A Review of the Application of Artificial Intelligence in College Mental Health Education

Chen Liu[1*], Hong Mei Liu[2]

{ccnupsyliu@qq.com[1*]; 23044673@qq.com[2]}

Mental Health Education Center, University of Electronic Science and Technology of China, Chengdu, China

Abstract. The application of artificial intelligence is one of the ways to improve the work efficiency of psychological education. By combing the relevant literature of CNKI and web of science database in recent five years, this paper comprehensively expounds the comprehensive application of artificial intelligence in psychological counseling, crisis screening and early warning, as well as psychological health courses, it provides the basis for the university psychological workers to carry out the new form of mental health education, and provides the thinking direction for further improving the contemporary university students' mental health level.

Keywords: Artificial intelligence; Psychological counseling; Crisis screening; Mental heath class

1 Introduction

The mental well-being of college students stands as a shared concern among the society, encompassing a critical aspect of youth development. In recent years, college students have been confronted with a surge in psychological crises, with escalating rates of anxiety, depression, and other emotional disorders being detected annually[1].Additionally, unfortunate incidents such as self-harm and campus-related tragedies have been occurring at an alarming rate.

To address this issue, the Ministry of Education, in collaboration with mental health professionals across various universities, continuously implements measures to strengthen the effectiveness of psycho education[2]. Over the past decade, AI has been applied in many social sciences, especially in the fields exceptionally in Big data research[3][4].The content of mental health education involves not only professional psychological services for individuals, but also descriptions of the psychological status of groups, as well as grasping the overall atmosphere of psychological education in universities. This has led university psychologists to gradually explore the application of related technologies such as network information capture, deep learning, and multimodal data processing in their work.

Actively applying artificial intelligence related content in mental health work can respond to difficult and key points in work. For example, the analysis of the psychological health status of a large number of students in universities, the growing demand for psychological counseling that does not match the shortage of professionals, the pre warning and timely

ICMEIM 2023, September 08-10, Wuhan, People's Republic of China

DOI 10.4108/eai.8-9-2023.2340096

response to crisis psychological cases in universities, and the ability to grasp the psychological dynamics of students from multiple aspects and develop corresponding work plans.

2 Method

This article adopts the method of literature review in the past five years to summarize the application of artificial intelligence in mental health education in universities, in order to further promote the effectiveness of psychological education. Search using CNKI and Web of Science as databases, and combine "artificial intelligence" with "mental health", "depression", "psychological education," suicide "in the full text content. Summarize and sort out the inclusion criteria based on publishing in authoritative journals and books. By ranking and extracting references from over 50 relevant papers, the practical application of artificial intelligence in mental health work in universities is organized.

3 AI in mental health

3.1 Psychological counseling

From a theoretical perspective, the realm in which artificial intelligence technology can most effectively integrate into mental health services is individual psychological counseling[5]. Since the 1970s, with the emergence of chatbots, also known as social robots, the incorporation of psychological counseling frameworks into the chat programs of robots marks the initial attempt at the automation of individual psychological counseling [6]. The majority of studies endorse the application of social robots in the field of psychological counseling and therapy, advocating for improved programming of these social robots to better comprehend and respond to human individuals .The current internal logical architecture of chat robots is shown in the following Fig1.

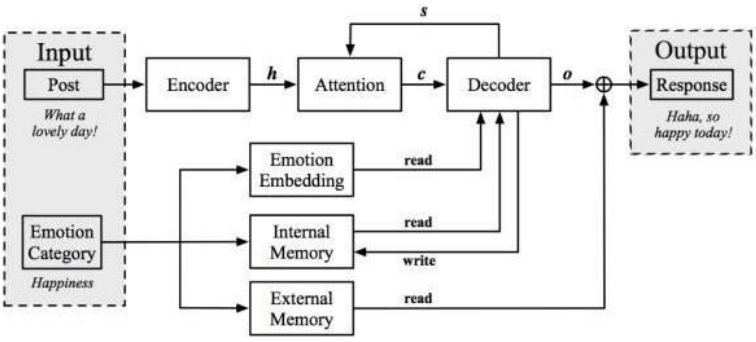

Fig1. A typical internal recognition model of Chatbot

Psychological therapy also employs virtual reality (VR) technology to enhance patients' relaxation experiences and facilitate behavior training, making the therapy more realistic [7].

In an experimental study comparing the counseling outcomes of AI consultants and human counselors, a comparative analysis of data reveals that AI consultants can effectively establish

therapeutic alliances, offer emotional support, and encounter fewer concerns regarding evaluation and influence from patients, thereby reinforcing their role in emotional guidance[8].

At the individual level of psychological disorders, the application of computer technology in psychotherapy represents one of the exploratory endeavors of artificial intelligence in individual mental health services. Researchers conducted experimental studies utilizing computerized therapy based on ACT for depression, and results from meta-analysis demonstrate the effectiveness of computerized treatment for depression, with the largest effect size observed in the adult population[9]. This intervention effectively reduces depressive symptoms and enhances individuals' levels of psychological well-being.

3.2 Psychological Crisis Warning

Artificial intelligence technology excels in big data computation and modeling. Efficient screening of psychological crises entails the processing of vast amounts of student data in the field of mental health. Significant progress and research outcomes have been achieved through the application of artificial intelligence algorithms in higher education psychological data processing[10] .

Researchers propose exploring the use of artificial intelligence data organization techniques to construct models for analyzing mental well-being[11]. For instance, in a study on a mental health analysis model for college students using the Naive Bayes algorithm, researchers employed data cleansing and analysis techniques to swiftly assess the psychological state of students. Through open and closed testing, the experimental accuracy rates surpassed 80% [12].

The objective of natural language processing (NLP) is to enable computers to comprehend and respond to human language[13]. It allows for the sentiment analysis of students' written and spoken content, their social media posts, as well as their communication records with mental health counselors and teachers. Through this analysis, it becomes possible to detect severe emotional issues such as anxiety and depression. Psychological theories suggest that an individual's language expression can reflect their inner psychological state and personality traits. With the prevalence of social media, online social language embodies the emotions and thoughts of college student communities, providing an effective means of predicting their mental well-being.

Ophir have successfully obtained key patterns for predicting suicide risk from everyday language found on platforms like Facebook, using artificial neural network models. The results exhibit a range of correlated textual features for predicting suicide risk, including profanity, expressions of inner anguish, and statements about physical discomfort.

Chinese researchers conducted screenings of textual data from social platforms such as Weibo and Zhihu. They utilized an online recognition system for data screening. The findings indicate that domestic violence has the most significant impact on an individual's mental well-being, and it is associated with a notable increase in the subsequent risk of depression and suicide[14].The Deep Learning techniques enable the mining and analysis of a vast amount of historical data pertaining to students. This includes factors such as academic performance, course participation, and social media behavior. By conducting analyses across multiple data

sources, the interrelationships between these data can be uncovered. This, in turn, facilitates a more precise evaluation of students' psychological well-being.

In addition to social media and smart devices, researchers have proposed the idea of modeling and analyzing individuals' behavior data extracted from electronic games and wearable devices. Researchers like Chen Yiqiang have developed experimental paradigms for diagnosing and evaluating children with ADHD by integrating wearable devices into the assessment system [15]. Furthermore, Ma Huimin et al. have explored anxiety prediction through eye movement using the startle-competition paradigm. These explorations serve as foundations and references for intelligent psychological assessments.

3.3 The Mental Health Classroom

In the realm of applying AI to educational settings, researchers have proposed the concept of Intelligent Learning [16]. Intelligent learning entails the effective utilization of intelligent technologies to establish an environment that fosters wisdom, collecting learning data, regulating the learning process, aiding learners in selecting suitable learning materials and approaches, ultimately promoting the development of learners' intellectual capabilities.

By employing a simplified version of the intelligent learning model diagram, it becomes evident that gathering and processing data within the psychological classroom, utilizing artificial intelligence as a means of data acquisition, ultimately leads to the achievement of intelligent developmental learning objectives. Researchers have successfully applied this model, using elementary school mathematics as an exemplary case, and achieved favorable learning outcomes.

4 Discussions

Artificial intelligence technology predominantly relies on the foundation of extensive data for model construction. This implies that a substantial amount of data is required to train these models. However, obtaining and processing psychological health data within higher education institutions often proves to be challenging. Ethical and professional requirements within the field of psychological services become involved, thereby demanding significant dedication of time and effort from psychological professionals in data preparation and processing.The provision of mental health services underscores the significance of individual differences, necessitating the delivery of distinct service types and content based on each patient's unique circumstances and needs. However, artificial intelligence technology typically operates on the foundation of big data and statistical models for prediction and recommendation purposes. Therefore, the integration of artificial intelligence technology with specialized knowledge in psychology becomes imperative for the genuine realization of personalized services.

5 Conclusion

In summary, artificial intelligence has a wide range of applications in mental health education in universities. Chat robots have a relatively mature architecture model, and are also suitable

for crisis warning to improve efficiency and accuracy in big data screening. They can also provide students with more experiential experience in mental health educational activities.

References

[1] Chen, Y. M., Zhang, Y. L., & Yu, G. L. (2022). Meta-analysis of the detection rate of mental health problems among mainland Chinese university students from 2010 to 2020. Advances in Psychological Science, 030-005.

[2] Lv, X. K. (2023). The Realistic Dilemma and Historical Reflection on the System of Mental Health Education in Universities. Social Sciences, (2), 11.

[3] Lai, S. D. (2022). Exploring the Application of Artificial Intelligence and Big Data in Mental Health Education for College Students. Computer Knowledge and Technology, 018-006.

[4] Long, B. X. (2023). The Educational Reform and Prospects in the Era of Artificial Intelligence. Nanjing Social Sciences, (3), 11.

[5] Boucher, E. M. , Harake, N. R. , Ward, H. E. , et al. (2021). Artificially intelligent chatbots in digital mental health interventions: a review. Expert Review of Medical Devices, 18(sup1), 37-49.

[6] Rhim, J. , Kwak, M. , Gong, Y . (2022). Application of humanization to survey chatbots: change in chatbot perception, interaction experience, and survey data quality. Computers in human behavior(Jan.), 126.

[7] D'Alfonso, S. . (2020). Ai in mental health. Current Opinion in Psychology, 36, 112-117.

[8] Shi, M. L. (2018). Perceptions and Experiences of Clients in "AI" Psychological Counseling. (Doctoral dissertation, Huazhong Normal University).

[9]Ren, Z. H. (2012). Computerized Treatment of Depression Based on ACT: Effect, Matching, and Mechanism of Change. (Doctoral dissertation, Huazhong Normal University).

[10]Adnan, H. S., Srsic, A., Venticich, P. M., & Townend, D. M. R. (2020). Using AI for Mental Health Analysis and Prediction in School Surveys. European Journal of Public Health, (Supplement_5).

[11]Zhou, X. Y., Liu, L., Chen, Y. Y., Hong, J. L., & Lu, X. (2021). Design and Application of Automatic Assessment Model for College Students' Mental Health Based on Multimodal Data Fusion. Educational Technology Research, 42(8), 7.

[12] Wang, W. H., Liu, Y. C., Cheng, F., & Ji, S. S. (2021). Analysis of Mental Health of College Students Based on Naive Bayes Algorithm. Advances in Psychological Science, 11(7), 9.

[13] Ophir, Y., Asterhan, C. S. C., & Schwarz, B. B. (2017). Unfolding the Manifestations of Depression on Facebook among Adolescents. Computers in Human Behavior, 72(JUL.), 96-107.

[14] Su, Y., Liu, M. M., Zhao, N., Liu, X. Q., & Zhu, T. S. (2021). Modeling Psychological Indicator Identification Based on Social Media Data: Machine Learning Approaches. Advances in Psychological Science, 29(4), 15.

[15] Zhang, Y. Y., Pu, S. L., Zhu, Q., Kong, M., Hong, W. C., & Zhao, T. Q. (2020). ADHD Screening and Assessment System for Children Based on Multimodal Deep Learning Technology. CN111528859A.

[16] Zhong, Z., Zhong, S. C., & Tang, Y. W. (2021). Research on the Construction of Intelligent Learning Models Supported by Artificial Intelligence. Research in Distance Education, 42(12), 9.