Chapter 1
Artificial Intelligence in Neuropsychology:
Advances and Challenges

Katie Moraes de Almondes
Federal University of Rio Grande do Norte, Brazil

Gilberto Sousa Alves
iD https://orcid.org/0000-0002-0463-6183
Federal University of Maranhão, Brazil

Candida Lopes Alves
iD https://orcid.org/0000-0002-6161-2938
Federal University of Maranhão, Brazil

ABSTRACT

This chapter reflects the challenge of discussing the possibility of a paradigm shift in neuropsychology to cognitive and behavioral science based on technology, especially with the use of artificial intelligence, considering all continents and their sociocultural differences. With this purpose, it presents the history of neuropsychology in the digital universe, the advancement of artificial intelligence/technology in neuropsychological assessment, and the creation of standardized tests through digital means. It discusses psychological intervention and the use of artificial intelligence. Lastly, there are monitoring applications for neurocognitive and technology in rehabilitation.

In the mid-20th century, there was an unimaginable network of global information flows. This period marked the emergence of the third industrial revolution characterized by technological and scientific advances used in industry, agriculture, commerce, and livestock. The famous digital era was born!

Undoubtedly, great progress has been made, with various resources and tools emerging to make our lives more agile and comfortable, modifying the structure and logic of information, means of communication, and the provision of services. In the meantime, technology has demonstrated that it is always at the forefront, revolutionizing systems, enabling discoveries, crossing different areas, and, consequently, contributing to improving the quality of life of societies.

This tone is no different for health, despite today's great challenges in dealing with chronic diseases, an aging population, and diseases with no or reduced therapeutic possibilities, rehabilitation, and progressive diseases such as amyotrophic lateral sclerosis, and dementia. Technology has been applied to support life expectancy with excellence, responding to the challenges posed by these limiting conditions.

The technological wave also intervened in neuropsychology, an area that aims to study the relationship between the brain, cognition, and behavior, providing conceptual and substantive advances in training, research, and the practice of assessment and rehabilitation, providing an evidence-based area.

Unquestionably, this path has not been easy, as the perspective is of a possible paradigm shift towards a cognitive and behavioral science based on technology, which presupposes more accuracy and effectiveness, faster, fewer errors in data correction, with a unique contribution to the structuring and cohesion of the information collected, and with a substantial contribution to respond to the demands of large-scale population cohorts.

We are moving slowly towards this paradigm, considering all continents and their socio-cultural differences. Nevertheless, emphasis is placed on the progressive technical-scientific development of Neuropsychology. In this sense, this chapter aims to present the advancement of artificial intelligence/technology in neuropsychological assessment and the creation of standardized tests through digital means, presenting some applications of neurocognitive monitoring and technology in rehabilitation.

TECHNOLOGICAL NEUROPSYCHOLOGICAL ASSESSMENT

The development of artificial intelligence was influenced by the exact sciences and the humanities, with the help of human imagination, but sometimes the words used by professionals and users of this technology do not understand the current new capabilities of the various algorithms and procedures included in the generic term

14 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/artificial-intelligence-in-neuropsychology/342880

Related Content

Neuropathology of Parkinson's Disease: An Update of the Recent Findings
Bilal El-Mansoury, Omar El Hiba, Mustapha Agnaou, Arumugam Radhakrishan Jayakumar, Abdelaati El Khiat, Kholoud Kahim, Samira Boulbaroud, Nadia Zouhairi, Oumaima Tibssirte, Hayat Bouighajd, Moulay Abdelmonaim El Hidan, Abdesslam Ferssiwiand Abdelali Bitar (2023). *Experimental and Clinical Evidence of the Neuropathology of Parkinson's Disease (pp. 82-101).*
www.irma-international.org/chapter/neuropathology-of-parkinsons-disease/327967

Attitudes of Society Towards People With Neurodevelopmental Disorders: Problems and Solutions
Pallavi Khanna (2020). *Interdisciplinary Approaches to Altering Neurodevelopmental Disorders (pp. 1-12).*
www.irma-international.org/chapter/attitudes-of-society-towards-people-with-neurodevelopmental-disorders/254666

Alpha-Synucleinopathies: Parkinson's Disease, Dementia With Lewy Bodies, and Multiple System Atrophy
Carlos Henrique Ferreira Camargo, Marcus Vinicius Della-Coletta, Delson José da Silvaand Hélio A. G. Teive (2019). *Handbook of Research on Critical Examinations of Neurodegenerative Disorders (pp. 274-297).*
www.irma-international.org/chapter/alpha-synucleinopathies/209101

Support of Gamification, Virtual, and Assistive Technologies in Intervening in Social and Behavioral Impairment
Hiten Rajpurohitand Arun Khosla (2020). *Interdisciplinary Approaches to Altering Neurodevelopmental Disorders (pp. 131-142).*
www.irma-international.org/chapter/support-of-gamification-virtual-and-assistive-technologies-in-intervening-in-social-and-behavioral-impairment/254673

The Role of the Gut-Brain Axis in Eating Disorders: An Empirical Study From India