The application of WeChat navigation assistant

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Abstract. The field of artificial intelligence and deep learning has made significant progress in recent years, with the development of innovative techniques and technologies that have the potential to improve various aspects of human life. However, the elderly population faces significant challenges when it comes to utilizing electronic devices, as the demand for convenient and easy-to-use products in their daily lives remains unmet. To address this challenge, this paper proposes the design of a software solution, consisting of four key components. Firstly, the software application is simulated, and the process of software operation when the elderly use WeChat is modeled. Secondly, automatic speech recognition technology is utilized to enhance the usability of WeChat for the elderly. Thirdly, a dataset is created for data collection, processing, and analysis, with the aim of constantly improving the software. Finally, evaluation methods such as formative and summative evaluations are utilized to assess and enhance the effectiveness of the software. The proposed software solution has the potential to significantly improve the quality of life of the elderly population by enabling them to better access and utilize electronic devices. Moreover, the incorporation of automatic speech recognition technology and data analysis for continuous improvement has the potential to contribute to the advancement of the field of artificial intelligence and deep learning. Further research should focus on refining the software solution to better cater to the specific needs of the elderly population.

Keywords: WeChat, machine learning, artificial intelligence.

1. Introduction

The demographic shift towards an aging population in China has become a serious societal issue. According to a survey, China has entered a deeply aging society in 2022, with the elderly accounting for 14 percent of the population, and will enter a super-aging society in 2033, with 22 percent of the population aged. As a serious social problem, it urgently needs attention and solution from all walks of life. This demographic transformation has brought about significant challenges, particularly in terms of ensuring that the elderly population receives due attention and consideration. For example, in terms of smart devices, the Internet penetration rate among the elderly is less than 20%, and many elderly people do not know how to use smart phones. Especially for the elderly in some remote and backward areas, they not only do not enjoy the convenience brought by intelligence, but it is more difficult to integrate into the modern society, becoming "Internet refugees". Smartphones are becoming increasingly important, for example, to keep in touch with family and friends, to pay for shopping, and even during the outbreak of the pandemic, elderly people cannot walk without using the phone to

show them a "health code". However, the current social attention to this phenomenon is far from enough, thereby this direction should deserve more attention.

The field of artificial intelligence has developed rapidly in recent decades [1-4]. Deep learning, a branch of artificial intelligence, aims to make machines capable of analytical learning like humans, able to recognize data such as words, images and sounds [5-8]. Deep learning is a complex machine learning algorithm that has achieved far greater results in speech and image recognition than previous techniques. Deep learning has made many achievements in search technology, data mining, machine learning, machine translation, natural language processing, multimedia learning, speech, recommendation and personalization technologies, and other related fields. Deep learning enables machines to imitate human activities such as hearing, listening and thinking, and solve many complex pattern recognition problems, making great progress in Artificial Intelligence (AI) related technologies. Many famous Internet companies have developed countless products based on deep learning technology that have changed people's lives. For instance, the AI-powered Go-playing computer program AlphaGo famously defeated the human world champion after extensive training with self-iteration techniques [9-11]. Additionally, Chatgpt serves as an outstanding example of a deep learning-based chatbot that assists college students with programming assignments. Based on this, this paper intends to propose an app framework based on deep learning, speech recognition and other technologies, so as to solve the current situation that the elderly have difficulties in using the popular software called wechat.

The app is designed for elder users who are uncomfortable with WeChat. Those who find it difficult to utilize the program owing to its complexity, unfamiliarity, or age-related difficulties are also included. WeChat Navigation Assistant's instructional purpose is to help older users become familiar with the application's functioning so that they can correctly browse WeChat and take benefit of its core functions, such as messaging, audio and video chat, payments, and browsing the micro-app. The program is intended to promote senior users' digital literacy by allowing them to engage with friends and family as well as access a variety of services via WeChat.

2. Methodology

2.1. Overview of the method

The method applied to this app includes Automatic Speech Recognition (ASR) [12-14], Data set creation and evaluation techsniques. ASR enables hands-free navigation and natural language interaction, while machine learning assesses the user's background and tailors the app to their specific requirements. Data set creation entails gathering and analyzing data to create a data collection that aligns with the application's specific demands Formative and summative assessment approaches are used to discover areas for development and measure the app's efficacy in aiding learning.

2.2. Process assumption

The following is a general flow of the app's functions. As an instance, if an elderly user would like to speak to the grandson, the WeChat Navigation Assistant initially delivers on-screen text and audio directions, saying, "Open the 'Chats' tab by clicking on the 'Chats' icon located in the bottom left corner of the screen." When users complete the instructions, the app will link them to their grandchildren's conversations, saying, "Find the grandchildren's name in the chat list and click on it to begin the discussion." Lastly, the software will urge the user to make a voice call, saying, "Press the + symbol in the bottom right corner of the screen, then hit the camera icon and select 'Voice Call' to commence the call." The program may use visual cues such as arrows or highlighting during the procedure. This makes it easier for the user to find the appropriate buttons or icons.

2.3. Automatic speech recognition

The utilization of Automatic Speech Recognition (ASR) in the app enables users to interact with it through voice commands, eliminating the need for typing or tapping on the screen, and making it

particularly advantageous for individuals with limited dexterity or vision impairments. ASR, on the other hand, enables the app to detect and understand utterances. Thus, it allows users to converse with the app in the same manner they would with a human, which improves the software's intuitiveness and usability, decreasing the learning curve for elderly users.

2.4. Dataset creation

Data set creation focuses on the mining, collection and analysis of data which include the number and percentage of successfully solved user problems, the most searched keywords, and user satisfaction. Analyze them and make changes accordingly to better serve users.

A data set needs to be designed to meet the needs of the app. The first thing to do is to design a scene and a variety of different scenarios for the elderly to use wechat. Then collect the keywords that appear most frequently. In addition, a large number of older people were surveyed, including their age, education level and the type of mobile phone they used. This information can help people understand the proportion of elderly people using smartphones and analyze the difficulty of learning to use wechat based on age and educational background. When defining keywords, first consider the existing nouns in wechat and the names of various functions, such as "scan code", "wallet", "voice call", etc., which will be defined as keywords. After collecting user input, the system first searches for the existence of these keywords. Fuzzy content and data not related to the user's primary purpose will be defined as dirty data and will be ignored or erased during data processing. In terms of data iteration, the preferred language of the user in the data will be collected and analyzed, and there will also be data association, that is, after receiving a data, the meaning of the words in it will be associated, and the keyword information most suitable for the associated content will be output.

3. Evaluation

This study proposes techniques for conducting formative and summative evaluations of an application designed to facilitate the use of WeChat by elderly individuals. The purpose of formative evaluation is to identify critical concerns and weaknesses of the application in order to modify and improve it. This will be accomplished by evaluating various aspects of the application through experimentation and the use of standards-based metrics. The identified factors will provide a basis for assessing the overall satisfaction of the application. Summative evaluation aims to determine the learning curve of the application compared to other learning methods, such as self-learning or learning with a human tutor. For example, the learning curve of an application can be compared to allowing users to learn on their own or to learning with a human tutor. To determine the learning curve of the app, a diagnostic test will be provided firstly for the user, to determine the user's familiarity with different functionalities of the app. Then, the experimenters were spitted into three groups: no outside help, with the help of the app, and with a human tutor. The primary metric used to evaluate the learning curve of the application will be the number of steps taken to navigate to the desired functionality. Regression techniques will be employed to analyze the data and determine the learning curve. Then, the effectiveness of the using app as the tutor can be evaluated by comparing these groups.

4. Conclusion

As society becomes more technologically advanced, the elderly population may feel left behind in their ability to utilize these new tools effectively. WeChat is a popular messaging and social media app used extensively in China, but the elderly may face difficulties in navigating the app due to its complexity. This paper proposes a solution to this problem by designing an app specifically tailored to assist the elderly in using WeChat more smoothly. The app is designed to provide a user-friendly interface that simplifies the process of using WeChat for the elderly. The app consists of four main parts: a process overview, automatic speech recognition, data set creation, and evaluation techniques. The process overview outlines the basic steps needed to operate WeChat, and the automatic speech recognition feature allows the user to interact with the app using voice commands. The data set creation component involves collecting data on the types of problems encountered by the elderly when

using WeChat, while the evaluation techniques assess the effectiveness of the app. The significance of this paper lies in its potential to improve the quality of life for the elderly population. By designing an app that addresses the specific needs and difficulties of the elderly when using WeChat, the app can serve as a bridge to help the elderly integrate into the rapidly developing society as much as possible. The app can help the elderly stay connected with family and friends, access important information, and participate in online communities.

References

[1]   Holzinger A Langs G Denk H et al. 2019 Causability and explainability of artificial intelligence in medicine Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery 9(4): e1312.

[2]   McCarthy J Hayes P J 1981 Some philosophical problems from the standpoint of artificial intelligence Readings in artificial intelligence. Morgan Kaufmann 431-450.

[3]   Zhang R Zou D Cheng G 2023 A review of chatbot-assisted learning: pedagogical approaches, implementations, factors leading to effectiveness, theories, and future directions Interactive Learning Environments 1-29.

[4]   Baghaei A Alipour N Abbaszadeh P 2023 et al. Identifying and combating the Covid-19 pandemic using Artificial Intelligence Tobacco Regulatory Science (TRS) 313-330.

[5]   Qiu Y Wang J Jin Z et al. 2022 Pose-guided matching based on deep learning for assessing quality of action on rehabilitation training Biomedical Signal Processing and Control 72 103323.

[6]   Shafiq M Du C Jamal N et al 2023 Smart E-Health System for Heart Disease Detection Using Artificial Intelligence and Internet of Things Integrated Next-Generation Sensor Networks Journal of Sensors.

[7]   Ma S Liu J Li W et al. 2023 Machine learning in TCM with natural products and molecules: current status and future perspectives Chinese Medicine 18(1): 1-17.

[8]   Alsaade F W Al-Adhaileh M H 2023 Cyber Attack Detection for Self-Driving Vehicle Networks Using Deep Autoencoder Algorithms Sensors 23(8): 4086.

[9]   Wang F Y Zhang J J Zheng X et al. 2016 Where does AlphaGo go: From church-turing thesis to AlphaGo thesis and beyond IEEE/CAA Journal of Automatica Sinica 3(2): 113-120.

[10]   Li F Du Y 2018 From AlphaGo to power system AI: What engineers can learn from solving the most complex board game IEEE Power and Energy Magazine 16(2): 76-84.

[11]   Fu M C 2016 AlphaGo and Monte Carlo tree search: the simulation optimization perspective 2016 Winter Simulation Conference (WSC) IEEE 659-670.

[12]   Juang B H Rabiner L R 2005 Automatic speech recognition–a brief history of the technology development Georgia Institute of Technology Atlanta Rutgers University and the University of California. Santa Barbara 1: 67.

[13]   O'Shaughnessy D 2008 Automatic speech recognition: History, methods and challenges Pattern Recognition 41(10): 2965-2979.

[14]   Cutajar M Gatt E Grech I et al. 2013 Comparative study of automatic speech recognition techniques IET Signal Processing 7(1): 25-46.