Biosignals Monitoring of First Responders for Cognitive Load Estimation in Real-Time Operation

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During the last decade, new technological tools have emerged to provide first responders with augmented senses in emergency and disaster situations. Some of these tools focus on providing extra information about their surroundings. However, despite augmenting first responders' capabilities, the quantity and the way that this information is presented can affect their cognitive load. This manuscript presents an integrated framework that allows real-time biosignals monitoring to analyze physical constants and correlate them with subjective cognitive load tests.

Biosignals monitoring allows alarms to be raised related to the physical status while cognitive load values will allow modulation of the amount of information that can be assimilated by the first responder in operation. In-lab and practice experimental tests have been conducted to create a fully functional framework. During the technical validation, a strong dispersion of subjective cognitive load by means of NASA-TLX questionnaires has been found between participants. Nonetheless, the developed framework allows extraction of relationships between biosignals and cognitive load, with special attention to the respiration rate and eye movements.

Biography

Marta Álvarez Calderón is a Clinical Psychologist specialized in Clinical Neuropsychology and Psychology of Emergencies and Catastrophes. She works in SUMMA 112 (Medical Emergency Services in Madrid Community). She combines healthcare work with teaching and research, being the author of several articles on Clinical Psychology. Currently, she collaborates as a researcher in the European project RESCUER.