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Notice for the PhD Viva Voce Examination

Mr Febin Antony (Registration Number: 1942042), PhD scholar at the School of Sciences, CHRIST (Deemed to be University), Bangalore will defend his PhD thesis at the public viva-voce examination on Thursday, 11 January 2024 at 10.00 am in Room No. 044, Ground Floor, R & D Block, CHRIST (Deemed to be University), Bengaluru - 560029.

Title of the Thesis	:	**Classification of Alzheimer's Disease Stages Using Machine Learning Techniques**
Discipline	:	**Computer Science**
External Examiner (Outside Karnataka)	:	**Dr Thiyagarajan C** Associate Professor Department of Computer Technology PSG College of Arts & Science Coimbatore Tamil Nadu
External Examiner (Within Karnataka)	:	**Dr Pushpa C N** Associate Professor Department of CSE University of Visvesvaraya College of Engineering K R Circle, Dr Ambedkar Veedhi Bengaluru, Karnataka – 560001
Supervisor	:	**Dr Anita H B** Associate Professor Department of Computer Science School of Sciences CHRIST (Deemed to be University) Bengaluru – 560029 Karnataka

The members of the Research Advisory Committee of the Scholar, the faculty members of the Department and the School, interested experts and research scholars of all the branches of research are cordially invited to attend this open viva-voce examination.

Registrar

Place: Bengaluru
Date: 05 January 2024

ABSTRACT

Alzheimer's disease (AD) is a type of mental disorder which deteriorates the normal functioning of human brain by reducing the memory capacity of an individual. Age is the most common factor for AD and this disease cannot be reversed or stopped. Doctors can only treat the symptoms of AD which include personality changes and brain structural changes. Analyzing neuro-degenerative disorders, neuroimaging plays an important role in diagnosing subjects with AD and other stages of AD. The proposed research identified this gap and using MRI and PET images for recognizing AD in its early occurrences by the professionals. This helps in tailoring an appropriate treatment procedure for treating AD. As per literature survey, many researchers have worked with convolutional methods like inbuilt skull stripping with two or more conversions and classified with different CNN architectures. The proposed research experimented advanced skull stripping method and classified using deep learning architectures.

This research emphasizes the implementation of ResNet50 architecture with T1 weighted MRI and Amyloid PET images for detecting the abnormalities in the brain patterns based on the image attributes. For the proposed experiment, a total of 5000 T1 weighted MRI data and 3000 Amyloid PET data were used. The collected images were pre-processed with noise removal techniques and skull stripping method. The ResNet50 is used to classify AD from the data obtained from the ADNI dataset. Pre-processed images /data were fed to the tuned for three class classification on ADNI image data at 200 Epochs shows the accuracy of 97.3% for T1 weighted MRI data and 98% for Amyloid PET data. The experimental results of the proposed model prove that it classifies the images according to various stages with better accuracy than the other existing models by achieving excellent results.

Keywords: Alzheimer's Disease, ADNI, ResNet50, MRI, PET, Deep Learning, Classification

Publications:

1. **F. Antony**, A. H. B and J. George, "Classification on Alzheimer's Disease MRI Images with VGG-16 and VGG-19," *IOT with Smart Systems: Proceedings of ICTIS 2022, Volume 2* (pp. 199-207). Singapore: Springer Nature Singapore, 2022.
2. **F. Antony**, A. H. B and J. George, "Detection of Alzheimer's Disease Stages Based on Deep Learning Architectures from MRI Images," *Diagnosis of Neurological Disorders Based on Deep Learning Techniques*, 47,2023.
3. **F. Antony** and A. H. B, "Classification and analysis of Alzheimer's Disease using Deep Learning methods on MRI and PET," 2022 5th International Conference on Multimedia, Signal Processing and Communication Technologies (IMPACT), Aligarh, India, 2022, pp. 1-7, doi: 10.1109/IMPACT55510.2022.10029052.
4. **F. Antony**, A. H. B and J. George, "Classification of Alzheimer's disease stages using Res Net50 architecture" Indian Journal of Natural Sciences,14, issue 78,2023.