

Weidong Huang · Leila Alem  
Mark A. Livingston *Editors*

# Human Factors in Augmented Reality Environments

 Springer

# Human Factors In Augmented Reality Environments

**Daniel N. Cassenti**

## **Human Factors In Augmented Reality Environments:**

*Human Factors in Augmented Reality Environments* Weidong Huang,Leila Alem,Mark A Livingston,2012-09-19 Advances in hardware and networking have made possible a wide use of augmented reality AR technologies However simply putting those hardware and technologies together does not make a good system for end users to use New design principles and evaluation methods specific to this emerging area are urgently needed to keep up with the advance in technologies Human Factors in Augmented Reality Environments is the first book on human factors in AR addressing issues related to design development evaluation and application of AR systems Topics include surveys case studies evaluation methods and metrics HCI theories and design principles human factors and lessons learned and experience obtained from developing deploying or evaluating AR systems The contributors for this cutting edge volume are well established researchers from diverse disciplines including psychologists artists engineers and scientists Human Factors in Augmented Reality Environments is designed for a professional audience composed of practitioners and researchers working in the field of AR and human computer interaction Advanced level students in computer science and engineering will also find this book useful as a secondary text or reference

*Human Factors in Augmented Reality Environments* Weidong Huang,Leila Alem,Mark A Livingston,2012-09-19 Advances in hardware and networking have made possible a wide use of augmented reality AR technologies However simply putting those hardware and technologies together does not make a good system for end users to use New design principles and evaluation methods specific to this emerging area are urgently needed to keep up with the advance in technologies Human Factors in Augmented Reality Environments is the first book on human factors in AR addressing issues related to design development evaluation and application of AR systems Topics include surveys case studies evaluation methods and metrics HCI theories and design principles human factors and lessons learned and experience obtained from developing deploying or evaluating AR systems The contributors for this cutting edge volume are well established researchers from diverse disciplines including psychologists artists engineers and scientists Human Factors in Augmented Reality Environments is designed for a professional audience composed of practitioners and researchers working in the field of AR and human computer interaction Advanced level students in computer science and engineering will also find this book useful as a secondary text or reference

**Human Factors in Virtual Environments and Game Design** Tareq Ahram and Christianne Falcão,2023-07-19 Proceedings of the 14th International Conference on Applied Human Factors and Ergonomics AHFE 2023 July 20 24 2023 San Francisco USA **Springer Handbook of Augmented Reality** Andrew Yeh Ching Nee,Soh Khim Ong,2023-01-01 The Springer Handbook of Augmented Reality presents a comprehensive and authoritative guide to augmented reality AR technology its numerous applications and its intersection with emerging technologies This book traces the history of AR from its early development discussing the fundamentals of AR and its associated science The handbook begins by presenting the development of AR over the last few years mentioning the

key pioneers and important milestones It then moves to the fundamentals and principles of AR such as photogrammetry optics motion and objects tracking and marker based and marker less registration The book discusses both software toolkits and techniques and hardware related to AR before presenting the applications of AR This includes both end user applications like education and cultural heritage and professional applications within engineering fields medicine and architecture amongst others The book concludes with the convergence of AR with other emerging technologies such as Industrial Internet of Things and Digital Twins The handbook presents a comprehensive reference on AR technology from an academic industrial and commercial perspective making it an invaluable resource for audiences from a variety of backgrounds

### **Advances in**

**Usability, User Experience, Wearable and Assistive Technology** Tareq Ahram,Christianne Falcão,2020-07-01 This book addresses emerging issues in usability interface design human computer interaction user experience and assistive technology It highlights research aimed at understanding human interactions with products services and systems and focuses on finding effective approaches for improving the user experience It also discusses key issues in designing and providing assistive devices and services for individuals with disabilities or impairment offering them support with mobility communication positioning environmental control and daily living The book covers modeling as well as innovative design concepts with a special emphasis on user centered design and design for specific populations particularly the elderly Further topics include virtual reality digital environments gaming heuristic evaluation and forms of device interface feedback e g visual and haptic Based on the AHFE 2020 Virtual Conference on Usability and User Experience the AHFE 2020 Virtual Conference on Human Factors and Assistive Technology the AHFE Virtual Conference on Human Factors and Wearable Technologies and the AHFE 2020 Virtual Conference on Virtual Environments and Game Design held on July 16 20 2020 it provides academics and professionals with an extensive source of information and a timely guide to tools applications and future challenges in these fields

*Practical Augmented Reality* Steve Aukstakalnis,2016-09-08 The most comprehensive and up to date guide to the technologies applications and human factors considerations of Augmented Reality AR and Virtual Reality VR systems and wearable computing devices Practical Augmented Reality is ideal for practitioners and students concerned with any application from gaming to medicine It brings together comprehensive coverage of both theory and practice emphasizing leading edge displays sensors and DIY tools that are already available commercially or will be soon Beginning with a Foreword by NASA research scientist Victor Luo this guide begins by explaining the mechanics of human sight hearing and touch showing how these perceptual mechanisms and their performance ranges directly dictate the design and use of wearable displays 3 D audio systems and tactile force feedback devices Steve Aukstakalnis presents revealing case studies of real world applications from gaming entertainment science engineering aeronautics and aerospace defense medicine telerobotics architecture law enforcement and geophysics Readers will find clear easy to understand explanations photos and illustrations of devices including the Atheer AiR HTC Vive DAQRI Smart Helmet Oculus Facebook CV1 Sony PlayStation VR

Vuzix M300 Google Glass and many more Functional diagrams and photographs clearly explain how these devices operate and link directly to relevant theoretical and practical content Practical Augmented Reality thoroughly considers the human factors of these systems including sensory and motor physiology constraints monocular and binocular depth cues elements contributing to visually induced motion sickness and nausea and vergence accommodation conflicts It concludes by assessing both the legal and societal implications of new and emerging AR VR and wearable technologies as well as provides a look next generation systems *Skill Training in Multimodal Virtual Environments* Massimo Bergamasco,Benoit Bardy,Daniel Gopher,2018-03-09 The advent of augmented reality technologies used to assist human operators in complex manipulative operations has brought an urgency to research into the modeling and training of human skills in Virtual Environments However modeling a specific act still represents a challenge in cognitive science The same applies for the control of humanoid robots and the replication of skilled behavior of avatars in Virtual Environments Skill Training in Multimodal Virtual Environments presents the scientific background research outcomes engineering developments and evaluation studies conducted during the five years 2006 2011 of the project SKILLS Multimodal Interfaces for Capturing and Transfer of Skill funded by the European Commission under its 6th Framework Programme for Research and Technological Development The SKILLS project evaluated how to exploit robotics and virtual environment technologies for the training of specific skills This book details the novel approach used in the study to cope with skill acquisition setting aside the mainstream assumptions of common computer assisted training simulators It explores how the SKILLS approach generated new training scenarios that allow users to practice new experiences in the performance of the devised task Using a carefully designed approach that balances science with practicality the book explores how virtual and augmented reality systems can be designed to address the skill transfer and training in different application contexts The application of the same roadmap to skills originating from domains such as sports rehabilitation industrial environment and surgery sets this book apart It demonstrates how technology oriented training conditions can yield better results than more traditional training conditions

*Advances in Human Factors in Simulation and Modeling* Daniel N. Cassenti,2018-06-26 This book focuses on computational modeling and simulation research that advances the current state of the art regarding human factors in this area It reports on cutting edge simulators such as virtual and augmented reality on multisensory environments and on modeling and simulation methods used in various applications including surgery military operations occupational safety sports training education transportation and robotics Based on the AHFE 2018 International Conference on Human Factors in Simulation and Modeling held on July 21 25 2018 in Orlando Florida USA the book serves as a timely reference guide for researchers and practitioners developing new modeling and simulation tools for analyzing or improving human performance It also offers a unique resource for modelers seeking insights into human factors research and more feasible and reliable computational tools to foster advances in this exciting research field **Telepresence: Actual and Virtual** Thomas B.

Sheridan,2022-11-15 Telepresence Actual and Virtual explores the history of telepresence from the 1948 developments of master slave manipulation through to current telepresence technology used in space undersea surgery and telemedicine operations in nuclear and other hazardous environments policing and surveillance agriculture construction mining warehousing education amusement social media and other contexts It also describes the various operator hand and body controls and the corresponding telerobotic actuation of robotic hands arms and locomotion This book reviews the sensing and control technology its history and likely future and discusses the many research and policy issues that are raised The book also takes up key questions relating to social and ethical issues given that a person's mechanical reach is becoming unlimited enabling one to perform mischievous or harmful acts without identification and what that portends for future developments in telepresence including regulation and recommended directions of development The primary audience for this book is professionals interested in human robot interaction human factors engineering virtual reality applications to space and undersea exploration telemedicine and telesurgery firefighting mechanized agriculture policing drone surveillance warehouse parts fetching mining and military operations

**Advances in Usability, User Experience, Wearable and**

**Assistive Technology** Tareq Z. Ahram,Christianne S. Falcão,2021-07-07 This book addresses emerging issues in usability interface design human computer interaction user experience and assistive technology It highlights research aimed at understanding human interactions with products services and systems and focuses on finding effective approaches for improving the user experience It also discusses key issues in designing and providing assistive devices and services for individuals with disabilities or impairment offering them support with mobility communication positioning environmental control and daily living The book covers modeling as well as innovative design concepts with a special emphasis on user centered design and design for specific populations particularly the elderly Further topics include virtual reality digital environments gaming heuristic evaluation and forms of device interface feedback e g visual and haptic Based on the AHFE 2021 Conferences on Usability and User Experience Human Factors and Wearable Technologies Human Factors in Virtual Environments and Game Design and Human Factors and Assistive Technology held virtually on 25 29 July 2021 from USA this book provides academics and professionals with an extensive source of information and a timely guide to tools applications and future challenges in these fields

**Advances in Simulation and Digital Human Modeling** Julia L.

Wright,Daniel Barber,Sofia Scataglini,Sudhakar L. Rajulu,2021-06-26 This book provides readers with a timely snapshot of modeling and simulation tools including virtual and mixed reality environment for human factors research It covers applications in healthcare and physical ergonomics military and transportation systems industrial monitoring as well as economics and social sciences Based on the AHFE 2021 International Conference on Human Factors and Simulation and the AHFE 2021 International Conference on Digital Human Modeling and Applied Optimization held virtually on 25 29 July 2021 from USA the book offers a unique resource for modelling and simulation researchers seeking insights into human factors

research and to human factors experts seeking reliable computational tools **Advances in Usability, User Experience, Wearable and Assistive Technology** Tareq Z. Ahram,Christianne S. Falcão,2021 This book addresses emerging issues in usability interface design human computer interaction user experience and assistive technology It highlights research aimed at understanding human interactions with products services and systems and focuses on finding effective approaches for improving the user experience It also discusses key issues in designing and providing assistive devices and services for individuals with disabilities or impairment offering them support with mobility communication positioning environmental control and daily living The book covers modeling as well as innovative design concepts with a special emphasis on user centered design and design for specific populations particularly the elderly Further topics include virtual reality digital environments gaming heuristic evaluation and forms of device interface feedback e g visual and haptic Based on the AHFE 2021 Conferences on Usability and User Experience Human Factors and Wearable Technologies Human Factors in Virtual Environments and Game Design and Human Factors and Assistive Technology held virtually on 25 29 July 2021 from USA this book provides academics and professionals with an extensive source of information and a timely guide to tools applications and future challenges in these fields *Advances in Simulation and Digital Human Modeling* Daniel N Cassenti,Sofia Scataglini,Sudhakar L. Rajulu,Julia L. Wright,2020-06-27 This book presents the latest advances in modeling and simulation for human factors research It reports on cutting edge simulators such as virtual and augmented reality multisensory environments and modeling and simulation methods used in various applications including surgery military operations occupational safety sports training education transportation and robotics Based on two AHFE 2020 Virtual Conferences such as the AHFE 2020 Virtual Conference on Human Factors and Simulation and the AHFE 2020 Virtual Conference on Digital Human Modeling and Applied Optimization held on July 16 20 2020 the book serves as a timely reference guide for researchers and practitioners developing new modeling and simulation tools for analyzing or improving human performance It also offers a unique resource for modelers seeking insights into human factors research and more feasible and reliable computational tools to foster advances in this exciting field Advances in Human Factors in Wearable Technologies and Game Design Tareq Ahram,2019-06-13 This book focuses on the human aspects of wearable technologies and game design which are often neglected It shows how user centered practices can optimize the wearable experience thus improving user acceptance satisfaction and engagement with novel wearable gadgets It addresses both research and best practices in the applications of human factors and ergonomics to sensors wearable technologies and game design innovations as well as new findings on the integration of wearability principles with regard to aesthetics affordance comfort contextual awareness customization ease of use ergonomics information overload intuitiveness obtrusiveness privacy reliability responsiveness satisfaction subtlety user friendliness and wearability Gathering the outcomes of both the AHFE 2019 Conference on Human Factors and Wearable Technologies and the AHFE 2019 Conference on Human Factors in Game

Design and Virtual Environments held on July 24 28 2019 in Washington DC USA the book addresses the needs of professionals researchers and students whose work involves the human aspects of wearable smart and or interactive technologies and game design research **Everyday Virtual and Augmented Reality** Adalberto Simeone, Benjamin Weyers, Svetlana Bialkova, Robert W. Lindeman, 2023-02-18 This edited book introduces readers to the area of Everyday Virtual and Augmented Reality With Virtual and Augmented Reality technologies becoming more pervasive in our homes and workplaces new use cases and scenarios emerge together with new challenges that need to be addressed These challenges encompass the design and implementation of appropriate VR AR applications for ordinary environments that were not built with the explicit intention of supporting VR systems The everyday domestic environments present a range of issues that are usually not present in the physical locations purposed for VR and AR use in academic or professional environments such as constrained spaces presence of obstacles absence of instrumentation social and organizational restrictions etc To address the above challenges we collect the latest work from the Virtual Reality and Augmented Reality research community by combining the presentation of general definitions and characterization of the field of interaction concepts and techniques of a variety of use cases and areas The constellation of different environment examples from education sport to consumer and marketing from across the globe and platforms provide a comprehensive discussion on scientific and engineering methods which enable the development of VR AR systems in everyday context *Advances in Human Factors and System*

*Interactions* Isabel L. Nunes, 2016-07-26 This book reports on cutting edge research in innovative systems interfaces with an emphasis on both lifecycle development and human technology interaction especially in the cases of virtual augmented and mixed reality systems It describes advanced methodologies and tools for evaluating and improving interface usability and covers new models as well as case studies and good practices The book reports on considerations of the human hardware and software factors in the process of developing interfaces for optimizing total system performance especially innovative computing technologies for teams dealing with dynamic environments while minimizing total ownership costs One of the main purposes is to discuss forces currently shaping the nature of computing and systems including the needs of decreasing hardware costs the importance of portability which translates to the modern tendency of hardware miniaturization and technologies for reducing power requirements the necessity of a better assimilation of computation in the environment and social concerns about access to computers and systems for people with special needs The book which is based on the AHFE 2016 International Conference on Human Factors and System Interactions held on July 27 31 2016 in Walt Disney World Florida USA offers a timely survey and practice oriented guide for systems interface users and developers alike **ACM Transactions on Computer-human Interaction**, 2006 Presents original research that spans the field of human computer interaction The primary emphasis has been on results of broad application but the journal also publishes work focused on special domains on special requirements on ethical issues the full range of design development and use of interactive systems

**Human Factors Issues in the Use of Virtual and Augmented Reality for Military Purposes - USA.** ,2005 This is an aggregate of 6 articles outlining current current research into human factors engineering within U S military virtual reality research facilites The articles lists key research personnel current research projects a selection of literature by affiliated researchers and laboratory facilities available Facilities discussed are 1 the Air Force Research Laboratory Mesa AZ 2 the Army Research Institute ARI Orlando FL 3 NAVAIR Orlando Training Systems Division Orlando FL 4 Naval Postgraduate School Graphics and Video Laboratory Monterey CA 5 the Naval Research Lab Washington DC and 6 U S Army Research Development Command RDECOM Simulation Training Technology Center STTC Orlando FL [Hypertext ... Proceedings](#),2004 **Advances in Human Factors and Systems Interaction** Isabel L. Nunes,2020-06-30 This book presents cutting edge research on innovative system interfaces highlighting both lifecycle development and human technology interaction especially in virtual augmented and mixed reality systems It describes advanced methodologies and tools for evaluating and improving interface usability and discusses new models case studies and good practices The book addresses the human hardware and software factors in the process of developing interfaces for optimizing total system performance while minimizing costs It also highlights the forces currently shaping the nature of computing and systems such as the importance of portability and technologies for reducing power requirements the need for better assimilation of computation in the environment and solutions to promote computer and system accessibility for people with special needs Based on the AHFE 2020 Virtual Conference on Human Factors and Systems Interaction held on July 16 20 2020 the book offers a timely survey and a practice oriented guide for systems interface users and developers alike

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