A Cognitive Modeling Approach for Predicting Behavioral and Physiological Workload Indicators

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Abstract

Measuring cognitive workload is a persistent challenge in cog-nitive science. Cognitive architectures may offer a principledway to measure, define, and understand workload and its be-havioral and physiological consequences in terms of under-lying cognitive dynamics. Previous research has shown thatmodel-based workload relates to subjective workload judg-ments in simple tasks. Our goal was to further validate model-based workload measurement with known physiological work-load indicators in a complex task characterized by varying de-grees of workload levels. Participants completed an unmannedvehicle management task while their physiology was recorded.Correlations between model-based workload and physiologi-cal metrics generally trended in the predicted direction, andthe engagement index showed the strongest and most consis-tent relationship to model workload. The results provide pre-liminary validation for model-based workload measurement.