

Artificial Intelligence Applications in Healthcare and Medicine

# Artificial Intelligence and Multimodal Signal Processing in Human-Machine Interaction



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Saeed Mian Qaisar, and Humaira Nisar



ARTIFICIAL INTELLIGENCE AND  
MULTIMODAL SIGNAL PROCESSING  
IN HUMAN-MACHINE INTERACTION

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# Artificial Intelligence Applications in Healthcare and Medicine

## ARTIFICIAL INTELLIGENCE AND MULTIMODAL SIGNAL PROCESSING IN HUMAN-MACHINE INTERACTION

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# Understanding dyslexia and the potential of artificial intelligence in detecting neurocognitive impairment in dyslexia

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## 8.1 Introduction to dyslexia and artificial intelligence

In 1877 Dr. Adolph Kussmaul, a German physician, introduced the term “word blindness” to describe a condition of individuals who had the ability to distinguish the form of letters but were unable to read and translate them into spoken words. A decade later, a German ophthalmologist, Dr. Rudolf Berlin, coined the term “dyslexia,” which derived from the Greek words *dys-* (difficult) and *-lexia* (words), and literally means “difficulty with words.” Reading is not an easy task. Most of us mastered our reading abilities during the early years of primary

school, where we learned how to pronounce each letter and connect the sound of each letter to form words. Unfortunately, this ability is not present in children with dyslexia. Dyslexia is a neurodevelopmental disorder that is referred to as a specific learning disorder (SLD) in reading and writing, which affects academic performance. While dyslexia can also arise later in life from head trauma, illness, or other factors, the most common type is present at birth and persists throughout life. Most often, children with dyslexia have delayed learning development compared to their peers of the same age. It is not new knowledge that this difficulty originally comes from neurocognitive abnormalities,