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Luca Longo · Maria Chiara Leva (Eds.)

Human Mental Workload

Models and Applications

4th International Symposium, H-WORKLOAD 2020
Granada, Spain, December 3–5, 2020
Proceedings

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ISSN 1865-0929 ISSN 1865-0937 (electronic)
Communications in Computer and Information Science
ISBN 978-3-030-62301-2 ISBN 978-3-030-62302-9 (eBook)
<https://doi.org/10.1007/978-3-030-62302-9>

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The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

This year has been a very challenging one across the world due to the need to change and adapt in the context of a worldwide pandemic. The pandemic has affected many areas of our normal living, working environments and conditions including changing the landscape for many areas where mental workload can be experienced. We have seen a steep increase in remote working settings across various workforce and operational environments, and an increase in the weight of contextual conditions affecting it not just for remote working situations but also for frontline workers. These people have continued in their safety critical tasks with the extra weight of performance shaping factors such as fatigue from longer working hours to cover for the need of possible reduced staffing due to sick leave and/or the need to isolate. These factors have been witnessed in healthcare, in urban transports, in logistics, and in food manufacturing and distribution services, just to name a few. Similarly, external stressors have been observed, such as the fear of being at personal risk and/or with a changed family-related workload. In all of these situations, we have also recovered a sense of the role of human performance in an imperfect world not only as part of the imperfection but also as the one able to maintain continuity even in the face of adverse circumstances, with unexpected resilience. In this context, the requirement for cognitive resources has certainly seen an increase. Therefore, there is still a need to discuss the assessment of mental workload and its implications on human performance. The modeling of human mental workload can be used to inform the design of interfaces in this changing context, the technologies we are relying on more and more for remote working, monitoring of conditions, and our direct frontline activities, so as to ensure they can be better aligned to the human capabilities and limitations. There are many operational definitions and contexts to study mental workload in action in various fields, different ways to approach the problem, its dimensions, and the mechanism to aggregate these dimensions and the various contributing factors. This trend is also confirmed by the best papers selected in this book from the proceedings of the 4th International Symposium on Human Mental Workload, models, and applications (H-WORKLOAD 2020). The conference was held during December 3–5, 2020, in Granada, Spain; the conference was held virtually due to the COVID-19 pandemic. Selected papers have gone through a strict review process, with an average of four reviews for each paper. Some authors considered task-specific dimensions, while others chose a combination of task and user-specific dimensions. Primary researches have mainly employed self-reporting measurements or a combination of psychophysiological techniques. However, the development of a generally applicable model that manages to incorporate task, user, and context-specific dimensions is yet to be achieved.

As pointed out by an author in one of the chapters in this volume, the development of new methodologies should try and verify how subjective, task-objective, and physiological measures can work well together, so as to achieve cross validation and

the convergence of various measurement techniques. Furthermore, other authors in the volume also highlight that it is useful to focus on complex safety-critical systems alongside manufacturing contexts where mental workload and fatigue may rather be induced by repetitive tasks, generating feasible ways to approach and assess the issue in the real contexts. We hope to continue as a community to provide steps in the right direction for progressing the field in terms of the fundamental problems and in terms of the usefulness and inclusiveness of their applications in various domains such as the models and measures adopted in rail, nuclear industry, aviation, manufacturing, and healthcare.

This book endeavors to stimulate and encourage further discussion on mental workload, its measures, dimensions, models, applications, and consequences. We believe this discussion should be multidisciplinary and not only confined to ergonomics. It should be at the intersection of human factors, computer science, psychology, neuroscience, and statistics. This book presents recent developments in the context of theoretical models of mental workload and practical applications aimed at task support and mental workload management in operations. This is why the contributions have been organized in two sections: models of mental workload and applications.

The idea for the H-WORKLOAD 2020 symposium is supported by the Irish Ergonomics Society, the conference Organizing Committee, and the reviewers without which neither the conference nor the book would have been realized. A special thanks goes to the University of Granada, Spain, Faculty of Psychology, for hosting the conference, even if in a virtual format, and the Technological University Dublin, Ireland, for all the support received.

September 2020

M. Chiara Leva
Luca Longo

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