

## Enhancing Early Detection of Dementia through Risk Factor Aggregation: Leveraging AI-Driven Knowledge Management Solutions

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### Abstract

Dementia represents a significant public health issue, characterized by cognitive decline that disrupts daily activities and the ability to live independently. With the global population aging, the number of individuals affected by dementia is expected to rise, necessitating innovative approaches for diagnosis and care. This study addresses the critical need for early detection of dementia, which is essential for timely treatments that enhance patient outcomes and improve the quality of life for both patients and caregivers. This research explores the integration of artificial intelligence (AI) into knowledge management systems, leveraging machine learning (ML) and deep learning (DL) techniques to analyze multimodal data from diverse sources, including electronic health records, genetic information, and lifestyle factors. Using a systematic review methodology, the study synthesizes existing literature on AI-driven approaches for dementia detection, highlighting their effectiveness in identifying risk factors and early symptoms. The analysis compares various AI techniques, such as Convolutional Neural Networks (CNNs) for image analysis and Natural Language Processing (NLP) for symptom extraction. Findings reveal that integrating diverse data sources such as clinical, behavioural, and neuroimaging significantly enhances the accuracy of early dementia detection. AI technologies are shown to uncover complex patterns and connections that traditional diagnostic methods often overlook, thereby improving diagnostic precision and patient outcomes. Future advancement may include real-time monitoring via wearable technology and enhanced multimodal data integration to refine predictive models. These developments hold potential for addressing the growing burden of dementia and improving patient care.

**Keywords:** *Dementia, Risk factor, Artificial intelligence, Knowledge management*