Setting the Standards for Haptic and Tactile Interactions: ISO's Work

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Abstract. Tactile and haptic interaction is becoming increasingly important and ergonomic standards can ensure that systems are designed with sufficient concerns for ergonomics and interoperability. ISO (through working group TC159/SC4/WG9) is working toward international standards, which are being dual-tracked as both ISO and CEN standards. This paper gives an update on the status of the work in progress and the recently published International Standard on tactile/haptic interactions. Active involvement of experts is sought for work on terms and definitions and measures to characterize devices and operator capabilities.

Keywords: guidelines, haptics, human computer interaction, standards, tactile.

1 Introduction

Ergonomic standards go beyond providing consistency and interoperability. They help enhance usability in a number of ways including: improving effectiveness and avoiding errors, improving performance, and enhancing the comfort and well-being of users. Ergonomic standards provide a basis for analysis, design, evaluation, procurement, and even for arbitrating issues of international trade. Material providing guidance on the design and use of tactile and haptic interactions is sparse [1, 2]. Therefore, an ISO expert group has been working on standards documents for haptic interaction since 2005. ISO TC159/SC4/WG9 reported on its progress at several conferences

A.M.L. Kappers et al. (Eds.): EuroHaptics 2010, Part II, LNCS 6192, pp. 353–358, 2010.

Haptics Generating And Perceiving Tangible Sensations Part Ii

Christian Drosten

Haptics Generating And Perceiving Tangible Sensations Part Ii:

Haptics: Generating and Perceiving Tangible Sensations, Part II Astrid M. L. Kappers,Jan BF Van Erp,Wouter M Bergmann Tiest,Frans CT Van Der Helm,2010-07-04 This book constitutes the proceedings of the conference on Haptics Generating and Perceiving Tangible Sensations held in Amsterdam Netherlands in July 2010 Haptics: Generating and Perceiving Tangible Sensations, Part I Astrid M. L. Kappers,Jan BF Van Erp,Wouter M Bergmann Tiest,Frans CT Van Der Helm,2010-07-06 Annotation This book constitutes the proceedings of the conference on Haptics Generating and Perceiving Tangible Sensations held in Amsterdam Netherlands in July 2010 **Immersive Multimodal Interactive Presence** Angelika Peer,Christos D. Giachritsis,2012-03-05 Immersive Multimodal Interactive Presence presents advanced interdisciplinary approaches that connect psychophysical and behavioral haptics research with advances in haptic technology and haptic rendering It delivers a summary of the results achieved in the IMMERSENCE European project and includes selected chapters by international researchers Organized into two parts I Psychophysical and Behavioral Basis and II Technology and Rendering it is an excellent example of interdisciplinary research directed towards the advancement of multimodal immersive virtual environments with particular focus on haptic interaction The twelve chapters of the book are grouped around three different scenarios representing different types of interactions in virtual environments Person Object PO Person Object Person POP and Person Person PP interaction Recent results of psychophysical and behavioral studies are reported along with new technological developments for haptic displays and novel haptic rendering techniques

Scholarpedia of Touch Tony Prescott,Ehud Ahissar,Eugene Izhikevich,2015-11-21 Scholarpedia s Encyclopedia of Touch provides a comprehensive collection of peer reviewed articles written by leading researchers detailing our current scientific understanding of tactile sensing and its neural substrates in animals including humans The encyclopedia allows ideas and insights to be shared between researchers working on different aspects of touch and in different species including research in synthetic touch systems In addition this encyclopedia raises awareness of research in tactile sensing and increases scientific and public interest in the field The articles address subjects including tactile control whiskered robots vibrissal coding the molecular basis of touch invertebrate mechanoreception fingertip transducers and tactile sensing All the articles in this encyclopedia provide in depth and state of the art scholarly treatment of the academic topics concerned making it an excellent reference work for academics professionals and students **Responsive Polymer Surfaces** Danqing Liu,Dirk J. Broer,2017-07-20 Adopting an integrated approach this book covers experiments theory and emerging applications In the first part surfaces are described that change from flat to either a random corrugated or to a well structured structure while the second part deals with those surface structures integrated in the coating surface where the structures change their shape or dimension when addressed by an external trigger A variety of materials are addressed including liquid crystal polymers hydrogels hard acrylates and soft silicones The whole is rounded off by a discussion of

various applications including surface controlled flows in microfluidic systems Of interest to chemists and engineers researchers in industry and academia as well as those working in the paint industry and hydrodynamics **Multi-finger Haptic Interaction** Ignacio Galiana,Manuel Ferre,2014-07-08 Multi finger Haptic Interaction presents a panorama of technologies and methods for multi finger haptic interaction together with an analysis of the benefits and implications of adding multiple fingers to haptic applications Research topics covered include design and control of advanced haptic devices multi contact point simulation algorithms interaction techniques and implications in human perception when interacting with multiple fingers These multi disciplinary results are integrated into applications such as medical simulators for training manual skills simulators for virtual prototyping and precise manipulations in remote environments Multi finger Haptic Interaction presents the current and potential applications that can be developed with these systems and details the systems complexity The research is focused on enhancing haptic interaction by providing multiple contact points to the user This state of the art volume is oriented towards researchers who are involved in haptic device design rendering methods and perception studies as well as readers from different disciplines who are interested in applying multi finger haptic technologies and methods to their field of interest **Novel Haptic Cues for UAV Tele-Operation** Samantha Alaimo,2014-01-15 Outlines three case studies obstacle avoidance wind gust rejection and a combination of the two In each case Direct Haptic Aid DHA and Indirect Haptic Aid IHA systems are designed and compared against baseline performance with no haptic aid This work aims to show that IHA is a valid and promising alternative to the other approaches which fall into the DHA category Skill Training in Multimodal Virtual Environments Massîmo Bergamasco,Benoit Bardy,Daniel Gopher,2012-08-24 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

Technical Report Adriano, Christian,Bleifuß, Tobias,Cheng, Lung-Pan,Diba, Kiarash,Fricke, Andreas,Grapentin, Andreas,Kovacs, Robert,Krejca, Martin,Jiang, Lan,Mandal, Sankalita,Marwecki, Sebastian,Matthies, Christoph,Mattis, Toni,Meinel, Christoph,Niephaus, Fabio,Pirl, Lukas,Quinzan, Francesco,Ramson, Stefan,Rezaei, Mina,Risch, Julian,Rothenberger, Ralf,Roumen, Thijs,Stojanovic, Vladeta,Wolf, Johannes,2019 Der Entwurf und die Realisierung dienstbasierender Architekturen wirft eine Vielzahl von Forschungsfragestellungen aus den Gebieten der Softwaretechnik der Systemmodellierung und analyse sowie der Adaptierbarkeit und Integration von Applikationen auf Komponentenorientierung und WebServices sind zwei Ans tze f r den effizienten Entwurf und die Realisierung komplexer Web basierender Systeme Sie erm glichen die Reaktion auf wechselnde Anforderungen ebenso wie die Integration gro er komplexer Softwaresysteme Heute bliche Technologien wie J2EE und NET sind de facto Standards f r die Entwicklung gro er verteilter Systeme Die Evolution solcher Komponentensysteme f hrt ber WebServices zu dienstbasierenden Architekturen Dies manifestiert sich in einer Vielzahl von Industriestandards und Initiativen wie XML WSDL UDDI SOAP All diese Schritte f hren letztlich zu einem neuen vielversprechenden Paradigma f r IT Systeme nach dem komplexe Softwarel sungen durch die Integration vertraglich vereinbarter Software Dienste aufgebaut werden sollen Service Oriented Systems Engineering repr sentiert die Symbiose bew hrter Praktiken aus den Gebieten der Objektorientierung der Komponentenprogrammierung des verteilten Rechnen sowie der Gesch ftsprozesse und ber cksichtigt auch die Integration von Gesch ftsanliegen und Informationstechnologien Die Klausurtagung des Forschungskollegs Service oriented Systems Engineering findet einmal j hrlich statt und bietet allen Kollegiaten die M glichkeit den Stand ihrer aktuellen Forschung darzulegen Bedingt durch die Querschnittstruktur des Kollegs deckt dieser Bericht ein weites Spektrum aktueller Forschungsthemen ab Dazu z hlen unter anderem Human Computer Interaction and Computer Vision as Service Service oriented Geovisualization Systems Algorithm Engineering for Service oriented Systems Modeling and Verification of Self adaptive Service oriented Systems Tools and Methods for Software Engineering in Service oriented Systems Security Engineering of Service based IT Systems Service oriented Information Systems Evolutionary Transition of Enterprise Applications to Service Orientation Operating System Abstractions for Service oriented Computing sowie Services Specification Composition and Enactment Design and Implementation of service oriented architectures imposes a huge number of research questions from the fields of software engineering system analysis and modeling adaptability and application integration Component orientation and web services are two approaches for design and realization of complex web based system Both approaches allow for dynamic application adaptation as well as integration of enterprise application Commonly used technologies such as J2EE and NET form de facto standards for the realization of complex distributed systems Evolution of component systems has lead to web services and

service based architectures This has been manifested in a multitude of industry standards and initiatives such as XML WSDL UDDI SOAP etc All these achievements lead to a new and promising paradigm in IT systems engineering which proposes to design complex software solutions as collaboration of contractually defined software services Service Oriented Systems Engineering represents a symbiosis of best practices in object orientation component based development distributed computing and business process management It provides integration of business and IT concerns The annual Ph D Retreat of the Research School provides each member the opportunity to present his her current state of their research and to give an outline of a prospective Ph D thesis Due to the interdisciplinary structure of the research school this technical report covers a wide range of topics These include but are not limited to Human Computer Interaction and Computer Vision as Service Service oriented Geovisualization Systems Algorithm Engineering for Service oriented Systems Modeling and Verification of Self adaptive Service oriented Systems Tools and Methods for Software Engineering in Service oriented Systems Security Engineering of Service based IT Systems Service oriented Information Systems Evolutionary Transition of Enterprise Applications to Service Orientation Operating System Abstractions for Service oriented Computing and Services Specification Composition and Enactment **Online Distance Education** Olaf Zawacki-Richter,Terry Anderson,2014-06-01 Online Distance Education Towards a Research Agenda offers a systematic overview of the major issues trends and areas of priority in online distance education research In each chapter an international expert or team of experts provides an overview of one timely issue in online distance education summarizing major research on the topic discussing theoretical insights that guide the research posing questions and directions for future research and discussing the implications for distance education practice as a whole Intended as a primary reference and guide for distance educators researchers and policymakers Online Distance Education addresses aspects of distance education practice that have often been marginalized including issues of cost and economics concerns surrounding social justice cultural bias the need for faculty professional development and the management and growth of learner communities At once soundly empirical and thoughtfully reflective yet also forward looking and open to new approaches to online and distance teaching this text is a solid resource for researchers in a rapidly expanding discipline Haptic Feedback Teleoperation of Optical Tweezers Zhenjiang Ni,Céline Pacoret,Ryad Benosman,Stéphane Régnier,2014-09-25 The authors of this book provide the first review of haptic optical tweezers a new technique which brings together force feedback teleoperation and optical tweezers This technique allows users to explore the microworld by sensing and exerting piconewton scale forces with trapped microspheres The design of optical tweezers for high quality haptic feedback is challenging given the requirements for very high sensitivity and dynamic stability The concept design process and specification of optical tweezers reviewed throughout this book focus on those intended for haptic teleoperation The authors provide two new specific designs as well as the current state of the art Furthermore the remaining important issues are identified for further developments Haptic optical tweezers will soon

become an invaluable tool for force feedback micromanipulation of biological samples and nano and micro assembly parts

Engineering Haptic Devices Christian Hatzfeld,Thorsten A. Kern,2014-09-15 In this greatly reworked second edition of Engineering Haptic Devices the psychophysic content has been thoroughly revised and updated Chapters on haptic interaction system structures and design methodology were rewritten from scratch to include further basic principles and recent findings New chapters on the evaluation of haptic systems and the design of three exemplary haptic systems from science and industry have been added This book was written for students and engineers that are faced with the development of a task specific haptic system It is a reference book for the basics of haptic interaction and existing haptic systems and methods as well as an excellent source of information for technical questions arising in the design process of systems and components Divided into two parts part 1 contains typical application areas of haptic systems and a thorough analysis of haptics as an interaction modality The role of the user in the design of haptic systems is discussed and relevant design and development stages are outlined Part II presents all relevant problems in the design of haptic systems including general system and control structures kinematic structures actuator principles and sensors for force and kinematic measures Further chapters examine interfaces and software development for virtual reality simulations *Haptics: Understanding Touch; Technology and Systems; Applications and Interaction* Hiroyuki Kajimoto,Pedro Lopes,Claudio Pacchierotti,Cagatay Basdogan,Monica Gori,Betty Lemaire-Semail,Maud Marchal,2024-11-02 The two volume set LNCS 14768 14769 constitutes the refereed proceedings of the 14th International Conference on Human Haptic Sensing and Touch Enabled Computer Applications EuroHaptics 2024 held in Lille France during June 30 July 3 2024 The 81 full papers presented were carefully reviewed and selected from 142 submissions They were organized in topical sections as follows understanding touch technology and systems applications and interaction **The Connected Home: The Future of Domestic Life** Richard Harper,2011-12-08 The title of this new book The Connected Home reflects the move away from the idea that smart homes would alter the lives of those living in them by providing technologies to take over tasks that were previously the responsibility of the householder such as managing entertainment education and even eating Up until around 10 years ago this view was commonplace but time has shown that the technologies to support a smart home have not developed in such a way as to support this premise Instead what people do in their homes has moved the concept of a smart home into that of the connected home The rise of on line games technologies video connections via Skype social networking internet browsing etc are now an integral part of the home environment and have had a significant effect on the home The contributors to this exciting new book consider and discuss the effects and ramifications of the connected home from a variety of viewpoints an examination of the take up of personal computers and the Internet in domestic situations an analysis of the changing intersection of technology and human habits in the connected home the impact of gaming texting e book readers tablets and other devices and their effect on the social conditions of a household the relationship between digital messaging applications

and real geography and an overview of how sensing technologies for the smart home might evolve lightweight medical technologies for example The book culminates by addressing unfinished ambitions from the smart home agenda the factors that have prevented their realisation and addresses the need for extending research into the area *Haptics: Neuroscience, Devices, Modeling, and Applications* Malika Auvray,Christian Duriez,2014-10-14 The two volume set LNCS 8618 and 8619 constitutes the refereed proceedings of the 9th International Conference EuroHaptics 2014 held in Versailles France in June 2014 The 118 papers 36 oral presentations and 82 poster presentations presented were carefully reviewed and selected from 183 submissions Furthermore 27 demos were exhibited each of them resulting in a short paper included in the volumes These proceedings reflect the multidisciplinary nature of EuroHaptics and cover topics such as human computer interaction human robot interactions neuroscience perception and psychophysics biomechanics and motor control modelling and simulation and a broad range of applications in medicine rehabilitation art and design **Hand Preference and Hand Ability** Miriam Ittyerah,2013-09-18 This volume adds new dimension and organization to the literature of touch and the hand covering a diversity of topics surrounding the perception and cognition of touch in relation to the hand No animal species compare to humans with regard to the haptic or touch sense so unlike visual or auditory cognition we know little about such haptic cognition We do know that motor skills play a major role in haptics but senses like vision do not determine hand preference or hand ability It seems also that the potential ability to perform a task may be present in both hands and evidence indicates that the hand used to perform tactile tasks in blind or in sighted conditions is independent of one s hand preference This book will be useful for those in education and robotics and can serve as a general text focusing on touch and developmental psychology *Making Sense of Haptics* Femke Elise van Beek,2018-01-05 Tele operation systems in which robots are controlled remotely are a potential solution to performing tasks in remote small and hazardous environments However there is a big disadvantage to these systems as the direct connection between the human and the environment is lost and operators are deprived of their sense of touch The recreation of touch feedback through haptic devices is a possible solution however haptic devices are far from perfect and improving their design is usually a slow trial and error process This book describes 7 scientific studies that try to break this slow loop by using a deductive approach Through investigating fundamental properties of human haptic perception using psychophysical paradigms general knowledge on haptic perception of force position movement and hardness was gained The resulting information can be applied to many different haptic devices Consequently haptic systems can be more easily designed in an intuitive human centered way **Engineering Haptic Devices** Thorsten A. Kern,Christian Hatzfeld,Alireza Abbasimoshaei,2022-11-05 This is an open access book In this third edition of Engineering Haptic Devices the software part was rewritten from scratch and now includes even more details on tactile and texture interaction modalities The kinematics section was improved to extend beyond a pure knowledge explanation to a comprehensive guideline on how to actually do and implement haptic kinematic functions The control

section was reworked incorporating some hands on experience on control implementation on haptic systems The system actuator and sensor design chapters were updated to allow easier access to the content This book is written for students and engineers faced with the development of a task specific haptic system Now 14 years after its first edition it is still a reference for the basics of haptic interaction and existing haptic systems and methods as well as an excellent source of information for technical questions arising in the design process of systems and components Following a system engineering approach it is divided into two parts with Part I containing background and reference information as a knowledge basis Typical application areas of haptic systems and a thorough analysis of haptics as an interaction modality are introduced The role of users in the design of haptic systems is discussed and relevant design and development stages are outlined Part II presents all related challenges in the design of haptic systems including general system architecture and control structures kinematics actuator principles and all types of sensors you may encounter doing haptic device development Beside these hardware and mechanical topics further chapters examine state of the art interfaces to operate the devices and hardware and software development to push haptic systems to their limits Multisensory Softness Massimiliano Di Luca,2014-07-23 Offers a unique multidisciplinary overview of how humans interact with soft objects and how multiple sensory signals are used to perceive material properties with an emphasis on object deformability The authors describe a range of setups that have been employed to study and exploit sensory signals involved in interactions with compliant objects as well as techniques to simulate and modulate softness including a psychophysical perspective of the field Multisensory Softness focuses on the cognitive mechanisms underlying the use of multiple sources of information in softness perception Divided into three sections the first Perceptual Softness deals with the sensory components and computational requirements of softness perception the second Sensorimotor Softness looks at the motor components of the interaction with soft objects and the final part Artificial Softness focuses on the identification of exploitable guidelines to help replicate softness in artificial environments

Quantifying Quality Aspects of Multimodal Interactive Systems Christine Kühnel,2012-06-07 This book systematically addresses the quantification of quality aspects of multimodal interactive systems The conceptual structure is based on a schematic view on human computer interaction where the user interacts with the system and perceives it via input and output interfaces Thus aspects of multimodal interaction are analyzed first followed by a discussion of the evaluation of output and input and concluding with a view on the evaluation of a complete system

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