(1): 212-216.

[4] Dubrovsky D I. Does Brain Research Make Reading Another's Thoughts Possible? [J]. Russian Studies in Philosophy, 2018, 56(1): 18-28.

[5] Rainey S, Martin S, Christen A, et al. Brain Recording, Mind Reading, and Neurotechnology: Ethical Issues from Consumer Devices to Brain-based Speech Decoding [J]. Sci Eng Ethics, 2020, 26(4): 2295-2311.

[6] He Rui. This important document reveals how to do future elderly care work [N]. Xinjingbao. 2021-11-25(A04).

[7] Lu Yingchun, Tang Yalin. Interactive service model of elderly care supply in the era of digital governance: Characteristics, issues and optimization strategies [J]. Nanjing Social Sciences, 2020(7): 51-59.

[8] Yuval Noah Harari. Sapiens: A Brief History of Humankind [M]. Translated by Lin Junhong. Beijing: CITIC Publishing Group, 2017: 390.

[9] Wang Jun. Ethical issues of artificial intelligence: Challenges and responses [J]. Ethics Research, 2018(4): 79-83.

[10] Dashevsky E. Do Robots and AI Deserve Rights? [EB/OL]. (2017-02-16)[2022-05-27].

[11] Herbert Marcuse. One-Dimensional Man: Studies in the Ideology of Advanced Industrial Society [M]. Translated by Liu Ji. Shanghai: The Commercial Press, 2016: 195.

[12] Karl Marx, Friedrich Engels. Selected Works of Marx and Engels: Volume 1[M]. Compiled and Translated by the Marx-Engels-Lenin-Stalin Institute of the Central Committee of the Communist Party of China. Beijing: People's Publishing House, 1995: 775.

[13] Sherry Turkle. Alone Together: Why We Expect More from Technology and Less from Each Other [M]. Translated by Zhou Kui and Liu Jingjing. Hangzhou: Zhejiang People's Publishing House, 2014: 310.

[14] Liu Zhiyuan. The Future of Medical Robots: Record of the Development and Future Strategies of the Medical Robot Industry Forum [J]. Science and Technology Review, 2015, 33(23): 43-45.

[15] Wu Nannan. Analysis of Realistic Dilemmas and Countermeasures of Intelligent Moral Machines: Taking

Autonomous Driving Vehicles as an Example [J]. Robotics Industry, 2022, 6(1): 20-27.

[16] Yan Kunru. Robot Ethics: Ethics of Machines or Ethics of Humans? [J]. Journal of Northeastern University: Social Sciences, 2019, 21(4): 331-336.

[17] Gringer J. Warum die Angst vor Robotern [EB/OL]. (2020-01-04) [2022- 05-27].

[18] Li Xiaoyan. Analysis of Ethical Risks of Elderly Care Robots [J]. Journal of Northeastern University: Social Sciences, 2015, 17(6): 561-566.

[19] Zhang Jiaxin. Aging Population in the World: Hidden Worries or Opportunities? [N]. Science and Technology Daily, 2021-04-16 (04).

[20] Zhang Gailen. World Health Organization Releases Guidelines for Ethics and Governance of Artificial Intelligence in Health and Healthcare [N]. Science and Technology Daily, 2021-06-29(04).

[21] Li Tianjiao. Summary and Analysis of Policies on Intelligent Elderly Care Industry in China and 31 Provinces and Cities in 2021[EB/OL]. (2021-11-06)[2022-05-27].

[22] State Council. Notice of the State Council on Printing and Distributing the Development Plan for the New Generation of Artificial Intelligence [EB/OL]. (2017-07-20)[2022-05-26].

[23] Luo Dingsheng, Wu Xihong. A Brief Discussion on Ethical Issues of Intelligent Nursing Robots [J]. Science and Society, 2018, 8(1): 25-39.

[24] Tang Jun. The Idea of Long-Term Care in Chinese Traditional Culture [J]. Hunan Social Sciences, 2021(6): 101-107.

[25] Xin Hua News Agency. CPC Central Committee and State Council Issue "National Medium- and Long-Term Plan for Active Aging"[EB/OL]. (2019-11-21) [2021-12-12].