Roadmapping Extended Reality: Fundamentals and Applications
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DESCRIPTION

ROADMAPPING EXTENDED REALITY

This book offers a comprehensive overview of the technological aspects of Extended Realities (XR) and discusses the main challenges and future directions in the field.

This book is important and timely – XR technologies have overcome the 3 main aspects that were holding it back from mainstream adoption: cost, cables, and size. However, there are many aspects of XR technologies that are now going to be explored and developed that still need urgent research in terms of security, privacy, health and safety, long-term effects, addiction risks, and age-related developmental concerns, and the aim of the book is to inform all readers of these open issues and challenges. There are currently a great number of interdisciplinary researchers and developers working in the XR R&D field. Recently, XR technologies moved from the Gartner Hype Cycle onto the Plateau of Productivity on the Gartner Hype Cycle signaling that the fundamental XR technologies are now deemed mature technologies and ready for deployment in a wide variety of application areas. Corroborated by the fact that XR technologies are part of the future Metaverse, a concept that went rapidly mainstream during the time of writing of this book.

Roadmapping Extended Reality is divided into two parts: (1) fundamentals and (2) applications. The first part covers the main technological aspects of XR. The chapters in this section review and discuss relevant fundamental concepts of XR, the actual state-of-the-art, and future challenges. The second part of the book focuses on covering a wide range of applications of XR including a future
roadmap. All in all, the book offers a snapshot of the state-of-the-art in XR and addresses the needs of a multidisciplinary audience working in both academia and the industry, as well as stakeholders at government agencies and non-profit organizations.

**Audience**

This book is aimed at academic and industrial developers, exploring and developing applications in the XR, VR, AR, AI, smart IoT, 4th Industrial Revolution space, including those that are solving technology requirements, human factors, evaluation methodology advances, and ROI investigations.

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**ABOUT THE AUTHOR**

**Mariano Alcañiz, Ph.D.** is founding director of the Immersive Neurotechnologies Lab (LabLENI) as well as a Full Professor of Biomedical Engineering at the Polytechnic University of Valencia, Spain. He has published more than 350 academic papers, in interdisciplinary journals such as Scientific Reports and PLoS One, as well domain-specific journals in the fields of biomedical engineering, computer science, psychology, marketing, management, psychology and education. His work is centered on using empirical and behavioral science methodologies to explore people as they interact in these digital worlds, but he also engages in research geared towards developing new ways to produce Extended Reality (XR) simulations.

**Marco Sacco** is Senior Researcher, head of CNR-STIIMA Lecco subsidiary, and head of division Enterprise Engineering and Virtual Applications. President of EuroXR (European Association of Extended Reality). He has more than 160 publications (118 Scopus certified – H-index 19), including papers in academic journals and conference proceedings. His experiences are VR/MR/AR applied to the life-cycle of the product/process/factory, discrete event and 3D simulation, Knowledge management, and Semantic Web.

**Jolanda G. Tromp** is consultant to the EuroXR association for the Delphi consensus study; Director Center for Visualization & Simulation (CVS), Duy Tan University, Da Nang, Viet Nam; founding CIO spinout Company for Visualization & Simulation, Viet Nam; visiting research professor XR lab Grupo DIANA, University of Malaga, Spain, and XR R&D Study Abroad internships Adjunct Instructor HCI Master and XR curriculum R&D, State University of New York in Oswego, NY, USA, and Duy Tan University, Viet Nam. She has been working in XR R&D since 1993 after trying garageVR headsets and gloves in the early nineties, including 4 EU and UK-funded long-term Collaborative Virtual Environment demonstrator R&D projects.

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