Artificial Intelligence Helps the Elderly to Integrate into the Internet Age

Chenshuo Wang

School of International Education, Guangxi University of Science and Technology, Liuzhou, 545,000, China
C.wang.36@student.scu.edu.au

Abstract. The Internet has seen significant advancements in recent years, yet elderly individuals have historically struggled to reap its benefits. With the advent of artificial intelligence (AI), this technology promises to bridge the digital divide for the elderly. Despite numerous reports highlighting the rising number of older adults engaging with the Internet, research into the specific assistance provided by AI remains insufficient. This paper examines how AI facilitates the elderly's engagement with the Internet, addressing the digital divide they face, the various challenges in using traditional applications, and the obstacles encountered when accessing the Internet under AI applications. By comparing traditional applications tailored for the elderly, which often suffer from information overload and complexity, the introduction of AI significantly simplifies operations. Applications specifically designed for elderly users, intelligent recommendations, and advanced image recognition technologies have emerged in response to these needs, substantially aiding older adults in navigating the digital landscape. Moreover, this paper explores how AI-enhanced smart furniture and generative AI technologies can ease daily activities for the elderly, ultimately improving their quality of life. At the end of the article, a summary and outlook on the entire text were provided.

Keywords: Artificial intelligence, Internet, Elderly People

1   Introduction

In today's rapidly evolving digital era, the internet has profoundly transformed lives at an unprecedented pace. It has altered traditional lifestyles, enabling remote communication, global shopping, and access to diverse digital content, thus enriching both material and spiritual dimensions of life [1]. However, amidst the rapid global transformations, a demographic group appears to struggle in keeping pace with the zeitgeist—the elderly populace. The unparalleled pace of technological advancements and societal evolution has engendered a profound disconnect between the elderly and the younger generations. With their diminishing propensity to embrace novelty, the elderly encounter formidable challenges in comprehending and adeptly navigating the realm of smart technologies characteristic of the internet era, such as the myriad applications

housed within smartphones. Consequently, a prevailing sentiment of helplessness and isolation often pervades among the elderly, as they grapple with a sense of estrangement from the contemporary milieu. The advent of artificial intelligence, however, holds promise in ameliorating the predicament of elderly integration into the digital age.

In recent years, the rapid development of artificial intelligence (AI) technology has provided an innovative path to solve the problem of the elderly integrating into the Internet. Through intelligent and personalized service design, such as voice interaction, facial recognition, situational awareness and other technologies, AI has the potential to greatly simplify the operation process, improve user experience [2], and make Internet services closer to the actual needs of the elderly. For example, intelligent voice assistant allows elderly people with degraded vision to complete complex operations by only using voice commands; AI algorithm accurately pushes health information and entertainment content by learning user habits, enhancing the richness and interest of their online life.

Although there have been many related studies on the use of AI to serve the elderly, the discussion on how to use AI to help the elderly integrate into the Internet age is not deep enough. To this end, this paper investigates the application of artificial intelligence in devices and software today, aiming to explore how AI technology will help the elderly to integrate into the Internet era.

2   The Digital Divide Among the Elderly

In the Internet era, people's life has become more convenient than before, but this convenience seems to be difficult to reflect in the elderly group, and the elderly seem to be abandoned in the Internet era. The term "digital divide" was proposed as early as 1989 and has been widely accepted and studied around the world, creating divisions and life gaps between digital and non-digital groups [3]. Does the digital divide still exist for the elderly? Take China as an example. As the fastest growing country in the Internet era, mobile payment, short video and online shopping have long been popular in China. A survey released at the Third China Population and Development Forum shows that more than half of Chinese seniors aged 65-69 use smartphones, and 31.2 percent of those aged 70-79 use smartphones. According to this data, the data gap between the elderly seems to have been greatly alleviated. However, from the perspective of daily life, the data gap between the elderly is aggravating rather than solving.

Despite owning information and communication technology (ICT) equipment, many elderly individuals struggle with using both software and hardware, contributing to the persistence of the digital gap [4]. Merely possessing a smartphone doesn't necessarily mean one has fully embraced the Internet age. For instance, research indicates that while a significant portion of the elderly population owns smartphones, they predominantly use them for basic functions taught by their children, such as making phone calls and sending text messages. Many elderly

individuals often rely on memorization of specific steps rather than truly understanding the underlying technology.

Furthermore, the internet offers a myriad of functionalities beyond simple communication and news access. Complex tasks such as online shopping or using ride-hailing services pose significant challenges for the elderly due to their limited digital literacy. Statistics show that only a small percentage of elderly individuals engage in online shopping regularly, with many citing concerns about security and difficulties navigating e-commerce platforms.

This phenomenon underscores the disparity in learning abilities between the elderly and younger generations. Research suggests that cognitive decline associated with aging can impede the ability to acquire new skills and adapt to technological advancements. Moreover, the psychological barrier to accepting new technology often exacerbates the digital gap, as the elderly may feel overwhelmed or intimidated by unfamiliar devices and software interfaces.

In essence, the digital gap experienced by the elderly reflects not only a lack of technical skills but also deeper societal challenges related to age-related cognitive decline and the pace of technological change. Bridging this gap requires comprehensive interventions that address both skill-building and attitudinal barriers to ensure equitable access to the benefits of the digital age for all age groups.

3   Technical Limitations for Older Adults

3.1   The Defect of the Intelligent Voice Assistant for the Elderly

The first artificial intelligence product that most ordinary people come into contact with is Siri, the voice assistant that entered people's lives with the release of iPhone 4s in 2011. A voice assistant is a type of AI that supports voice interactions. Unlike early voice activation technologies, Siri can answer more questions and fulfill user commands because it is always connected to the internet. It uploads commands to a central processing system, interprets them, and provides relevant responses. The emergence of voice assistants has made operating smartphones, smart computers, and other smart devices easier for users.

Although voice assistants like Siri have brought great convenience to users, there are still flaws in their usage by elderly users. In an experiment studying elderly individuals' use of a voice assistant, two main challenges were identified: difficulty in constructing command sentences and misunderstanding how the voice assistant operates [5]. Elderly individuals often forget wake-up words or fail to provide sufficient pauses between wake-up words and subsequent instructions, resulting in the inability of the voice assistant to capture wake-up words. Additionally, many elderly individuals are unaware that a connection to the internet is required for a voice assistant [5]. Therefore, despite assisting many users with convenient operations like Siri does, elderly users face numerous difficulties and challenges when using a voice assistant due to their lack of understanding new technology and slower learning abilities.

3.2   Challenges Faced by Older Adults with Traditional Apps

Many applications are difficult for the elderly to use, which prevents them from truly integrating into internet life.

- Page is not concise enough

Traditional applications often have more comprehensive functions and include more elements in the interface. The elderly have weaker interpretation abilities than young people, and complex pages can easily cause visual confusion for the elderly, leading to a fear of using applications.

- The font is not appropriate

Standard version applications default to fonts that prioritize young users. For elderly users, these fonts are too small. As they age, their vision is not as good as that of young people, making it difficult for them to find the information they need or even read the text clearly, resulting in reading difficulties.

- Complex operation

The complexity of operations is an important reason why older adults find it difficult to use standard version applications. Standard version applications usually require multiple steps to achieve a certain function. For example, when using Taobao for online shopping, users need to enter text in the search box first to search for desired products and then compare prices by viewing search results. After clicking on a desired product and entering its main page, they need to select specific information such as color and input shipping address before completing payment. This series of operations may not be complicated for young people but is definitely not simple for older adults. Even if older adults manage to remember the operation steps reluctantly，each page will display a lot of information and buttons with different functions after being opened，making it difficult for them to remember which button needs clicking or find what they need among numerous buttons.In most cases, elderly users will encounter unfamiliar pages due to mistakenly clicking wrong buttons during operation process.This will leave them at a loss causing operational difficulties.

4   AI Helps the Elderly into the Internet Era in Various Ways

After years of technological development, artificial intelligence has become more intelligent, and it has also made many modifications for the elderly, to better facilitate the elderly to use intelligent devices or conduct Internet operations.

4.1   The Convenience of Embedded AI to the Operation

The Technology is More Advanced After years of technological development, artificial intelligence has become more intelligent, and it has also made many modifications for the elderly, to better facilitate the elderly to use intelligent devices or conduct Internet operations.Nowadays, many software have launched versions for the elderly. By comparing the traditional version with the elderly version, the author found that the version for the elderly launched with the support of artificial intelligence technology has solved the problem of many elderly groups.With the

arrival of aging, the society attaches more importance to the elderly, and more and more Internet companies begin to pay attention to the elderly users. More than 60% of people aged 65 and older use the Internet in both the United States and Europe [6].

Take Wechat as an Example of the Elderly Application WeChat is one of the most widely used applications in Chinese people. Take WeChat as an example, the care mode of WeChat is the elderly version of WeChat. After opening the care mode, the page becomes more simple and concise, and the font becomes larger to adapt to the elderly.In addition to larger fonts and simpler page design, AI intelligent push is an important factor for the elderly to easily use the older version of the app. In the older version of the application, AI will push more suitable content to users through the favorite preferences and browsing record data that users fill in when they first login, which well solves the problem that the elderly will lose interest in the Internet because they are not interested in or unable to use the Internet. In the wechat care version also added the reading function, users can click the text to read automatically more convenient for the elderly users to use.

4.2   AI Makes Online Shopping Easier for the Elderly

Intelligent Recommendation Online shopping has become an important part of the Internet era. With the progress of technology, online shopping has become more and more simple. The emergence of ARTIFICIAL intelligence makes online shopping no longer the patent of young people. The first thing for the elderly to solve in online shopping is to simplify the operation and minimize the complex process of searching for goods. Through the use of AI technology, today's online shopping platform is no longer a single online sales, but to calculate the possibility of users buying goods under the analysis of big data with the support of artificial intelligence technology. Big data is used to analyze users' access to data in other applications and even other smart devices[7]. With the support of artificial intelligence technology and combined with the calculation of big data, personalized recommendation is gradually used. This technology makes online shopping more accurate. People have a greater probability of finding the goods they want in the recommendation without having to search through search, which is friendly to the elderly.

Image Recognition Technology At the same time, when there are no expected products in the personalized intelligent recommendation, another AI-based technology, image recognition technology, will be used to search for items. Elderly people usually don't buy things they have never seen online, while they have inner comparisons and want to own things for others around them. The intelligent image recognition function helps users identify items in the image and analyze and search for the same product [8]. In today's mainstream online shopping platforms, such as Amazon and Taobao, both have a photo search function using intelligent image recognition technology. Users search for objects by cameras or visiting photo albums, even if the searcher does not know what it is and what it is called. Elderly users can

also use image recognition technology to search for products they want without the ability to search for too much information.

4.3   Smart Furniture Facilitates the Daily Life of the Elderly

Intelligent furniture is one of the representative products of the Internet era. Intelligent furniture is also known as "home automation system", which is using the Internet of things, artificial intelligence and other technologies to make furniture intelligent and automated [9]. Smart furniture is the welfare of the elderly in the Internet era and improves their quality of life (Fig. 1). Smart furniture analyzes the voice commands received through AI and converts the voice messages into electrical signals and passes them to the corresponding components to complete the commands [10]. For example, intelligent beds can be adjusted according to instructions to make the elderly have the most comfortable sleeping position [11]. Intelligent furniture is not used alone, usually by multiple intelligent furniture and intelligent AI housekeeper through wireless network connection, the user by calling AI intelligent housekeeper and issued commands such as "turn on the TV" to control the intelligent furniture, which makes the elderly for legs inconvenient life got great convenience. In fact, smart furniture has been accepted by most elderly. In many developed countries, the sales of smart furniture have increased almost equally with aging [12]. AI provides convenience for the elderly group in life, and enables them to enjoy the dividends of the Internet era.

Fig.1 Smart Furniture [13]

4.4   Generative AI Helps Older People Learn

When it comes to AI, most people's first reaction is ChatGPT, which is an artificial intelligence generated content (AIGC) model developed by OpenAI, which can be automatically created and generated content according to the user's personalized needs[12]. The author believes that generative AI like ChatGPT can help the elderly learn to use the Internet (Fig. 2).The emergence of generative AI provides a new idea for the elderly to learn the Internet. The operation of generative AI can be said to be

very simple, and you only need to input the questions to get the corresponding answers. For an operation that the elderly want to enter, the elderly can ask the AI questions, such as " Tell me the steps of the Tiktok user."Such instructions, AI will answer detailed answers to the combination of big data search and its own system reserve knowledge base. This allows older people to ask questions and learn what they want to do. Generative AI helps users save the steps and time to retrieve answers in search engines and directly provide users with the most direct answers, which is crucial for the elderly group because the search engine search content is complex and difficult to operate for many elderly people. So generative AI is a great help for the elderly to learn how to use the Internet and smart devices.

Fig.2 ChatGPT Easy quiz [14]

5   Conclusion

AI has the potential to assist the elderly in utilizing smart devices and accessing the Internet, thereby integrating them into the digital era. A comparison between early intelligent voice assistants, such as Siri, and traditional applications reveals that modern AI technology has significantly simplified Internet operations. This advancement enables the elderly to proficiently navigate network devices and access online resources. Despite initial technological limitations, early intelligent voice assistants, found in mobile phones, assisted in streamlining operations; however, they posed challenges for the elderly in constructing command sentences and understanding the operational modes of such assistants. Currently, AI-driven features like intelligent push notifications and image recognition in applications tailored for the elderly facilitate their technological engagement. Furthermore, innovations such as smart furniture and ChatGPT contribute to enhancing the daily lives of the elderly through intelligent functionalities.

The author predicts that in the future, artificial intelligence will further streamline various operations, enabling the elderly—a demographic often with limited learning and operational capabilities—to effortlessly enjoy the benefits of technology. AI is anticipated to evolve, becoming more intelligent and ubiquitous, and will be embedded across a wide range of smart devices. This progression will allow for

precise command recognition without the necessity for specific statement formats. Users will merely need to issue commands, leaving the execution process to AI.

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