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1107

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Luca Longo · Maria Chiara Leva (Eds.)

# Human Mental Workload

## Models and Applications

Third International Symposium, H-WORKLOAD 2019  
Rome, Italy, November 14–15, 2019  
Proceedings

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ISSN 1865-0929                      ISSN 1865-0937 (electronic)  
Communications in Computer and Information Science  
ISBN 978-3-030-32422-3              ISBN 978-3-030-32423-0 (eBook)  
<https://doi.org/10.1007/978-3-030-32423-0>

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# Preface

This book endeavors to stimulate and encourage discussion on mental workload, its measures, dimensions, models, applications, and consequences. It is a topic that demands a multidisciplinary approach, spanning across human factors, computer science, psychology, neuroscience, statistics, and cognitive sciences. This book presents recent developments in the context of theoretical models of mental workload and practical applications.

This year in particular it contains a selection of the work presented in the context of the Third International Symposium on Mental Workload, Models and Applications (H-WORKLOAD 2019), sponsored by the Sapienza University of Rome and supported by the Irish Ergonomics Society. It contains a revision of the best papers presented at the symposium and selected through a strict peer-review process. The contributions of this edition were predominately focused on the use of neurosciences tools in the context of detecting, assessing, and modeling mental workload.

From the content of these research contributions, it is clear that mental workload, as a multidimensional and multifaceted construct, is still under definition, development, and investigation. This is one of the reasons why mental workload is today a keyword used and abused in life sciences, as pointed by Prof. Fabio Babiloni. However, despite the difficulty in precisely defining and modeling it, the capacity to assess human mental workload is a key element in designing and implementing information-based procedures and interactive technologies that maximize human performance. Some of the articles published in this book applied psychological subjective self-reporting measures, others made use of primary task measures and some a combination of these. Physiological measures in general, and more specifically electroencephalography (EEG), have been gaining a more prominent role, thanks to advances in data-gathering technology as well as a growing availability of computational power and classification techniques offered by the discipline of artificial intelligence. This is also reflected in the present book where half of the chapters focus on the development of novel models of mental workload employing data-driven techniques, borrowed from machine learning. However, one of the key issues in modeling mental workload employing automated learning techniques is that, although it often leads to accurate and robust models, they lack explanatory capacity. This problem is fundamental if we want to define mental workload for the fields of human factors, human–computer interaction, and in general for human-centered designers. Thus, we believe that future research efforts on mental workload modeling should employ a mix of measures as well as qualitative and quantitative research methods to not only assess mental workload but also to understand its meaning and implications on the individuals and our approach toward work and life.

September 2019

Luca Longo  
M. Chiara Leva

# Acknowledgments

We wish to thank all the people who helped in the Organizing Committee for the Third International Symposium on Mental Workload, Models and Applications (H-WORKLOAD 2019). In particular the local chairs, Dr. Gianluca Di Flumeri, Dr. Gianluca Borghini, Dr. Pietro Aricò, and the members of the scientific committee listed in this book for their contribution toward the revision process and their constructive feedback to the scientific community around it. We would also like want to include in our thanks the main sponsors of the event, the Sapienza University of Rome, the Irish Ergonomics Society, and the Technological University Dublin. Without the support of this extended community the conference and the book would not have been realized. A special thank you goes to the researchers and practitioners who submitted their work and committed to attend the event and turn it into an opportunity to meet and share our experiences on this fascinating topic.

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**Dr. Luca Longo** is currently an assistant professor at the Technological University Dublin, where he is a member of the Applied Intelligence Research Centre. His core theoretical research interests are in artificial intelligence, specifically in automated reasoning and machine learning. He also performs applied research in mental workload modeling. He is the author of 50+ peer-reviewed articles that have appeared in conference proceedings, book chapters, and journals in various theoretical and applied computer science fields. Luca has been awarded the National Teaching Hero in 2016, by the National Forum for the Enhancement of Teaching and Learning in Higher Education.

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