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OpenMATB: A Task Battery promoting task customization, software extensibility and experiment replicability

Prof. CEGARRA, Julien (Laboratoire Sciences de la Cognition, Technologie, Ergonomie (SCoTE EA 7420), Université de Toulouse, INU Champollion, Albi, France.); Mr VALÉRY, Benoît (Laboratoire Sciences de la Cognition, Technologie, Ergonomie (SCoTE EA 7420), Université de Toulouse, INU Champollion, Albi, France.); Mrs AVRIL, Eugénie (Laboratoire Sciences de la Cognition, Technologie, Ergonomie (SCoTE EA 7420), Université de Toulouse, INU Champollion, Albi, France.); Mr CALMETTES, Christophe (Laboratoire Sciences de la Cognition, Technologie, Ergonomie (SCoTE EA7420), Université de Toulouse, INU Champollion, Albi, France.); Mr NAVARRO, Jordan (Laboratoire d'Etude des Mécanismes Cognitifs (LEMC EA 3082), Université Lyon 2, France & Institut Universitaire de France, Paris, France.)

Content

The original Multi-Attribute Task Battery (MATB) contains a set of interactive tasks that are representative of those performed during aircraft piloting (Comstock & Arnegard, 1992). More precisely, it requires participants to simultaneously perform four tasks that are distributed over the screen: a system monitoring task, a compensatory tracking task, an auditory communication task and a resource management task. MATB task set offers a robust way to study the effects of various parameters (e.g., automation, priorities, instructions and so on) on the participant's multitasking behavior, such as his/her decision-making, level of performance, ocular behavior, mental workload, and so on. Moreover, the nature of the reduction allows researchers to design experiments that can be used even with participants having no prior experience of aircraft. This probably explains why, since it was first published, MATB has undoubtedly become one of the most firmly established micro-world used by human factors researchers. However, as thirty years have passed since the original MATB it appears no longer adequate to meet up-to-date research requirements. Multiple incompatible re-implementations have been designed, such as MATB-II (Santiago-Espada, Myer, Latorella, & Comstock, 2011), AF-MATB (Miller, 2010), or TSU-MATB (Thanoon, Zein-Sabatto, & McCurry, 2017).

We argue that an updated implementation should promote three aspects: (1) task customization so that the current task set can be appropriately adapted to the experimenter's needs, (2) software extensibility to permit the simple addition of new features, and (3) experiment replicability to favor replication studies, the transparency of the methods and, hence, the credibility of the results.

We then present OpenMATB: an open-source variant of the Multi-Attribute Task Battery which is available under a free software license (see <https://github.com/juliencegarra/OpenMATB>). We stress how OpenMATB provides a robust platform, fundamentally adaptable to any emerging technical or research need, which should both alleviate the workload of researchers and guarantee a high level of quality in the MATB research field.

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Thanoon, M. I., Zein-Sabatto, M. S., & McCurry, C. D. (2017). Multi-Attribute Task Battery for Human-Machine Teaming. Paper presented at the International Conference on Advances on Applied Cognitive Computing, Las Vegas, USA.

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