Preface

Progress in ubiquitous computing, social networking, medical informatics and IT technologies is bringing healthcare a new generation of systems, which we term as the ubiquity 2.0 trend systems. Before embarking on a discussion of the concepts contributing to the ubiquity 2.0 trend and its effects on e-health, it is important to consider the drivers, reasons, and challenges behind such an innovative shift in healthcare. Some of challenges are common as they accompany any healthcare enhancement project such as:

• Enhancement of Quality of Care
• Providing Patient Safety
• Reducing the Delivery of Cost of Care
• Comprehensive Availability and Ubiquity
• Empowerment of e-health Providers and
• Synchronization of Content and Application Development
• Integration of e-health Segments
• Providing Context-Awareness
• Encouraging New Types of Collaborations
• Enhancing the Continuity and Coverage of Care
• Supporting Sound Research and Education

Other challenges involve the healthcare of the aging population. For example, in the United States alone, the number of people over age 65 is expected to hit 70 million by 2030, doubling from 35 million in 2000, and similar increases are expected worldwide. Moreover, many elderly people suffer from chronic diseases that require medication and clinic visits on a regular basis. The cost of the healthcare is a growing problem and challenge, too. For example, United States expenditures for healthcare make up about 16% of the US GDP (Center for Medicare and Medicaid Services, 2008), as a result of the accumulative impact of chronic degenerative diseases in the elderly and their increasing dependence on the healthcare system. Many other factors may also be added to the list of challenges, including preference of home and self care over traditional hospital care and cost advantages associated with home and self care. The ubiquitous health market is expected to attain significantly high growth in future. The next generation of networked medical devices and health management systems are envisioned to be ubiquitous networked systems for secure, reliable, privacy-preserving, cost-effective and personalized quality healthcare. This would lead not only to better healthcare delivery, but also to improving people's quality of life in general. This vision requires an innovative IT infrastructure on the Internet that en-
encourages collaboration, flexibility and integration. The ubiquity 2.0 trend is based on such vision. An important concept in ubiquity 2.0 is that Web-based software should offer its functionality not only via the browser, but also as open Web services so that it can be mashed up in new and unintended ways. This will allow for sharing and reusing functionality and contents anywhere in a loosely-coupled and interoperable way. The ubiquity 2.0 Web services are different from traditional Web service technologies as they use simpler and more straightforward methods that just work and hide the protocol complexity in the application state. Essentially, the ubiquity 2.0 Web services utilize lightweight protocols like HTTP and JSON for Web service interoperability. This means that the ubiquity 2.0 supports only the REST type of Web services along with JSON (JavaScript Object Notation) instead of XML. The ubiquity 2.0 trend is also about consumer empowerment by interactively delivering what they need and thus greatly reducing their workload, time and effort spent on targeted actions performance. Moreover, the ubiquity 2.0 simplifies the highly complex processes, saves bandwidth and performs considerably faster than traditional Web applications, thus escalating customers’ online interaction with the e-health websites or portals. The ubiquity 2.0 healthcare environment is about the hyper connectivity collaboration environment that involves Ubiquitous Computing (Kumar, S., Kambhatla, K., Hu, F., Lifson, M., & Xiao, Y., 2008), Web 2.0 (Karkalis, G. I., & Koutsouris, D. D., 2006), Web 3.0 (Giustini, D., 2007), Web-Oriented Architectures (Hinchcliffe, D., 2006, April 1), Cloud Computing (Wikipedia, n.d.) and Medical Informatics (Wikipedia, n.d.) technologies. Intuitively, the ubiquity 2.0 trend highlights the changes to healthcare distribution via the Internet that will significantly impact on the value exchange occurring between a health provider and consumer.

ORGANIZATION OF THE BOOK

With the obvious global need for understanding in this evolving area, this book provides a valuable insight into the various trends, innovations, and organizational challenges of contemporary ubiquitous health and medical informatics. The interest in this area was quite obvious in that we were overwhelmed with expressions of interest to submit chapters. We have managed to carefully select the most appropriate of these but, in doing so, left out many almost as deserving. All contributions underwent a double blind review process in order to ensure academic rigor. Readers can therefore be assured that only the very highest qualities of contributions were accepted for the final publication.

The book contains 28 chapters, split into five sections; the first contains one chapter dedicated to introduce the concept of ubiquity 2.0 trend. The second section is comprised of chapters that discuss some of the research issues related to the ubiquity of healthcare. The third section describes healthcare management and organizational issues. The fourth section provides a good mix of clinical and healthcare applications. The final section contains one chapter that is dedicated for introducing a future vision for e-health interoperability.

Section 1: Background

This section includes one chapter by the editors which provides a roadmap solution based on the emerging Web technologies that hold great promise for addressing the various challenges facing e-health. The roadmap is termed as the “ubiquity 2.0 trend.” This chapter also highlights the security challenges and the emerging Web-oriented identity management technologies to provide a single, common user credential that is trusted, secure, and widely supported across the Web and within the healthcare enterprises.
Section 2: Research Issues

This section includes eleven chapters. William Hammond begins this section by examining the issue of standardizing medical vocabularies. The next chapter by Simon Liu discusses the issue of using the open source approach for personal healthcare records. Chapter 4 is by Jun Hu and Liam Peyton and provides a framework of knowledge discovery for Health 2.0 collaborative and ubiquitous environments. Chapter 5 is by Fracisco Echart et. al., where they provide a semantic model to address health queries to professionals in a healthcare social networking environment. Chapter 6 is by Ivan Chorbev and Boban Joksimoski, where they provide a vision for producing an integrated e-medical system. Chapter 7 by Eleni Kaldoudi et. al. introduces Web 2.0 based collaborative approaches for health and medical learning. Chapter 8 is by Juha Puustjärvi and Leena Puustjärvi, which provides a research vision on integrating medical learning objects for lifelong learning. Chapter 9 is by David Wiljer, Sara Urowitz and Erin Jones, where they provide a vision on treating personal health information for the age of ubiquitous health. Chapter 10 is by Wail Omar, who introduced an ontological approach for dealing with a Web 2.0 Service-Oriented healthcare system. Chapter 11 is by Daniel Ruiz Fernández, who provides an agent-based architecture for modeling ubiquitous healthcare systems. Finally, chapter 12 is by Mahmood Tara, who examined the paradigm of Semantic Web and its suitability providing ubiquitous contents and services.

Section 3: Management Issues

This section contains five chapters. In chapter 13, Christo El-Morr introduces his mobile virtual communities’ model for the management of ubiquitous health. The next chapter is by Christian Stingl and Daniel Slamanig, where they introduced a privacy enhancing technology as a solution for sharing electronic healthcare records. The following chapter is by AbdulMutalib Masaud Wahaishi and Hamada Ghenniwa, where they introduced a Multi-agent Brokering Architecture for Privacy enforcement of Ubiquitous Healthcare Systems. Chapter 16 is by Benjamin Hughes, who evaluated the impact of Web 2.0 on managing e-health systems. The final chapter of this section is by David Topps, who provided a vision on managing academic family health teams.

Section 4: Applications

This section contains ten chapters providing very interesting healthcare application. The first chapter of this section is by David Isern et. al., where they provided the K4Care agent-based Web-accessible platform that helps medical practitioners to deliver Home Care services. Chapter 19 chapter introduces a case study for treating depression for integrated care management. The following chapter is by Sameer Siddiqi and Rebecca E. Lee, where they employed virtual reality via Second Life to build virtual communities for health promotion. The following chapter is by Dimosthenis Georgiadis et. al., where they analyzed the virtual communities in the wireless e-health environment. The next chapter is by Marcial Rojo, who provided a digital pathology virtual microscopy for Integration in eHealth records. Chapter 23 is by Issam El Naqa, Liyang Wei and Yongyi Yang, where they introduced content-based image retrieval for searching for digital mammography repository. The next chapter is by Ivica Dimitrovski and Suzana Loskovska, where they used content image retrieval for features evaluation and classifications of medical images. The following chapter is by Alessandra Gorini, Andrea Gaggioli and Giuseppe Riva,
where they experimented with virtual reality as a method for psychological interventions. Chapter 26 is by Elizabeth M. Borycki and Andre W. Kushniruk, where they examined the use of clinical simulations and their impacts on ubiquitous health. The last chapter in this section is by Stefane Kabene and Candace Gibson, where they examined the use of technology and human resource management in the future of e-health.

Section 5: The Future

This section contains one chapter by Donald W. M. Juzwishin, who introduced a future vision for a challenging framework to enable e-health interoperability.

REFERENCES


