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Cognitive load assessment through EEG: A dataset from arithmetic and Stroop tasks

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Abstract

This study introduces a thoughtfully curated dataset comprising electroencephalogram (EEG) recordings designed to unravel mental stress patterns through the perspective of cognitive load. The dataset incorporates EEG signals obtained from 15 subjects, with a gender distribution of 8 females and 7 males, and a mean age of 21.5 years [1]. Recordings were collected during the subjects' engagement in diverse tasks, including the Stroop color-word test and arithmetic problem-solving tasks. The recordings are categorized into four classes representing varying levels of induced mental stress: normal, low, mid, and high. Each task was performed for a duration of 10–20 s, and three trials were conducted for comprehensive data collection. Employing an OpenBCI device with an 8-channel Cyton board, the EEG captures intricate responses of the frontal lobe to cognitive challenges posed by the Stroop and Arithmetic Tests, recorded at a sampling rate of 250 Hz. The proposed dataset serves as a valuable resource for advancing research in the realm of brain-computer interfaces and offers insights into identifying EEG patterns associated with stress. The proposed dataset serves as a valuable resource for researchers, offering insights into identifying EEG patterns that correlate with different stress states. By providing a solid foundation for the development of algorithms capable of detecting and classifying stress levels, the dataset supports innovations in non-invasive monitoring tools and contributes to personalized healthcare solutions that can adapt to the cognitive states of users. This study's foundation is crucial for advancing stress classification research, with significant implications for cognitive function and well-being. © 2025 The Author(s)

Author keywords

Artificial intelligence; Deep learning algorithms; EEG signals; Mental stress; Stress detection dataset

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