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Optimization models for quantifying visual search scanpath efficiency: Measuring treatment recovery in traumatic brain injury

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A method for quantitatively measuring scanpath efficiency obtained from a visual search task, based on the Traveling Salesman Problem (TSP) is presented. Visual search relies on down top-down executive function guidance where the fixations and dwell times are influenced by knowledge and experience. Scanpath efficiency based on TSP offers a quantitative, absolute measurement of the most optimal path for inspecting a search grid as part of a visual search task. This method may reveal cognitive function differences when applied to different populations of participants. The approach not only evaluates visual perceptual function post head injury but also serves as a basis to move from binary diagnostic evaluation and more to the examination of human efficiencies and inefficiencies objectively measuring treatment outcome.

Biography

Gerry Leisman is an Israeli neuroscientist educated in Europe and the United States in Medicine, Neuroscience, and Biomedical Engineering at Manchester University. He received a PhD in Neuroscience and Biomedical Engineering from Union University, in 1979. Currently he is the Director of the National Institute for Brain and Rehabilitation Sciences in Nazareth, Israel, Professor of Biomedical Engineering at ORT-Braude College of Engineering in Karmiel, Israel and of Brain and Rehabilitation Sciences at the University of Medical Sciences in Havana, Cuba. He is Editor-in-Chief of the journal Functional Neurology, Rehabilitation, and Ergonomics. He is the co-author of a text with Dr. Robert Melillo on Neurobiology and Autistic Spectrum Disorders, has published hundreds of papers in the Neurosciences, Engineering and Systems Sciences literature and is the holder of patents.

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