DELPHITM in the detection of neurological conditions and white matter pathologies

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The disruption of normal patterns of structural brain connectivity is believed to play a central role in the pathophysiology of many neurological and psychiatric disorders, such as, dementia, movement disorders, stroke, traumatic brain injury (TBI) etc., Particularly, white matter changes lay in the heart of the onset of many pathologies. Traditional brain imaging technologies are expensive, inaccessible, and fail to provide actionable insights regarding brain network health. Therefore, there is a huge need, for a simple, precise and accessible tool that objectively evaluates brain functional status.

DELPHITM is an active system for the visualization of brain health. It is a proprietary acquisition and analysis AI based algorithm that interfaces with available 'Off-the-Shelf' hardware to enable direct stimulation and monitoring of the brain (TMS-EEG). DELPHI's output measures, which are indicative for several electrophysiological features were significantly different between age defined groups as well as mild Dementia patients and age matched healthy controls.

In a multidimensional approach the DELPHI output measures ability in identification of brain white matter fibres connectivity damage in stroke and traumatic brain injury (TBI) was tested. DELPHI output measures was able to classify healthy from unhealthy with a balanced accuracy of 0.81 ± 0.02 and AUC of 0.88 ± 0.01. additionally, DELPHI output measures, differentiated successfully, between cerebral small vessle disease (cSVD) diagnosed subjects and age matched healthy controls, with AUC of 0.88 ($p < 0.0001$), sensitivity of 0.83 and specificity of 0.75. These results indicate DELPHI as a possible aid for early detection of white matter integrity and pathologies.