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A Systematic Review on AI-Powered Methods for
Assessing Attention and Focus in the Digital Age

In today's world, our attention and focus are constantly broken due to regular interaction with technology. In our daily life, we spend quite some time with our smartphones, computers, and other devices. Due to the increase in screen time, our thought process has suffered greatly. With that in mind, it was obvious to realize the need for intelligent systems capable of monitoring, assessing, and increasing attention and focus. Artificial Intelligence or AI, particularly machine learning and deep learning models, has shown great promise in automating the detection and evaluation of mental health issues such as attention and focus. This review paper examines the status of AI-powered methods for assessing attention and focus in digital environments. We followed PRISMA guidelines to identify and filter relevant literature across five major databases, ultimately narrowing it down to 19 highly matched papers. Our systematic literature review focuses on the AI-powered techniques, common datasets used, the evaluation metrics used, and applications such as online learning, mobile usage, and social media, and their role in assessing attention and focus. From our work, the key findings reveal that most of the AI-powered methodologies have a great reliance on supervised learning algorithms and techniques. Our paper ends with mentioning the current challenges and recommending directions for future research.

1. Introduction

Attention and focus are the two greatest components of human psychology. They are most important in learning, understanding, productivity in daily life, and mental health. However, the frequent use of technology such as smartphones and social media platforms in the online education system has introduced new challenges for mental health issues, especially with learning, keeping up attention, and focus while doing so.

Recent advancements in machine learning, deep learning, and other AI techniques, along with cognitive science, offer a variety of techniques for modeling human attention through behavioral, physiological, and interaction-based signals.

Currently, these systems are being deployed in educational environments, digital well-being tools, human-computer interaction systems, and mental health diagnostics. But, despite the growing interest in research in this domain, there is a limited combination of findings regarding the specific AI methods used, their effectiveness, and the contexts in which they are applied. And that is the main object of our review paper.

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This systematic literature review aims to critically analyze the studies that use AI-powered approaches for assessing attention and focus in digital contexts.

2. Methodology

Our review process follows the systematic methodology described in the PRISMA framework. The process involved designing a search term, multiple database queries, filtering papers, and then manual screening, as mentioned below. We used a very intelligent search technique, the detailed search strategy table provided below. This was specifically designed to cover a wide range of relevant domains.

2.1. Search Strategy and Data Sources

We used a comprehensive search strategy. We formulated this strategy using a combination of terms related to AI techniques and attention, and focus. The search was conducted across five major academic databases: IEEE Xplore, ACM Digital Library, ScienceDirect, Google Scholar, and PubMed. Our search finally resulted in an initial pool of 346 papers. These areas included AI/ML core terms, human-computer interaction, or HCI. We also considered non-AI tools, digital distraction, education, and mental health.

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