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A Cognitive Modeling Approach for Predicting Behavioral and Physiological Workload Indicators

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Abstract

Measuring cognitive workload is a persistent challenge in cognitive science. Cognitive architectures may offer a principled way to measure, define, and understand workload and its behavioral and physiological consequences in terms of underlying cognitive dynamics. Previous research has shown that model-based workload relates to subjective workload judgments in simple tasks. Our goal was to further validate model-based workload measurement with known physiological workload indicators in a complex task characterized by varying degrees of workload levels. Participants completed an unmanned vehicle management task while their physiology was recorded. Correlations between model-based workload and physiological metrics generally trended in the predicted direction, and the engagement index showed the strongest and most consistent relationship to model workload. The results provide preliminary validation for model-based workload measurement.