Application of Large Language Models (LLMs) in Dementia Care

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Background and aim: Dementia, a neurodegenerative disorder characterized by progressive cognitive decline, presents a growing challenge for healthcare systems worldwide. The number of people with dementia is increasing dramatically as the population ages. This necessitates exploring innovative approaches to manage the condition and support not only patients but also their caregivers. Artificial intelligence (AI) is rapidly transforming various sectors, and healthcare is no exception. Large Language Models (LLMs) are state-of-the-art in the AI domain. They utilize a deep neural network to generate human-like responses to text prompts. The capabilities of LLM-based tools such as ChatGPT and Gemini in interactive conversations and providing relevant information make them a valuable asset in supporting dementia care. The aim of this study is to investigate the applications and challenges of LLMs in dementia care.

Materials and Methods: We searched Web of Science, PubMed and google scholar by using related keywords such as "dementia", "Large language model", and "LLM". To select the relevant articles, we conducted title, abstract, and full-text screening based on inclusion/exclusion criteria.

Results: LLMs have potential applications in supporting dementia care, including early detection of dementia using speech and text analysis, personalized cognitive assessment, personalized care and support, personalizing interactions with dementia patients, content generation for cognitive stimulation, reminiscence therapy, medication management support, and education of healthcare providers. Based on the review, while the use of LLM-based tools in dementia care presents exciting opportunities, there are some challenges and considerations, including privacy and security, bias and discrimination, accuracy and reliability, e-health literacy, user acceptance, and integration issues.

Conclusion: Large Language Models (LLMs) represent a powerful emerging technology with the potential to revolutionize dementia care. From facilitating early detection through speech and text analysis to personalizing support for both patients and caregivers, LLMs offer a range of exciting opportunities. However, it is critical to attention the challenges of data privacy, algorithmic bias, and the need for transparency in LLM development. Further research and development are necessary to realize the full potential of LLMs in this critical area.

Keywords: Dementia, older adult, large language model, artificial intelligence

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