

Alzheimer's Disease Detection using Machine Learning Techniques In 3D MR Images

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Abstract: *Alzheimer's disease is a major global health concern, and early detection and treatment are crucial for slowing its progression and enhancing the quality of life for those affected. While a cure for the disease is yet to be found, machine learning algorithms like Random Forest are emerging as promising tools for its early detection and prediction with high accuracy. These algorithms can detect patterns and features in patient data that may indicate the presence or likelihood of Alzheimer's disease. By utilizing large datasets and complex algorithms, machine learning has the potential to revolutionize healthcare by enabling earlier diagnosis and treatment. This could significantly improve outcomes for patients and their families. Therefore, the application of machine learning to Alzheimer's disease holds immense promise for enhancing public health worldwide.*

Keywords: Alzheimer's Detection, CNN, Machine Learning, MR Images

REFERENCES

- [1]. Dong Hye Ye, K.M. Pohl, and C. Davatzikos published a paper in the 2011 International Workshop on Pattern Recognition in NeuroImaging, where they presented a semi-supervised pattern classification approach that utilized structural MRI for Alzheimer's disease detection.
- [2]. Gokce UYSAL and Mahmut OZTURK presented a study in the 2019 Medical Technologies Congress, where they employed machine learning methods for detecting Alzheimer's disease through hippocampal volume analysis.
- [3]. H.M. Tarek Ullah, Dr. Dip Nandi, and Zishan Ahmed Onik presented a paper in the 2018 3rd International Conference for Convergence in Technology, which proposed a deep convolutional neural network approach for Alzheimer's disease and dementia detection using 3D brain MRI data.
- [4]. Illan, I.A., Gorriz, J.M., Ramirez, J., Chaves, R., Segovia, F., López, M., Salas-Gonzalez, D., Padilla, P., and Puntonet, C.G. presented a paper in the IEEE Nuclear Science Symposium & Medical Imaging Conference in 2010, where they utilized machine learning for very early Alzheimer's disease diagnosis, comparing 18 F-FDG and pib PET.
- [5]. In 2010, Joshi, S., Shenoy, D., GG, V.S., Rrashmi, P.L., Venugopal, K.R., and Patnaik, L.M. presented a paper in the Second International Conference on Machine Learning and Computing, where they employed machine learning and neural network methods to classify Alzheimer's disease and Parkinson's disease.