Ergonomics In The Automotive Design Process

Ergonomics in the Automotive Design Process VIVEK BHISE 2016-04-19 The auto industry is facing tough competition and severe economic constraints. Their products need to be designed "right the first time" with the right combinations of features that not only satisfy the customers but continually please and delight them by providing increased functionality, comfort, convenience, safety, and craftsmanship. Based on t

Automotive Ergonomics NIKOLAOS GKIKAS 2016-04-19 In the last 20 years, technological developments have set new standards in driver-vehicle interaction. These developments effect the entire lifecycle, from the moment a customer enters a dealership to examine a prospective vehicle, to the driving experience during the vehicle lifecycle, and the interaction with other road users and facilities in pl

Automotive Ergonomics HEINER BUBB 2021-10-19 Ergonomics teaches how to design technology in such a way that it is optimally adapted to the needs, wishes and characteristics of the user. In this context, the concept of the human-machine system has become established. In a systematic way and with a detailed view of the complicated technical and perceptual psychological and methodological connections, this book explains the basics of automotive ergonomics with numerous examples. The application is shown in examples such as package, design of displays and control elements, of environmental ergonomics such as lighting, sound, vibrations, climate and smell. The design of driver assistance systems from an ergonomic perspective is also a central topic. The book is rounded off by methods of ergonomic vehicle development, the use of mock-ups, driving simulators and tests in real vehicles and prototypes. For the first time, those responsible in the automotive industry and in the field of relevant research are provided with a specialized systematic work that provides the ergonomic findings in the design of today's automobiles. This provides planners and designers of today's automobiles with concrete information for ergonomic product development, enabling them to keep an eye on decisive requirements and subsequent customer acceptance. This book is a translation of the original German 1st edition Automobilergonomie by Heiner Bubb, Klaus Bengler, Rainer E. Grünen & Mark Vollrath, published by Springer Fachmedien Wiesbaden GmbH, part of Springer Nature in 2015. The translation was done with the help of artificial intelligence (machine translation by the service DeepL.com). A subsequent human revision was done primarily in terms of content, so that the book will read stylistically differently from a conventional translation. Springer Nature works continuously to further the development of tools for the production of books and on the related technologies to support the authors.

Human Factors in Automotive Engineering and Technology GUY H. WALKER 2017-03-02 Offering a unique perspective on vehicle design and on new developments in vehicle technology, this book seeks to bridge the gap between engineers, who design and build cars, and human factors, as a body of knowledge with considerable value in this domain. The work that forms the basis of the book represents more than 40 years of experience by the authors. Human Factors in Automotive Engineering and Technology imparts the authors' scientific background in human factors by way of actionable design guidance, combined with a set of case studies highly relevant to current technological challenges in vehicle design. The book presents a novel and accessible insight into a body of
knowledge that will enable students, professionals and engineers to add significant value to their work.

**The Multisensory Driver**- Cristy Ho 2017-05-15 Driver inattention has been identified as one of the leading causes for car accidents. The problem of distraction while driving is likely to worsen, partly due to increasingly complex in-car technologies. However, intelligent transport systems are being developed to assist drivers and to ensure a safe road environment. One approach to the design of ergonomic automobile systems is to integrate our understanding of the human information processing systems into the design process. This book aims to further the design of ergonomic multisensory interfaces using research from the fast-growing field of cognitive neuroscience. It focuses on two aspects of driver information-processing in particular: multisensory interactions and the spatial distribution of attention in driving. The Multisensory Driver provides interface design guidelines together with a detailed review of current cognitive neuroscience and behavioural research in multisensory human perception, which will help the development of ergonomic interfaces. The discussion on spatial attention is particularly relevant for car interface designers, but it will also appeal to cognitive psychologists interested in spatial attention and the applications of these theoretical research findings. Giving a detailed description of a cohesive series of psychophysical experiments on multisensory warning signals, conducted in both laboratory and simulator settings, this book provides an approach for those in the engineering discipline who wish to test their systems with human observers.

**Automotive Ergonomics**- Heiner Bubb 2021-10-14 Ergonomics teaches how to design technology in such a way that it is optimally adapted to the needs, wishes and characteristics of the user. In this context, the concept of the human-machine system has become established. In a systematic way and with a detailed view of the complicated technical and perceptual psychological and methodological connections, this book explains the basics of automotive ergonomics with numerous examples. The application is shown in examples such as package, design of displays and control elements, of environmental ergonomics such as lighting, sound, vibrations, climate and smell. The design of driver assistance systems from an ergonomic perspective is also a central topic. The book is rounded off by methods of ergonomic vehicle development, the use of mock-ups, driving simulators and tests in real vehicles and prototypes. For the first time, those responsible in the automotive industry and in the field of relevant research are provided with a specialized systematic work that provides the ergonomic findings in the design of today's automobiles. This provides planners and designers of today's automobiles with concrete information for ergonomic product development, enabling them to keep an eye on decisive requirements and subsequent customer acceptance. This book is a translation of the original German 1st edition Automobilergonomie by Heiner Bubb, Klaus Bengler, Rainer E. Grünne & Mark Vollrath, published by Springer Fachmedien Wiesbaden GmbH, part of Springer Nature in 2015. The translation was done with the help of artificial intelligence (machine translation by the service DeepL.com). A subsequent human revision was done primarily in terms of content, so that the book will read stylistically differently from a conventional translation. Springer Nature works continuously to further the development of tools for the production of books and on the related technologies to support the authors.

**Automotive Ergonomics**- B. Peacock 1993-03-26 This important book focuses on the role of human factors in the design and use of automobiles. It should review current knowledge of human characteristics as related to passenger car design and thus serve as a basis for new car design and design evaluation. Comprehensive and accessible, the book is organized around the following themes: human capabilities and limitations in car design - anthropometry, biomechanics, human vision, motorskills, and cognition; the physical aspects of car design - occupant packaging, entry and egress, seating, luggage loading, occupant protection, thermal environment; informational aspects of design - displays and controls, HUDS, icons, warnings, vehicle lighting and sounds; and special topics such as driving performance models, driver workload, older drivers, and computer-aided ergonomic design.; It is Aimed At Automotive Designers, Government Agencies Concerned With Car passenger transport issues and the ergonomics research community.

**An Introduction to Modern Vehicle Design**- Julian Happian-Smith 2001 'An Introduction to Modern Vehicle Design' provides a thorough introduction to the many aspects of passenger car design in one volume. Starting with basic principles, the author builds up analysis procedures for all major aspects of vehicle and component design. Subjects of current interest to the motor industry, such as failure prevention, designing with modern materials, ergonomics and control systems are covered in detail, and the author concludes with a discussion on the future trends in automobile design. With contributions from both academics lecturing in motor vehicle engineering and those working in the industry, "An Introduction to Modern Vehicle Design" provides students with an excellent overview and background in the design of vehicles before they move on to specialised areas. Filling the niche between the more descriptive low level books and books which focus on specific areas of the design process, this unique volume is essential for all students of automotive engineering. Only book to cover the broad range of topics for automobile design and analysis procedures Each topic written by an expert with many years experience of the automotive industry

**Automotive Human Centred Design Methods**- Voula Gkatzidou 2021-03-08 There is currently a great need for introductory materials to help professionals of all types to understand and deploy Human Centred Design (HCD) methods. This compendium, written in simple everyday language by authors who are experts in automotive ergonomics, UX and HMI, is inclusive and easily accessible. The 21st century is characterised by ever greater reliance on the innovation paradigm of HCD. In many sectors, the practices of "technology push" and "market pull" have been giving ground to newer
ways of innovating which are based more on careful attention to the characteristics and needs of people. Where ethnographic, ergonomic and UX practices were once the remit of only the design teams, the practices and values of HCD are now permeating widely, leading in many cases to business restructuring. The automotive sector, characterised by large and sophisticated organisations, and by more than a century of success, is one sector with extensive requirements for HCD methods. This introductory book links the philosophy of the Human Centred Design innovation to the basic methods and simple everyday steps which can be taken to better understand customers and to better define briefs and tests. The book will prove a valuable reference to automotive designers who wish to more deeply integrate HCD into their everyday work, and to any professional who wishes to widen her or his skill set and understanding of HCD. The information regarding the selection of HCD methods, and their deployment, will provide a gentle introduction to the world of Human Centred Design.

**Automotive Product Development**-Vivek D. Bhise 2017-05-08 This book is about how to develop future automotive products by applying the latest methodologies based on a systems engineering approach and by taking into account many issues facing the auto industry such as meeting government safety, emissions and fuel economy regulations, incorporating advances in new technology applications in structural materials, power trains, vehicle lighting systems, displays and telematics, and satisfying the very demanding customer. It is financially disastrous for any automotive company to create a vehicle that very few people want. To design an automotive product that will be successful in the marketplace requires carefully orchestrated teamwork of experts from many disciplines, substantial amount of resources, and application of proven techniques at the right time during the product development process. Automotive Product Development: A Systems Engineering Implementation is intended for company management personnel and graduate students in engineering, business management and other disciplines associated with the development of automotive and other complex products.

**Designing for Human Reliability**-Ronald W. McLeod 2015-03-21 Industry underestimates the extent to which behaviour at work is influenced by the design of the working environment. Designing for Human Reliability argues that greater awareness of the contribution of design to human error can significantly enhance HSE performance and improve return on investment. Illustrated with many examples, Designing for Human Reliability explores why work systems are designed and implemented such that "design-induced human error" becomes more-or-less inevitable. McLeod demonstrates how well understood psychological processes can lead people to make decisions and to take actions that otherwise seem impossible to understand. Designing for Human Reliability sets out thirteen key elements to deliver the levels of human reliability expected to achieve the return on investment sought when decisions are made to invest in projects. And it demonstrates how investigation of the human contribution to incidents can be improved by focusing on what companies expected and intended when they chose to rely on human performance as a barrier, or control, against incidents. Recognise some ‘hard truths’ of human performance and learn about the importance of applying the principles of Human Factors Engineering on capital projects. Learn from analysis of real-world incidents how differences between ‘fast’ and ‘slow’ styles of thinking can lead to human error in industrial processes. Learn how controls and barrier against major incidents that rely on human performance can be strengthened throughout the design and development of assets and equipment.

**Automotive Product Development**-Vivek D. Bhise 2017-05-08 This book is about how to develop future automotive products by applying the latest methodologies based on a systems engineering approach and by taking into account many issues facing the auto industry such as meeting government safety, emissions and fuel economy regulations, incorporating advances in new technology applications in structural materials, power trains, vehicle lighting systems, displays and telematics, and satisfying the very demanding customer. It is financially disastrous for any automotive company to create a vehicle that very few people want. To design an automotive product that will be successful in the marketplace requires carefully orchestrated teamwork of experts from many disciplines, substantial amount of resources, and application of proven techniques at the right time during the product development process. Automotive Product Development: A Systems Engineering Implementation is intended for company management personnel and graduate students in engineering, business management and other disciplines associated with the development of automotive and other complex products.

**Advances on Mechanics, Design Engineering and Manufacturing**-Benoit Eynard 2016-09-02 This book gathers papers presented at the International Joint Conference on Mechanics, Design Engineering and Advanced Manufacturing (JCM 2016), held on 14-16 September, 2016, in Catania, Italy. It reports on cutting-edge topics in product design and manufacturing, such as industrial methods for integrated product and process design; innovative design; and computer-aided design. Further topics covered include virtual simulation and reverse engineering; additive manufacturing; product manufacturing; engineering methods in medicine and education; representation techniques; and nautical, aeronautics and aerospace design and modeling. The book is divided into eight main sections, reflecting the focus and primary themes of the conference. The contributions presented here will not only provide researchers, engineers and experts in a range of industrial engineering subfields with extensive information to support their daily work; they are also intended to stimulate new research directions, advanced applications of the methods discussed, and future interdisciplinary collaborations.

**Ergonomics in Design**-Marcelo M. Soares 2016-09-19 Currently people deal with various entities (such as hardware, software, buildings, spaces, communities and other people), to meet specific
goals while going about their everyday activities in work and leisure environments. These entities have become more and more complex and incorporate functions that hitherto had never been allocated such as automation, use in virtual environments, connectivity, personalization, mobility and friendliness. This book contributes to the analysis of human-system interactions from the perspective of ergonomics, regardless of how simple or complex they are, while incorporating the needs of users and workers in a healthy safe, efficient and enjoyable manner. This book provides a comprehensive review of the state of the art of current ergonomic in design methods and techniques that are being applied to products, machinery, equipment, workstations and systems while taking new technologies and their applications into consideration.7 Ergonomics in Design: Methods and Techniques is organized into four sections and 30 chapters covering topics such as conceptual aspects of ergonomics in design, the knowledge of human characteristics applied to design, and the methodological aspects of design. Examples are shown in several areas of design including, but not limited to, consumer products, games, transport, education, architecture, fashion, sustainability, biomechanics, intelligent systems, virtual reality, and neurodesign. This book will: Introduces the newest developments in social-cultural approaches Shows different ergonomics in design methodological approaches Divalges the ways that ergonomics can contribute to a successful design Applies different subjects to support the design including –ergonomics, engineering, architecture, urbanism, neuro, and product designs. Presents recent technologies in ergonomic design, as applied to product design. With the contributions from a team of 75 researchers from 11 countries, the book covers the state-of-the-art of ergonomics in a way to produce better design.

Ergonomics Simulation in Automotive Design- Viktor Hiort af Ornäs 2001

Automotive Ergonomics-Nikolaos Gkikas 2012-09-24 In the last 20 years, technological developments have set new standards in driver-vehicle interaction. These developments effect the entire lifecycle, from the moment a customer enters a dealership to examine a prospective vehicle, to the driving experience during the vehicle lifecycle, and the interaction with other road users and facilities in place. It is such developments, socioeconomic on the one hand, technological on the other, that make Automotive Ergonomics: Driver-Vehicle Interaction an important addition to the literature in this field. The book explores the challenges in research and development of new vehicles brought about by recent advances in theory and practice. Highlighting topics such as Human-Machine Interaction, Advanced Driver Assistance Systems, and the hugely evolving subject of digital human modeling and simulation in automotive applications, the book covers: Best practices and emerging developments Advances in power train technology Ergonomics of electric vehicles Effects of driver distraction, workload, and physical environments Active safety systems Navigation support Vibration and noise perception Health and safety aspects of driving While this area is not new, most of the books available are either too general or out of date. This book presents the latest developments in the field of ergonomics and human factors and discusses their implications to the design of modern and future vehicles, giving you the tools you need for innovation.

Ergonomics-K. H. E. Kroemer 1994 Written by a practicing ergonomics engineer, this new text explores the “why” and “how” of human engineering/ergonomics. It discusses physical as well as mental capacities of the human; considers how to design the work task, tools, the interface with the machine, and safe work procedures; and addresses the issues of cumulative trauma, back problems, design for the handicapped; and more.

Handbook of Human Factors and Ergonomics-Gavriel Salvendy 2012-05-24 The fourth edition of the Handbook of Human Factors and Ergonomics has been completely revised and updated. This includes all existing third edition chapters plus new chapters written to cover new areas. These include the following subjects: Managing low-back disorder risk in the workplace Online interactivity Neuroergonomics Office ergonomics Social networking HF&E in motor vehicle transportation User requirements Human factors and ergonomics in aviation Human factors in ambient intelligent environments As with the earlier editions, the main purpose of this handbook is to serve the needs of the human factors and ergonomics researchers, practitioners, and graduate students. Each chapter has a strong theory and scientific base, but is heavily focused on realworld applications. As such, a significant number of case studies, examples, figures, and tables are included to aid in the understanding and application of the material covered.

Automobile Automation-Victoria A. Banks 2017-08-04 Increasing levels of driving automation has changed the role of the driver from active operator to passive monitor. However, Systems Design has been plagued by criticism for failing to acknowledge the new role of the driver within the system network. To understand the driver’s new role within an automated driving system, the theory of Distributed Cognition is adopted. This approach provides a useful framework for the investigation of allocation of function between multiple agents in the driving system. A Systems Design Framework has been developed that outlines how the Distributed Cognition paradigm can be applied to driving using both qualitative and quantitative research methodologies.

Production Ergonomics-Cecilia Berlin 2017-06-28 Production ergonomics - the science and practice of designing industrial workplaces to optimize human well-being and system performance - is a complex challenge for a designer. Humans are a valuable and flexible resource in any system of creation, and as long as they stay healthy, alert and motivated, they perform well and also become more competent over time, which increases their value as a resource. However, if a system designer is not mindful or aware of the many threats to health and system performance that may emerge, the end
result may include inefficiency, productivity losses, low working morale, injuries and sick-leave. To help budding system designers and production engineers tackle these design challenges holistically, this book offers a multi-faceted orientation in the prerequisites for healthy and effective human work. We will cover physical, cognitive and organizational aspects of ergonomics, and provide both the individual human perspective and that of groups and populations, ending up with a look at global challenges that require workplaces to become more socially and economically sustainable. This book is written to give you a warm welcome to the subject, and to provide a solid foundation for improving industrial workplaces to attract and retain healthy and productive staff in the long run.

**Handbook of Automotive Human Factors**-Motoyuki Akamatsu 2019-06-25 Thanks to advances in computer technology in the last twenty years, navigation system, cabin environment control, ACC, advanced driver assistance system (ADAS) and automated driving have become a part of the automobile experience. Improvement in technology enables us to design these with greater flexibility and provide greater value to the driver (human centered design). To achieve this, research is required by laboratories, automobile and auto parts manufacturers. Although there has been a lot of effort in human factors research and development, starting from basic research to product development, the knowledge and experience has not been integrated optimally. The aim of this book is to collect and review the information for researchers, designers and developers to learn and apply them for further research and development of human centered design of future automotive technologies. Automotive human factors include psychological, physiological, mathematical, engineering and even sociological aspects. This book offers valuable insights to applying the right approach in the right place.

**Decision-Making in Energy Systems**-Vivek D. Bhise 2021-12-28 This is a comprehensive book on how to make complex decisions on energy systems problems involving different technologies, environmental effects, costs, benefits, risks, and safety issues. Using Industrial and Systems Engineering techniques for decision-making in Energy Systems, the book provides the background knowledge and methods to incorporate multiple criteria involved in solving energy system problems. It offers methods, examples, and case studies illustrating applications. Decision-Making in Energy Systems discusses subjective as well as objective methods, approaches, and techniques taken from the systems and industrial engineering domain and puts them to use in solving energy systems problems. It uses an integrated approach by including effects of all technical, economic, environmental, and safety considerations as well as costs and risks. The book is specially designed for practicing engineers from industrial/systems engineering who work in energy systems engineering industries. Aimed at graduate students, researchers, and managers involved in various energy generating, distributing, and consuming companies, the book helps the reader to understand, evaluate, and decide on solutions to their energy-related problems.

**Ergonomics**-Pamela McCauley-Bush 2011-12-13 A complete introduction to the field, Ergonomics: Foundational Principles, Applications and Technologies discusses scientific principles, research, applications, and emerging trends in technology. Covering the foundational principles and major topics in physical ergonomics, the book contains the necessary components of a quality ergonomics course,

**Human Factors and Ergonomics in Consumer Product Design**-Waldemar Karwowski 2011-06-22 Every day we interact with thousands of consumer products. We not only expect them to perform their functions safely, reliably, and efficiently, but also to do it so seamlessly that we don’t even think about it. However, with the many factors involved in consumer product design, from the application of human factors and ergonomics principles to reducing risks of malfunction and the total life cycle cost, well, the process just seems to get more complex. Edited by well-known and well-respected experts, the two-volumes of Handbook of Human Factors and Ergonomics in Consumer Product Design simplify this process. The first volume, Human Factors and Ergonomics in Consumer Product Design: Methods and Techniques, outlines the how to incorporate Human Factors and Ergonomics (HF/E) principles and knowledge into the design of consumer products in a variety of applications. It discusses the user-centered design process, starting with how mental workload affects every day interactions with consumer products and what lessons may be applied to product design. The book then highlights the ever-increasing role of information technology, including digital imaging, video and other media, and virtual reality applications in consumer product design. It also explores user-centered aspect of consumer product development with discussions of user-centered vs. task-based approach, articulation and assessment of user requirements and needs, interaction with design models, and eco design. With contributions from a team of researchers from 21 countries, the book covers the current state of the art methods and techniques of product ergonomics. It provides an increased knowledge of how to apply the HF/E principles that ultimately leads to better product design.

**Ergonomics and Safety in Hand Tool Design**-Charles A. Cacha 1999-02-26 This book focuses exclusively on ergonomics in the design and use of hand tools. Hand tools have been an integral supplement to the human hand since the beginning of civilization. Recently, they have been pinpointed as a prominent cause of workplace disease. Cumulative Trauma Disorders such as Tendonitis, Carpal Tunnel Syndrome, and Raynaud’s Syndrome are caused by the specialization of motion employed when using a screw driver, the shock to the hand and wrist when a hammer strikes a nail, or the vibration of a power saw. Ergonomics and Safety in Hand Tool Design explores the relationship between Biomechanics, Safety, and Ergonomics allowing the reader to recognize, evaluate, and control ergonomic risk factors and improve hand tool design. After a history of hand tool use and design, the book is broken down by the various disciplines as they apply to hand tools, taking a broad approach. The author gives special attention to safe design and use, illustrated with detailed diagrams. The text serves as a guide to the human factors in safety and ergonomics for safety
Design for Ergonomics - Francesca Tosi 2019-11-21 This book focuses on the global quality of the design of systems that people interact with during their work activities and daily lives; a quality that involves the globality of people’s experience – physical, sensory, cognitive and emotional. It presents a concise and structured overview of the ergonomic approach to planning, and of methodological and operational tools from ergonomics research that can more directly and concretely contribute to the design process. The book also explores physical ergonomics and cognitive ergonomics, which are essential components of design culture. The final section addresses the main design problems and intervention criteria regarding the design of environments, products and equipment, as well as the design of communication, training and learning interface systems based on digital technologies. The book is chiefly intended for designers and anyone interested in the methods, tools and opportunities for in-depth analysis and development that ergonomics can offer regarding the conception, production and testing of products, environments and services, whether physical or virtual. It also offers a learning resource for professionals and students in Industrial Design and Planning.

Usability Evaluation for In-Vehicle Systems - Catherine Harvey 2016-04-19 Ergonomics often seems to be involved too late in commercial project development processes to have substantive impact on design and usability. However, in the automotive industry, and specifically in relation to In-Vehicle Information Systems (IVIS), a lack of attention to usability can not only lead to poor customer satisfaction, it can also present a significant risk to safe and efficient driving. Usability Evaluation for In-Vehicle Systems describes how to apply a range of usability evaluation methods for IVIS. The authors explore the driving context and the range of driver-IVIS interactions, using case studies that show how Ergonomics methods can add considerable value throughout the product development process. They emphasize practical approaches that can be used to predict and analyze driver behavior with IVIS. The authors also present validation evidence for the methods covered. The book has three key objectives: Define and understand usability in the context of IVIS. This guides the specification of criteria against which usability can be successfully evaluated. Develop a multi-method framework to support designers in the evaluation of IVIS usability. The underlying motivations for the framework are a need for early-stage evaluation to support proactive redesign and a practical and realistic approach which can be used successfully by automotive manufacturers. Develop an analytic usability evaluation method which enables useful predictions of task interaction, whilst accounting for the specific context-of-use of IVIS. The major challenge of this particular context-of-use is the dual-task environment created by interacting with secondary tasks via an IVIS at the same time as driving. Written for students, researchers, designers, and engineers, the book is not only a guide to the practical application of evaluation methods, it also presents important theoretical concepts and hypotheses, describing the behavior of drivers and the effects of IVIS interactions. It provides a framework for developing more usable systems to enhance the overall driving experience by meeting the needs of the driver: safety, efficiency, and enjoyment.

Cognitive Ergonomics - Pierre Falzon 2015-09-03 This reference work covers the breadth of cognitive ergonomics in humancomputer interaction (HCI). Covering models for design, learning procedures, and planning and understanding, this book is specifically concerned with the cognitive ergonomics of human computer interaction—from analogical thinking to spreadsheet calculation, office organization to process control. It provides an overview of HCI issues from the cognitive perspective.

Eco-Driving - Rich C. McIlroy 2017-10-23 Eco-driving has the potential to save fuel and reduce emissions without having to make any changes to vehicles or road infrastructure. This book provides an in-depth understanding of the contemporary issues in the human factors aspects of eco-driving strategies and interfaces and the effects on driver behaviour. A review of the literature concerning design, behaviour, and energy use led to an exploration of Ecological Interface Design, and the Skills, Rules, and Knowledge (SRK) taxonomy of human behaviour, particularly with regard to haptic information presented through the accelerator pedal. This book explains that eco-driving can be performed by anyone in control of a vehicle.

Ergonomics and Safety of Intelligent Driver Interfaces - Y. Ian Noy 2020-11-26 Even to the casual observer of the automotive industry, it is clear that driving in the 21st century will be radically different from driving as we know it today. Significant advances in diverse technologies such as digital maps, communication links, processors, image processing, chipcards, traffic management, and vehicle positioning and tracking, are enabling extensive development of intelligent transport systems (ITS). Proponents of ITS view these technologies as freeing designers to re-define the role and function of transport in society and to address the urgent problems of congestion, pollution, and safety. Critics, on the other hand, worry that ITS may prove too complex, too demanding, and too distracting for users, leading to loss of skill, increased incidence of human error, and greater risk of accidents. The role of human factors is widely acknowledged to be critical to the successful implementation of such technologies. However, too little research is directed toward advancing the science of human-ITS interaction, and too little is published which is useful to system designers. This book is an attempt to fill this critical gap. It focuses on the intelligent driver interface (IDI) because the ergonomics of IDI design will influence safety and usability perhaps more than the technologies which underlie it. The chapters cover a broad range of topics, from cognitive considerations in the design of navigation and route guidance, to issues associated with collision warning systems, to monitoring driver fatigue. The chapters also differ in intent -- some provide design recommendations while others describe research findings or new approaches for IDI research and development. Based in part on papers presented at a symposium on the ergonomics of in-vehicle human systems held under the auspices of the 12th Congress of the International Ergonomics
Association, the book provides an international perspective on related topics through inclusion of important contributions from Europe, North America, and Japan. Many of the chapters discuss issues associated with navigation and route guidance because such systems are the most salient and arguably the most complex examples of IDI. However, the findings and research methodologies are relevant to other systems as well, making this book of interest to a wide audience of researchers, design engineers, transportation authorities, and academicians involved with the development or implementation of ITS.

**Decision-Making in Energy Systems**-Vivek D. Bhise 2022-01-10 This is a comprehensive book on how to make complex decisions on energy systems problems involving different technologies, environmental effects, costs, benefits, risks, and safety issues. Using Industrial and Systems Engineering techniques for decision-making in Energy Systems, the book provides the background knowledge and methods to incorporate multiple criteria involved in solving energy system problems. It offers methods, examples, and case studies illustrating applications. Decision-Making in Energy Systems discusses subjective as well as objective methods, approaches, and techniques taken from the systems and industrial engineering domain and puts them to use in solving energy systems problems. It uses an integrated approach by including effects of all technical, economic, environmental, and safety considerations as well as costs and risks. The book is specially designed for practicing engineers from industrial/systems engineering who work in energy systems engineering industries. Aimed at graduate students, researchers, and managers involved in various energy generating, distributing, and consuming companies, the book helps the reader to understand, evaluate, and decide on solutions to their energy-related problems.

**Driver Reactions to Automated Vehicles**-Alexander Eriksson 2018-07-04 Driver Reactions to Automated Vehicles focuses on the design and evaluation of the handover to and from driver and the automobile. The authors present evidence from studies in driving simulators and on the open roads to show that handover times are much longer than anticipated by previous research. In the course of the studies, Eriksson and Stanton develop compelling evidence to support the use of driving simulators for the study of handovers. They also develop guidelines for the design of handover strategies and show how this improves driver takeover of vehicle control. Features Provides a history of automobile automation Offers a contemporary analysis of the state of automobile automation Includes novel approaches in examining driver-automation interaction Presents studies of automation in driving simulators Includes on-road studies of driver automation Covers guidelines for design of vehicle automation

**Digital Human Modeling**-Vincent D. Duffy 2007-08-24 This book constitutes the refereed proceedings of the First International Conference on Digital Human Modeling, DHM 2007, held in Beijing, China in July 2007. The papers thoroughly cover the thematic area of digital human modeling, addressing the following major topics: shape and movement modeling and anthropometry, building and applying virtual humans, medical and rehabilitation applications, as well as industrial and ergonomic applications.

**Designing Interaction and Interfaces for Automated Vehicles**-Neville Stanton 2021-03-10 Driving automation and autonomy are already upon us and the problems that were predicted twenty years ago are beginning to appear. These problems include shortfalls in expected benefits, equipment unreliability, driver skill fade, and error-inducing equipment designs. Designing Interaction and Interfaces for Automated Vehicles: User-Centred Ecological Design and Testing investigates the difficult problem of how to interface drivers with automated vehicles by offering an inclusive, human-centred design process that focusses on human variability and capability in interaction with interfaces. This book introduces a novel method that combines both systems thinking and inclusive user-centred design. It models driver interaction, provides design specifications, concept designs, and the results of studies in simulators on the test track, and in road going vehicles. This book is for designers of systems interfaces, interactions, UX, Human Factors and Ergonomics researchers and practitioners involved with systems engineering and automotive academics. "In this book, Prof Stanton and colleagues show how Human Factors methods can be applied to the tricky problem of interfacing human drivers with vehicle automation. They have developed an approach to designing the human-automation interaction for the handovers between the driver and the vehicle. This approach has been tested in driving simulators and, most interestingly, in real vehicles on British motorways. The approach, called User-Centred Ecological Interface Design, has been validated against driver behaviour and used to support their ongoing work on vehicle automation. I highly recommend this book for anyone interested, or involved, in designing human-automation interaction in vehicles and beyond." Professor Michael A. Regan, University of NSW Sydney, AUSTRALIA

**Design for Health**-Arathi Sethumadhavan 2020-01-29 Design for Health: Applications of Human Factors delves into critical and emergent issues in healthcare and patient safety and how the field of human factors and ergonomics plays a role in this domain. The book uses the Design for X (DFX) methodology to discuss a wide range of contexts, technologies, and population dependent criteria (X’s) that must be considered in the design of a safe and usable healthcare ecosystem. Each chapter discusses a specific topic (e.g., mHealth, medical devices, emergency response, global health, etc.), reviews the concept, and presents a case study that demonstrates how human factors techniques and principles are utilized for the design, evaluation or improvements to specific tools, devices, and technologies (Section 1), healthcare systems and environments (Section 2), and applications to special populations (Section 3). The book represents an essential resource for researchers in academia as well as practitioners in medical device industries, consumer IT, and hospital settings. It covers a range of topics from medication reconciliation to self-care to the artificial heart. Uses the Design for X (DFX) methodology A case study approach provides practical examples for operationalization of key human factors principles and guidelines Provides specific design guidelines for a wide range of
topics including resilience, stress and fatigue management, and emerging technologies Examines special populations, such as the elderly and the underserved Brings a multidisciplinary, multi-industry approach to a wide range of healthcare human factors issues

**Ergonomics in Product Design** - Sendpoints 2018-09 In the last two hundred years, the field of ergonomics has become a multidisciplinary science, incorporating elements of anatomy, physiology, psychology and engineering, all with the goal of making products and systems fit the people who use them. Ergonomics in Product Design is an invaluable resource for designers looking to stay at the forefront of ergonomic design, starting with a breakdown of human body points and percentiles, moving into an overview of principles and culminating in a curated selection of cutting-edge ergonomically designed products. Chairs and computer peripherals might be the first things to come to mind, and both are certainly covered here, along with much more: a thermometer, shampoo dispenser, bar of soap, bottle opener, fire extinguisher, dishes and tableware, wheelchairs, crutches, safety masks and more - all re-imagined based on the latest in ergonomic science.

**Driver Distraction and Inattention** - John D. Lee 2017-07-12 It is estimated that, in the United States, around 20 percent of all Police-reported road crashes involve driver distraction as a contributing factor. This figure increases if other forms of inattention are considered. Evidence (reviewed in this volume) suggests that the situation is similar in other countries and that driver distraction and inattention are even more dangerous as contributing factors in crashes than drug and alcohol intoxication. Having a solid evidence-base from which to develop injury countermeasures is a cornerstone of road-safety management. This book adds to the accumulating evidence-base on driver distraction and inattention. With 24 chapters by 52 authors from more than 10 countries, it provides important new perspectives on the definition and meaning of driver distraction and inattention, the mechanisms that characterize them, the measurement of their effects, strategies for mitigating their effects, and recommendations for further research. The goal of this book is to inspire further research and countermeasure development to prevent and mitigate the potentially adverse effects of driver distraction and driver inattention, and, in doing so, to save lives.

**Handbook of Digital Human Modeling** - Vincent G. Duffy 2016-04-19 The rapid introduction of sophisticated computers, services, telecommunications systems, and manufacturing systems has caused a major shift in the way people use and work with technology. It is not surprising that computer-aided modeling has emerged as a promising method for ensuring products meet the requirements of the consumer. The Handbook of Digital Human Modeling provides comprehensive coverage of the theory, tools, and methods to effectively achieve this objective. The 56 chapters in this book, written by 113 contributing authorities from Canada, China, France, Germany, the Netherlands, Poland, Sweden, Taiwan, UK, and the US, provide a wealth of international knowledge and guidelines. They cover applications in advanced manufacturing, aerospace, automotive, data visualization and simulation, defense and military systems, design for impaired mobility, healthcare and medicine, information systems, and product design. The text elucidates tools to help evaluate product and work design while reducing the need for physical prototyping. Additional software and demonstration materials on the CRC Press web site include a never-before-released 220-page step-by-step UGS-Siemens JackTM help manual developed at Purdue University. The current gap between capability to correctly predict outcomes and set expectation for new and existing products and processes affects human-system performance, market acceptance, product safety, and satisfaction at work. The handbook provides the fundamental concepts and tools for digital human modeling and simulation with a focus on its foundations in human factors and ergonomics. The tools identified and made available in this handbook help reduce the need for physical prototyping. They enable engineers to quantify acceptability and risk in design in terms of the human factors and ergonomics.

**Human-Automation Interaction Design** - Jediah R. Clark 2021-10-22 This text presents a four-step approach for applying communicative concepts to driving automation, including: scoping, piloting, designing, and testing. It further provides experimental data on how practical human-human communication strategies can be applied to interaction in automated vehicles. The book explores the role of communication and the nature of situation awareness in automated vehicles to ensure safe and usable automated vehicle operation. It covers the issue of interaction in automated vehicles by providing insight into communicative concepts, the transfer of control in human-teams, and how these concepts can be applied in automated vehicles. The theoretical framework is built on by presenting experimental findings, design workshop output and providing a demonstration of prototype generation for automated assistants that addresses a wide range of performance outcomes within human-machine interaction. Aimed at professionals, graduate students, and academic researchers in the fields of ergonomics, automotive engineering, transportation engineering, and human factors, this text: Discusses experimental findings on how practical human-human communication strategies can be applied to interaction in automated vehicles. Provides a four-step approach for applying communicative concepts to driving automation, including: scoping, piloting, designing and testing. Explores the role of distributed situation awareness in automated vehicles. Covers communication and system awareness in response to multiple complex road scenarios. Provides design guidelines for automation-human handover design.
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