

Understanding Computers And Cognition

Understanding Computers and CognitionComputers and CognitionUnderstanding Computers and CognitionComputers, Cognition and DevelopmentThe Computer and the MindComputers As Cognitive ToolsComputers As Cognitive ToolsComputers, Chess, and CognitionComputers, Cognition, and Writing InstructionFrom Humans To Computers: Cognition Through Visual PerceptionSynergetic Computers and CognitionCognition and Interaction: From Computers to Smart Objects and Autonomous AgentsExpertise and TechnologyCognitive Science and Its Applications for Human-computer InteractionNew Science of LearningMinds, Brains, and ComputersMinds, Brains, and ComputersCollective Intelligence in Computer-Based CollaborationArtificial Intelligence and Soft ComputingComputers as Cognitive Tools, Volume Two Terry Winograd J.H. Fetzer Terry Winograd Julie C. Rutkowska Philip Nicholas Johnson-Laird Susanne P. Lajoie Susanne P. Lajoie T. Anthony Marsland Marjorie Montague Victor V Alexandrov Hermann Haken Amon Rapp Jean-Michel Hoc Raymonde Guindon Myint Swe Khine Ralph Morelli Robert Cummins John B. Smith Amit Konar Susanne P. Lajoie

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understanding computers and cognition presents an important and controversial new approach to understanding what computers do and how their functioning is related to human language thought and action while it is a book about computers understanding computers and cognition goes beyond the specific issues of what computers can or can t do it is a broad ranging discussion exploring the background of understanding in which the discourse about computers and technology takes place understanding computers and cognition is written for a wide audience not just those professionals involved in computer design or artificial intelligence it represents an important contribution to the ongoing discussion about what it means to be a machine and what it means to be human book jacket

an important collection of studies providing a fresh and original perspective on the nature of mind including thoughtful and detailed arguments that explain why the prevailing paradigm the computational conception of language and mentality can no longer be sustained an alternative approach is advanced inspired by the work of charles s peirce according to which minds are sign using or semiotic systems which in turn generates distinctions between different kinds of minds and overcomes problems that burden more familiar alternatives unlike conceptions of minds as machines this novel approach has obvious evolutionary implications where differences in semiotic abilities tend to distinguish the species from this point of view the scope and limits of computer and ai systems can be more adequately appraised and alternative accounts of consciousness and cognition can be more thoroughly criticised readership intermediate and advanced students of computer science ai cognitive science and all students of the philosophy of the mind

presents the implications of recent advances in information technology for applications in the field of psychology brings together work from researchers in artificial intelligence education and developmental psychology discusses issues posed by the increasing spread of information technology into society including the effects on young children explains how insights that arise from the achievements of artificial intelligence may help define new computer environments for human learning in particular attention is focused on the debate between the advocates of the procedural language logo and those of the logic programming language prolog looks at computational metaphors of mental activity in cognitive science and developmental psychology

in a field choked with seemingly impenetrable jargon philip n johnson laird has done the impossible written a book about how the mind works that requires no advance knowledge of artificial intelligence neurophysiology or psychology the mind he says depends on the brain in the same way as the execution of a program of symbolic instructions depends on a computer and can thus be understood by anyone willing to start with basic principles of computation and follow his step by step explanations the author begins with a brief account of the history of psychology and the birth of cognitive science after world war ii he then describes clearly and simply the nature of symbols and the theory of computation and follows with sections devoted to current computational models of how the mind carries out all its major tasks including visual perception learning memory the planning and control of actions deductive and inductive reasoning and the formation of new concepts and new ideas other sections discuss human communication meaning the progress that has been made in enabling computers to understand natural language and finally the difficult problems of the conscious and unconscious mind free will needs and emotions and self awareness in an envoi the author responds to the critics of cognitive science and defends the computational view of the mind as an alternative to traditional dualism cognitive science integrates mind and matter within the same explanatory framework this first single authored introduction to cognitive science will command the attention of students of cognitive science at all levels including psychologists linguists computer scientists philosophers and neuroscientists as well as all readers curious about recent knowledge on how the mind works

highlighting and illustrating several important and interesting theoretical trends that have emerged in the continuing development of instructional technology this book s organizational framework is based on the notion of two opposing camps one evolves out of the intelligent tutoring movement which employs artificial intelligence technologies in the service of student modeling and precision diagnosis and the other emerges from a constructivist developmental perspective that promotes exploration and social interaction but tends to reject the methods

and goals of the student modelers while the notion of opposing camps tends to create an artificial rift between groups of researchers it represents a conceptual distinction that is inherently more interesting and informative than the relatively meaningless divide often drawn between intelligent and unintelligent instructional systems an evident trend is that researchers in both camps view their computer learning environments as cognitive tools that can enhance learning performance and understanding cognitive tools are objects provided by the instructional environment that allow students to incorporate new auxiliary methods or symbols into their social problem solving which otherwise would be unavailable a final section of the book represents researchers who are assimilating and accommodating the wisdom and creativity of their neighbors from both camps perhaps forming the look of technology for the future when the idea of model tracing in a computer based environment is combined with appreciation for creative mind extension cognitive tools and for how a community of learners can facilitate learning a camp is created where ai technologists and social constructivist learning theorists can feel equally at home

since the publication of the first edition of computers as cognitive tools in 1993 rapid changes have taken place in the uses of technology for educational purposes and in the theories underlying such uses changes in perspectives on thinking and learning are guiding the instructional design of computer based learning environments computers as cognitive tools volume ii no more walls provides examples of state of the art technology based research in the field of education and training these examples are theory driven and reflect the learning paradigms that are currently in use in cognitive science the learning theories which consider the nature of individual learning as well as how knowledge is constructed in social situations include information processing constructivism and situativity contributors to this volume demonstrate some variability in their choice of guiding learning paradigms this allows readers the opportunity to examine how such paradigms are operationalized and validated an array of instructional and assessment approaches are described along with new techniques for automating the design and assessment process new considerations are offered as possibilities for examining learning in distributed situations a multitude of subject matter areas are covered including scientific reasoning and inquiry in biology physics medicine electricity teacher education programming and hypermedia composition in the social sciences and ecology this volume reconsiders the initial camp analogy posited in 1993 edition of computers as cognitive tools and presents a mechanism for breaking camp to find new summits

computers chess and cognition presents an excellent up to date description of developments in computer chess a rapidly advancing area in artificial intelligence research this book is intended for an upper undergraduate and above level audience in the computer science artificial intelligence community the chapters have been edited to present a uniform terminology and balanced writing style to make the material understandable to a wider less specialized audience the book s primary strengths are the description of the workings of some major chess programs an excellent review of tree searching methods discussion of exciting new research ideas a philosophical discussion of the relationship of computer game playing to artificial intelligence and the treatment of computer go as an important new research area a complete index and extensive bibliography makes the book a valuable reference work the book includes a special foreword by ken thompson author of the unix operating system

marjorie montague provides both the philosophical and theoretical background for research in computer assisted composition as well as a comprehensive review and synthesis of the efficacy research in this area she focuses on effective writing instruction for elementary secondary and special needs students and she proposes a model in which the teacher and the

computer are viewed as compatible instructional agents within a microcomputer learning environment

this book considers computer vision to be an integral part of the artificial intelligence system the core of the book is an analysis of possible approaches to the creation of artificial vision systems which simulate human visual perception much attention is paid to the latest achievements in visual psychology and physiology the description of the functional and structural organization of the human perception mechanism the peculiarities of artistic perception and the expression of reality computer vision models based on these data are investigated they include the processes of external data analysis internal environmental model synthesis and the generating of behavioristic responses based on external and internal models comparison computer vision system evolution resulting from environmental effects is also considered a unique feature of this book is the authors use of black and white and colour prints of traditional and contemporary russian art to illustrate their principal theses in doing so they introduce the reader to a particularly russian view of the world

the first edition of this book has found great interest among scientists and engineers dealing with pattern recognition and among psychologists working on psychophysics or gestalt psychology this book also proved highly useful for graduate students of informatics the concept of the synergetic computer offers an important alternative to the by now more traditional neural nets i just mention a few advantages there are no ghost states so that time consuming methods such as simulated annealing can be avoided the synaptic strengths are explicitly determined by the prototype patterns to be stored but they can equally well be learned and the learning procedure allows a classification also a precise meaning and function can be attributed to hidden variables the synergetic computer has found a number of important practical applications in industry i use the opportunity of this second edition to include a new section on transformation properties of the equations of the synergetic computer and on the invariance properties of its order parameter equations a new section is devoted to the problem of stereopsis that is dealt with by the basic concept of the synergetic computer finally attention is paid to a recent development namely to the use of pulse coupled neural nets for pattern recognition

cognitive sciences have been involved under numerous accounts to explain how humans interact with technology as well as to design technological instruments tailored to human needs as technological advancements in fields like wearable and ubiquitous computing virtual reality robotics and artificial intelligence are presenting novel modalities for interacting with technology there are opportunities for deepening exploring and even rethinking the theoretical foundations of human technology use this volume entitled cognition and interaction from computers to smart objects and autonomous agents is a collection of articles on the impacts that novel 3 september frontiers in psychology 2019 cognition and interaction interactive technologies are producing on individuals it puts together 17 works spanning from research on social cognition in human robot interaction to studies on neural changes triggered by internet use that tackle relevant technological and theoretical issues in human computer interaction encouraging us to rethink how we conceptualize technology its use and development the volume addresses fundamental issues at different levels the first part revolves around the biological impacts that technologies are producing on our bodies and brains the second part focuses on the psychological level exploring how our psychological characteristics may affect the way we use understand and perceive technology as well as how technology is changing our cognition the third part addresses relevant theoretical problems presenting reflections that aim to reframe how we conceptualize ourselves technology and interaction itself finally the

last part of the volume pays attention to the factors involved in the design of technological artifacts providing suggestions on how we can develop novel technologies closer to human needs overall it appears that human computer interaction will have to face a variety of challenges to account for the rapid changes we are witnessing in the current technology landscape

technological development has changed the nature of industrial production so that it is no longer a question of humans working with a machine but rather that a joint human machine system is performing the task this development which started in the 1940s has become even more pronounced with the proliferation of computers and the invasion of digital technology in all wakes of working life it may appear that the importance of human work has been reduced compared to what can be achieved by intelligent software systems but in reality the opposite is true the more complex a system the more vital the human operator s task the conditions have changed however whereas people used to be in control of their own tasks today they have become supervisors of tasks which are shared between humans and machines a considerable effort has been devoted to the domain of administrative and clerical work and has led to the establishment of an internationally based human computer interaction hci community at research and application levels the hci community however has paid more attention to static environments where the human operator is in complete control of the situation rather than to dynamic environments where changes may occur independent of human intervention and actions this book s basic philosophy is the conviction that human operators remain the unchallenged experts even in the worst cases where their working conditions have been impoverished by senseless automation they maintain this advantage due to their ability to learn and build up a high level of expertise a foundation of operational knowledge during their work this expertise must be taken into account in the development of efficient human machine systems in the specification of training requirements and in the identification of needs for specific computer support to human actions supporting this philosophy this volume deals with the main features of cognition in dynamic environments combining issues coming from empirical approaches of human cognition and cognitive simulation addresses the question of the development of competence and expertise and proposes ways to take up the main challenge in this domain the design of an actual cooperation between human experts and computers of the next century

the field of human computer interaction is striving to provide the conceptual foundations for designing computer tools and the environment needed to perform increasingly more complex and specialized tasks to achieve this goal human computer interaction must rely on the meeting of specialized expert minds each of the research projects presented in this book investigate some critical question on the path of progress in human computer interaction these projects would not have been feasible without the multidisciplinary of the research team or of the researchers themselves

the earliest educational software simply transferred print material from the page to the monitor since then the internet and other digital media have brought students an ever expanding low cost knowledge base and the opportunity to interact with minds around the globe while running the risk of shortening their attention spans isolating them from interpersonal contact and subjecting them to information overload the new science of learning cognition computers and collaboration in education deftly explores the multiple relationships found among these critical elements in students increasingly complex and multi paced educational experience starting with instructors insights into the cognitive effects of digital media a diverse range of viewpoints with little consensus this cutting edge resource acknowledges the double edged potential inherent in computer based education and its role in shaping students thinking

capabilities accordingly the emphasis is on strategies that maximize the strengths and compensate for the negative aspects of digital learning including group cognition as a foundation for learning metacognitive control of learning and remembering higher education course development using open education resources designing a technology oriented teacher professional development model supporting student collaboration with digital video tools teaching and learning through social annotation practices the new science of learning cognition computers and collaboration in education brings emerging challenges and innovative ideas into sharp focus for researchers in educational psychology instructional design education technologies and the learning sciences

the basic questions addressed in this book are what is the computational nature of cognition and what role does it play in language and other mental processes what are the main characteristics of contemporary computational paradigms for describing cognition and how do they differ from each other what are the prospects for building cognition and how do they differ from each other and what are the prospects for building an artificial intelligence

this work offers a selection of seminal papers on the foundations of cognitive science from leading figures in artificial intelligence linguistics philosophy and cognitive psychology each category includes papers that show the conception in question illustrate interpret or criticise it

proposing a new paradigm for computer supported cooperative work cscw this ground breaking book presents a research agenda for developing and testing that paradigm it constitutes the first attempt to outline a comprehensive model of collaboration that integrates the cognitive conceptual and social dynamics of groups the challenge faced by all groups engaged in intellectual work is on the one hand to divide the task so that efforts of individual members may proceed in parallel and on the other hand to synthesize their separate contributions to form a coherent whole addressing this challenge smith examines the general form of a theory of computer based collaboration that extends across different tasks and working situations he uses the work of newell simon and anderson as a base from which to consider a group as a form of distributed information processing system within groups there are constructs analogous to human long term and short term memory conceptual processes and problem solving and knowledge construction strategies he discusses two metacognitive issues awareness and control as they occur in collaborative behavior and he reviews a number of advanced computer systems that support collaboration focusing on their impact on the thinking and behavior of groups smith s theoretical framework combines elements of information processing system theory and its detailed process models of cognitive behavior with the situated perspective of activity theory the book suggests new and useful ways of conceiving problems and solutions to all those interested in the ways in which people interact with each other and with computers to achieve goals

with all the material available in the field of artificial intelligence ai and soft computing texts monographs and journal articles there remains a serious gap in the literature until now there has been no comprehensive resource accessible to a broad audience yet containing a depth and breadth of information that enables the reader to fully understand and readily apply ai and soft computing concepts artificial intelligence and soft computing fills this gap it presents both the traditional and the modern aspects of ai and soft computing in a clear insightful and

highly comprehensive style it provides an in depth analysis of mathematical models and algorithms and demonstrates their applications in real world problems beginning with the behavioral perspective of human cognition the text covers the tools and techniques required for its intelligent realization on machines the author addresses the classical aspects search symbolic logic planning and machine learning in detail and includes the latest research in these areas he introduces the modern aspects of soft computing from first principles and discusses them in a manner that enables a beginner to grasp the subject he also covers a number of other leading aspects of ai research including nonmonotonic and spatio temporal reasoning knowledge acquisition and much more artificial intelligence and soft computing behavioral and cognitive modeling of the human brain is unique for its diverse content clear presentation and overall completeness it provides a practical detailed introduction that will prove valuable to computer science practitioners and students as well as to researchers migrating to the subject from other disciplines

volume ii provides the reader with examples of state of the art technology based research in the fields of education training researchers represented include computer scientists cognitive scientists educ psychologists instructional psychologists

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