

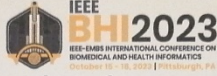
IEEE-EMBS BHI 2023 Best Paper Award for Andria Nicolaou (PhD Candidate)



The Best Paper Award First Place was presented to "An Explainable AI model in the assessment of Multiple Sclerosis using clinical data and Brain MRI lesion texture features" authored by Andria Nicolaou, Marios Pantzaris, Christos P. Loizou, Antonis Kakas, and Constantinos S. Pattichis. The paper was presented at the IEEE International Conference on Biomedical and Health Informatics (BHI), in Pittsburgh, PA, USA, Oct 15-18, 2023. The paper was presented by Andria Nicolau, a PhD candidate at our Department and a Research Scientist at CYENS. The IEEE-EMBS BHI, is sponsored by the IEEE Engineering in Medicine and Biology Society (IEEE EMBS) and is EMBS's primary technical

conference on informatics and computing in healthcare and life sciences. The conference theme was transforming healthcare and biomedicine with AI. The conference attracted more than 300 participants and the paper acceptance rate for oral presentations was 12%.

Abstract: Magnetic resonance imaging (MRI) is an essential visualizing tool in the diagnosis and monitoring of Multiple Sclerosis (MS) disease. However, the neurological examinations and the MRI assessments are insufficient to provide personalized treatment to the patients due to the complexity of the disease. This study implemented an explainable artificial intelligence (AI) model with embedded rules to assess MS disease evolution. Clinical data were used including demographic and neurological measurements. Texture features were extracted from manually delineated and normalized brain MRI lesions. Statistical analysis was employed to select the statistically significant texture features and clinical data. Different models using machine learning algorithms were implemented to differentiate the subjects diagnosed with relapsing-remitting MS (RRMS) from the subjects with progressive MS (PMS). Argumentation-based reasoning was performed by modifying the rules extracted from models with the best evaluation results. The findings indicated that the proposed explainable AI model can predict the clinical conditions of MS disease with high accuracy and provide transparent and understandable explanations with high fidelity. Future work will include further clinical data such as medications and investigate the correlation of the texture features and clinical data with the neurological impairment. The proposed model should also be evaluated on more MS subjects.



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"An Explainable AI model in the assessment of Multiple Sclerosis using clinical data and Brain MRI lesion texture features"

For the paper authored by Andria Nicolaou, Marios Pantzaris, Christos P. Loizou, Antonis Kafas, and Costantinos S. Pattichis presented at the IEEE International Conference on Biomedical and Health Informatics (BHI) in Pittsburgh, PA, USA

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