Chapter 14
Neural Insights: Harnessing Brain-Computer Interfaces for Real-Time Data-Driven Employee Engagement

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ABSTRACT

This research study aims to conduct a real-time analysis of employee involvement in the workplace by examining the possible applications of brain-computer interfaces, or BCIs. Brain-computer interfaces (BCIs) provide a novel means of monitoring employee engagement by directly detecting brain activity. As such, there is no longer a need to depend exclusively on the already employed self-reporting techniques, which may be arbitrary and inaccurate. This study aims to assess whether

DOI: 10.4018/979-8-3373-5122-3.ch014

brain-computer interfaces or BCIs, can be integrated into employee monitoring systems that already exist. More precisely, how real-time neural data may improve the precision of engagement assessments is the main area of interest. Some of the most important issues that are now being addressed include the processing of brain impulses, ensuring the ethical use of such technology, and maintaining user comfort. Based on the results, it seems that BCI-based engagement analysis offers deeper insights into employees' states, which helps companies react more quickly to changes in employee engagement.

INTRODUCTION

In today's highly competitive and ever-changing work environment, staff involvement is very necessary for the success of any firm. Companies are always looking for new methods to improve their efficiency, find strategies to keep their employees, and cultivate a healthy culture in the workplace (Gerber, T., et al., (2017). The traditional methods of assessing hand engagement (YItayew, M. et al., 2020), which are comparable to checks and feedback forms, are typically fixed and retrospective, and thus only provide a snapshot of the feelings of the hands. It is possible that these systems do not provide real-time perception of how people feel or react in particular work settings, which restricts the ability to take timely actions. This describes the means of overcoming these restrictions, the incorporation of cutting-edge technologies, such as Brain-Computer Interfaces (BCIs), has emerged as a game-changing instrument for evaluating hand engagement in real-time (Pandey, B. K. et al., 2024a). Brain-computer interfaces, often known as BCIs, are systems that create a direct communication link between the brain and external bias. This allows for the collection of brainwave data, which may then be used to evaluate cognitive and emotional states. By using electroencephalography (EEG) to record the amount of effort exerted by the brain, brain-computer interfaces (BCIs) provide a non-invasive method for gaining an understanding of how workers react to stimulants in the plant (Maheshwari, R. Uma. et al., 2024b). With the help of this technology, organizations can monitor their employees' emotional and internal responses in real-time. This technology also provides continuous feedback that can be utilized to adjust the working environment, (Pandey, B. K. et al., 2024b) duties, or communication techniques in a manner that improves employee satisfaction and productivity (Maheshwari, R. Uma. et al., 2024a).

The recent developments in neurotechnology have shown that brain-computer interfaces (BCIs) have the potential to be used for a variety of applications, including gaming, healthcare, and rehabilitation. Nevertheless, its application in plant settings, particularly for hand interaction analysis, is still relatively new and has not

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Galina Vladimirovna Astratova, Victoria E. Troninaand Chigozirim Ndubuisi Onwusiribe (2026). *Empowering Human Resources Through Human-Computer Interaction (pp. 89-114).*

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