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An Integrated AI and IoT-Based System for Early Detection and Continuous Monitoring of Alzheimer's Disease

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Abstract: *Millions of people worldwide endure Alzheimer's disease, a degenerative neurological disorder that needs to be detected early and observed continuously to improve care of patients and results. This study offers an comprehensive system that merges Internet of Things (IoT) technology for continuous patient monitoring with deep learning-based diagnosis utilizing magnetic resonance imaging (MRI) images. Convolutional neural networks (CNN) with smart sensors allows real-time monitoring and identifies the stage of Alzheimer's disease, helps enhance clinical decisions and emergency intervention. The significance of IoT to enhance patient safety and well being, lower risks and help experts successfully control Alzheimer's disease is highlighted in the article. This study is based on two areas related to Alzheimer`s disease: the first area or stage is to discover and diagnose Alzheimer's disease using Deep Learning (DL) methods and its models, and the second stage is to how can we keep monitoring and follow-up our patients movement using IoT. In our paper, a developed diagnosing framework based on DL also real time monitoring of Alzheimer's is proposed. Diagnosis stage is achieved through DL MRI analysis, then we followed it by a vital signs, sleep, and activity monitoring framework to monitor patients' all-day activity in daily life using wearable sensors. the Activity monitoring provides a comprehensive framework for assistance in activities of daily living and evaluation of patient decline based on movement level and sleeping pattern and vital signs. When compared to existent methods, the results of Alzheimer's diagnosing suggest an improve of up to 86.34% disease detection accuracy. Additionally, over 95% accuracy was attained in categorizing activities of daily living, which is extremely promising when considering the subject's activity profile.*

Keywords: Alzheimer's Disease, Deep Learning (DL), Internet of Things (IoT), MRI image, Monitoring, Healthcare Decision Support ,WebSocket , ocelot gateway

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