Group 6

Design of a Device for Task Saturation to Improve Safety and Communication in the Operating Room

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Abstract

Surgical and anesthesia residents frequently experience task saturation, which can reduce inter-team communication, increase the risk of surgical complications, and worsen patient outcomes. Despite the risks, residents do not receive formal training to recognize symptoms of cognitive overload or mechanisms to cope, such as asking for help. To address this gap, we developed a web-based multiplayer simulation that progressively overwhelms players through visual, auditory, and cognitive means while encouraging communication among teammates via speech-to-text mechanisms that require players to request help by name. Early testing showed that players began experiencing symptoms of overwhelm at levels 4-5 out of 20, demonstrating the platform's ability to induce cognitive overload. Future developments aim to integrate large language models to improve help-request detection and specific task delegation, and to deploy the application to a higher-capacity server, rather than the current server host, Render, to support wide-scale hospital adoption.