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Analysis of Nuclear Power Plant Operator Activities and Risk Factors Using an EEG System

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Abstract : Nuclear Power Plant (NPP) operators have a large responsibility on their shoulders. They must allow the plant to generate a high amount of energy while inspecting and maintaining the safety of the plant. This type of occupation comes with high amounts of mental fatigue, and a small mistake can have grave consequences. Electroencephalography (EEG) is a method of gathering the electromagnetic waves emitted by a human brain. We propose a safety system by monitoring brainwaves for signs of mental fatigue. This requires an analysis of the tasks and mental models of the NPP operator, as well as risk factors on mental fatigue and attention that NPP operators face when performing their tasks. The brain waves generated from experiencing mental fatigue can then be monitored for. These factors are analyzed, developing an EEG-based monitoring system, which aims to alert NPP operators when levels of mental fatigue and attention start affecting their performance in task completion.

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