Trends and technologies within the knowledge society are evolving exponentially. Much of this change and development has been accelerated by the implementation and advancement of intelligent technologies. Considering the complexities of current software research and adaptation, intelligent technologies have progressed to the forefront of creating tomorrow's solutions for today's challenges. Agent-based technologies, sensor applications, emergent behavior and neural networks pose the answer to future progress in the field of information science and technology and offer novel models for building effective systems. Through facilitating the advancement of technology with intelligent tools, the betterment of research and technological diffusion may be achieved.

Numerous researchers and academicians have developed a variety of techniques, methodologies, and measurement tools that have allowed them to develop, deliver and at the same time evaluate the effectiveness of several areas of intelligent information technologies throughout previous and past years. The explosion of these technologies and methodologies have created an abundance of new, state-of-art literature related to all aspects of this expanding discipline, allowing researchers and practicing educators to learn about the latest discoveries in the field of intelligent information technologies.

Due to rapid, ever-present and emerging technological changes, it is a constant challenge for researchers and experts in this discipline to stay abreast of the far-reaching effects of this emerging discipline, and to be able to cultivate and deliver more innovative methodologies and techniques utilizing contemporary technological innovation. In order to provide the most comprehensive, in-depth, and recent coverage of all issues related to intelligent information technologies, as well as to offer a single reference source on all conceptual, methodological, technical and managerial issues, as well as the opportunities, future challenges and emerging trends related to intelligent information technologies, Information Science Reference is pleased to offer a four-volume reference collection on this swiftly growing discipline, in order to empower students, researchers, academicians, and practitioners with a comprehensive understanding of the most critical areas within this field of study.

Entitled Intelligent Information Technologies: Concepts, Methodologies, Tools, and Applications this collection is organized in eight distinct sections, providing the most wide-ranging coverage of topics such as: (1) Fundamental Concepts and Theories; (2) Development and Design Methodologies; (3) Tools and Technologies; (4) Utilization and Application; (5) Organizational and Social Implications; (6) Managerial Impact; (7) Critical Issues; and (8) Emerging Trends. The following provides a summary of what is covered in each section of this multi volume reference collection:

Section 1, Fundamental Concepts and Theories, serves as a foundation for this extensive reference tool by addressing crucial theories essential to the understanding of intelligent information technologies. Chapters such as, “Introduction to Speech Recognition” by Sergio Suárez and Jose Luis Oropeza-Rodriguez as well as “Overview of Artificial Neural Networks and their Applications in Healthcare” by
Joarder Kamruzzaman, Rezaul Begg, and Ruhul Sarker provide an excellent framework in which to position intelligent computing within the field of information science and technology. Samuel G. Collins and Goran P. Trajkovski’s “Attack of the Rainbow Bots: Generating Diversity through Multi-Agent Systems” offers excellent insight into the critical incorporation of diversity into multi-agent systems, while chapters such as, “Pervasive Computing: What is it Anyway?” by Emerson Loureiro, Glauber Ferreira, Hyggo Almeida, and Angelo Perkusich address some of the basic, yet principle stumbling blocks of intelligent technologies. With over 18 chapters comprising this foundational section, the reader can learn and chose from a compendium of expert research on the elemental theories underscoring the intelligent information technology discipline.

Section 2, Development and Design Methodologies, provides in-depth coverage of conceptual architecture frameworks to provide the reader with a comprehensive understanding of the emerging technological developments within the field of intelligent information technology. “Trust Models for Ubiquitous Mobile Systems” by Mike Burmester offers research fundamentals imperative to the understanding of trust and mobile systems within intelligent computing. From broad examinations to specific discussions on intelligent IT such as, Paul Rippon and Kerrie Mengersen’s, “Bayesian Modelling for Machine Learning,” the research found within this section spans the discipline while offering detailed, specific discussions. From basic designs to abstract development, chapters such as “Fuzzy Logic Usage in Emotion Communication of Human Machine Interaction” by Zhe Xu, David John and Anthony C. Boucouvalas, and “From Requirements to Code with PASSI Methodology” by Massimo Cossentino serve to expand the reaches of development and design technologies within the intelligent information technology community. This section includes 20 contributions from researchers throughout the world on the topic of intelligent computing within the information science and technology field.

Section 3, Tools and Technologies, presents an extensive coverage of various tools and technologies available in the field of intelligent information technology that practitioners and academicians alike can utilize to develop different techniques. Chapters, such as Gunjan Kalra’s, “The Weather Tool, An Agent-Based Approach to Information Integration” discuss the process of providing information in its most accurate, complete form to its users and the difficulties faced by the users of the current information systems while describing the impact of prevalent technologies such as the Multi-Agent Systems and the Semantic Web in the area of information supply via an example implementation and a model use case, whereas chapters like, “Semantic Web Services for Healthcare” by Christina Catley, Monique Frize, and Dorina Petriu explore the semantic web and the medical field—an increasingly pertinent research arena. It is through these rigorously researched chapters that the reader is provided with countless examples of the up-and-coming tools and technologies emerging from intelligent information technology. With more than 25 chapters, this section offers a broad treatment of some of the many tools and technologies within the intelligent IT community.

Section 4, Utilization and Application, discusses a variety of applications and opportunities available that can be considered by practitioners in developing viable and effective programs and processes. This section includes 20 chapters such as “Games and Simulations: A New Approach in Education?” by Göknur Kaplan Akilli, which provides a brief theoretical framework and a fresh starting point for practitioners in the field who are interested in educational use of games and simulations and their integration into learning environments. Additional chapters such as Mohamed Salah Hamdi’s, “Extracting and Customizing Information Using Multi-Agents” discuss important problems in relationship to information customization systems and to pave the way for possible solutions with the main idea being to approach information customization using a multi-agent paradigm. Also considered in this section is the application of swarm intelligence principles to collective robotics, while aiming to identify the reasons for the growing interest in the intersection of these two areas as outlined by Amanda J. C. Sharkey and Noel Sharkey’s, “The Application of Swarm Intelligence to Collective Robots.” Contributions included in
this section provide excellent coverage of today’s global community and how research into intelligent information technology is impacting the social fabric of our present-day global village.

Section 5, Organizational and Social Implications, includes a wide range of research pertaining to the social and organizational impact of intelligent information technologies around the world. Introducing this section is Alexander Riegler’s chapter entitled, “The Goose, The Fly, and the Submarine Navigator: Interdisciplinarity in Artificial Cognition Research,” which critically analyzes how a variety of disciplines can contribute to the formulation of an alternative path to artificial cognition systems. Additional chapters included in this section, such as “Using Emotional Intelligence in Personalized Adaptation” by Violeta Damjanovic and Milos Kravcik, introduce an approach to the realization of personalized adaptation. Also investigating a concern within the field of intelligent information technology is Clarry Shchiglik, Stuart J. Barnes, and Eusebio Scornavacca’s, “Customer Perceptions Toward Mobile Games Delivered via the Wireless Application Protocol,” which contributes to the development of the mobile game industry by understanding corresponding consumer perceptions towards wireless application protocol (WAP) games. With over 10 chapters, the discussions presented in this section offer research on the integration of intelligent information technologies and access for everyone.

Section 6, Managerial Impact, presents contemporary coverage of the social implications of intelligent information technologies, more specifically related to the corporate and managerial utilization of intelligent information technologies and applications, and how these technologies can be facilitated within organizations. Core ideas such as training and continuing education of human resources in modern organizations are discussed through these six chapters. In “Artificial Intelligence in Electricity Market Operations and Management,” by Z. Y. Dong, T. K. Saha, and K. P. Wong, advanced techniques such as artificial neural networks, wavelet decomposition, support vector machines, and data mining techniques in electricity market demand and price forecasts are introduced. Equally as crucial, chapters such as “Computational Intelligence Applications in Business: A Cross-Section of the Field” by Kevin E. Voges and Nigel K. Ll. Pope Birkin, present an overview of literature relating to computational intelligence and business applications, particularly the journal-based literature. Concluding this section is a chapter by Victoria Yoon, Barbara Broome, Rahul Singh, and Tor Guimaraes, “Using Agent Technology for Company Knowledge Management.” This chapter presents an overview of expert system and agent technologies, and shows the latter as a powerful extension of artificial intelligence for systems development. It starts with a discussion illustrating this—a system developed first using an expert system approach and then an agent-based approach is used to identify the strengths and weaknesses of the agent-based approach and concludes by addressing the practical implications of a company adoption of agent-based technology for systems development that might augment the development of this emerging field.

Section 7, Critical Issues, contains more than 10 chapters addressing issues such as artificial cognition systems, competitive intelligence, artificial neural networks, augmented reality, and electronic monitoring, ubiquitous and pervasive knowledge management, and intelligent computational paradigms to name a few. Within the chapters, the reader is presented with an in-depth analysis of the most current and relevant issues within this growing field of study. Colin G. Johnson’s, “Does a Functioning Mind Need a Functioning Body?: Some Perspectives from Postclassical Computation” considers the somatic marker hypothesis and related ideas from the point of view of postclassical computation, i.e., the view that computing can be seen as a property of things-in-the-world rather than of an abstract class of mathematical machines, while “Ethics of Workplace Surveillance Games” by Peter Danielson develops some of the ethical issues raised by surveillance technology in the workplace, using a framework of informal game theory. Crucial questions are addressed such as that presented in Anna Trifonova’s chapter, “Accessing Learning Content in a Mobile System: Does Mobile Mean Always Connected?” discusses the possibility of access to the learning material from ubiquitous mobile devices during their off-line periods and more
specifically, its application in the learning domain. “You’re in Our World Now: Ownership and Access in the Proprietary Community of an MMOG” by Sal Humphreys closes this section by considering how the interactive and social nature of massively multiplayer online games (MMOGs) presents challenges to systems of organization, control, and regulation used for more conventional media products.

The concluding section of this authoritative reference tool, Emerging Trends, highlights research potential within the field of intelligent information technology, while exploring uncharted areas of study for the advancement of the discipline. Introducing this section is a chapter entitled, “Lireracy by Way of Automatic Speech Recognition,” by Russell Gluck and John Fulcher, which sets the stage for future research directions and topical suggestions for continued debate. Providing an alternative view of intelligent information technology is the chapter, “Engineering Emotionally Intelligent Agents” by Penny Baille, Mark Toleman and Dickson Lukose. This chapter explores the potential for employing artificial intelligence and adaptive methods into online learning applications. The existing and newly developing technologies for representing knowledge are explored as well as the pedagogic implications for online learning, including examining the roles of intelligent tutoring systems, decision support systems and pedagogic agents. Another debate which currently finds itself at the forefront of research within this field is presented by Douglas Griffith and Frank L. Greitzer’s research, “Neo-Symbiosis: The Next Stage in the Evolution of Human Information Interaction” which addresses the vision of human-computer symbiosis as originally expressed by J.C.R. Licklider nearly a half-century ago and to argue for the relevance of this vision to the field of cognitive informatics. Found in these 20 chapters, concluding this exhaustive multi-volume set are areas of emerging trends and suggestions for future research within this rapidly expanding discipline.

Although the primary organization of the contents in this multi-volume is based on its eight sections, offering a progression of coverage of the important concepts, methodologies, technologies, applications, social issues, and emerging trends, the reader can also identify specific contents by utilizing the extensive indexing system listed at the end of each volume. Furthermore to ensure that the scholar, researcher and educator have access to the entire contents of this multi volume set as well as additional coverage that could not be include in the print version of this publication, the publisher will provide unlimited multi-user electronic access to the online aggregated database of this collection for the life of edition, free of charge when a library purchases a print copy. This aggregated database provides far more contents than what can be included in the print version in addition to continual updates. This unlimited access, coupled with the continuous updates to the database ensures that the most current research is accessible knowledge seekers.

Intelligent information technologies, as a discipline, has witnessed fundamental changes during the past two decades, allowing information seekers around the globe to have access to information which two decades ago, was inaccessible. In addition to this transformation, many traditional organizations and business enterprises have taken advantage of the technologies offered by the development of intelligent information in order to expand and augment their existing programs and practices. This has allowed practitioners and researchers to serve their customers, employees and stakeholders more effectively and efficiently in the modern virtual world. With continued technological innovations in information and communication technology and with on-going discovery and research into newer and more innovative techniques and applications, the intelligent information technologies discipline will continue to witness an explosion of information within this rapidly growing field.

The diverse and comprehensive coverage of intelligent information technologies in this four-volume authoritative publication will contribute to a better understanding of all topics, research, and discoveries in this developing, significant field of study. Furthermore, the contributions included in this multi-volume collection series will be instrumental in the expansion of the body of knowledge in this enormous field,
resulting in a greater understanding of the fundamentals while fueling the research initiatives in emerging fields. We at Information Science Reference, along with the editor of this collection, and the publisher hope that this multi-volume collection will become instrumental in the expansion of the discipline and will promote the continued growth of intelligent information technologies.