Interactive Technologies for Health Special Interest Group

Helena Mentis

Socio-Digital Systems
Microsoft Research Cambridge
Cambridge CB58HT, UK
hementis@microsoft.com

Harold Thimbleby

Future Interaction Technology
Lab, FIT Lab
Swansea University
SA2 8PP, Wales
harold@thimbleby.net

Julie A. Kientz

Information School
Human Centered Design & Eng.
University of Washington
Seattle, Washington USA
jkientz@uw.edu

Gillian R. Hayes

University of California, Irvine
5072 Donald Bren Hall
Irvine, CA 92697 USA
gillianrh@ics.uci.edu

Madhu Reddy

The Pennsylvania State
University
University Park, PA 16802-6823
USA
mreddy@ist.psu.edu

Abstract

Health and how to support it with interactive computer systems, networks, and devices is a global and, for many countries, an explicit national priority. Significant interest in issues related to interactive systems for health has been demonstrated repeatedly within SIGCHI. A community focused on health started in 2010, fostering collaboration and dissemination of research findings as well as bridging with practitioners. As part of this community's on-going efforts, we will hold a special interest group session during ACM CHI 2011 to discuss, prioritize, and promote some of these most pressing issues facing the community.

Keywords

Health, Medicine, Assistive Technologies, Nutrition, Wellness, Fitness, Health Informatics, telecare

ACM Classification Keywords

J.3 Life and Medical Sciences: Health; K.4.1 Public Policy Issues: Computer-related health issues, ethics, human safety, privacy; K.4.2 Social Issues: Assistive Technologies for Persons with Disabilities

General Terms

Human Factors, Legal Aspects, Management, Design

Introduction

The medical informatics community has begun to recognize human-computer interaction (HCI) and a

better understanding of the social and human factors as important to a sound Health Information Technology strategy. Likewise, the HCI community too has found healthcare a rich and interesting domain of inquiry. Furthermore, concepts of health, including fitness, nutrition, mental health, aging, assistive technologies, and other considerations of well-being have long been core to research and industry projects related to HCI and interactive systems. Despite this cross- and interdisciplinary interest, however, there exists a largely untapped potential to create deeper and more profound connections among the medical, informatics, human-computer interaction, design, medical sociology and medical anthropology communities.

A US National Academies report speaks of a "healthcare IT chasm" (Stead & Lin, 2009); Clayton Christensen (www.claytonchristensen.com) calls delivering effective healthcare one of the world's most vexing problems; Prof. James Reason (international expert on human error) says healthcare is the most productive domain for error and therefore a pressing area for system-level innovation. The now classic *To Err Is Human: Building a Safer Health System* (Institute of Medicine, 2000) suggested that preventable error in hospitals leads to more deaths than car accidents. As a result of increasing awareness, there are many independent initiatives to highlight and promote human factors in healthcare, such as the Clinical Human Factors Group (www.chfg.org). However, few are integrated with a proactive research agenda or have an effective route to improvement. The CHI community can provide this, underpinned by rigorous methodologies.

The Health SIG session follows hard on the heels of a very successful two-day interdisciplinary research conference, WISH — *Workshop on Interactive Systems in Healthcare* (chi2010.org/wish) — co-located with the ACM CHI 2010 Conference on Human Factors and Computing Systems in Atlanta. With 140 attendees, the two-day WISH workshop – with presentations, posters and panel session - was a first step towards fostering conversation and bridging communities. WISH included specialists in medical informatics, nursing informatics, medical sociology, human-computer interaction and related fields. WISH will continue in 2012, though this time co-located with the American Medical Informatics Association Annual Symposium.

Additionally, new ACM-sponsored conferences have been started: *Pervasive Health* and *International Health Informatics Symposium* (IHI). Although the latter conference includes a wide variety of people from across computer science, medicine, medical informatics, and other related fields, there has been significant representation from specifically CHI-related researchers both in terms of submissions and in the composition of the program committee.

These international and interdisciplinary efforts demonstrate the substantial and timely interest in interactive systems for health from within the CHI community.

Topics to be Covered by the SIG
- Appropriate research methods and standards.
- Record-keeping and decision-support for caregivers and professional providers, in particular IT systems (EMR, EPR, CPOE, etc.).
- New therapeutic uses of mobile, collaborative, intelligent, and ubiquitous computing systems.
- Use of collaborative technologies by individuals with chronic or acute illnesses and their social

networks and professional providers.

- Best practices for working with medical professionals and patients.
- Gaining entry into a variety of healthcare settings.
- Technologies to support chronic illness, particularly outside clinical settings.
- Patient empowerment, personal health records, and medical information seeking.
- Writing for both HCI and Health audiences/venues.
- Design and evaluation of interactive med. devices.
- Telemedicine and Web 2.0 patient support systems.

CHI Projects and Career Paths in Health & HCI

Exploring the diverse backgrounds and projects of just the organizers of this SIG provides examples of the many directions a CHI researcher can take in studying and developing interactive systems for health. What follows is a brief description of some of the projects on which the organizers work.

Mentis is a researcher in the Socio-Digital Systems group at Microsoft Research Cambridge. Her work in the health domain has focused on the collaborative issues surrounding health information documentation. Previously this involved the investigation of the expression and documentation of emotion between healthcare providers in an emergency room (Mentis et al., 2010). Currently, she is investigating the use of multi-user touchless interaction in the discussions around medical imagery by surgical teams.

Thimbleby is a computer scientist and HCI expert, particularly researching principles for the design of effective and dependable interactive devices, such as infusion pumps. He is Director of the Future Interaction Technology Laboratory, FIT Lab, at Swansea University.

He is on the board of Informing Healthcare, the national Welsh Health IT program. He is a co-investigator on the large multi-disciplinary UK CHI+MED project (http://www.chi-med.ac.uk). Thimbleby has written widely on healthcare and HCI, e.g., (Thimbleby, 2010). His co-authored paper (Thimbleby & Cairns, 2010) shows how to halve "out by ten" drug dose errors by redesigning user interfaces.

Kientz is an Assistant Professor at the University of Washington, where she is director of the Computing for Healthy Living & Learning (CHiLL) Lab. She has conducted a wide variety of research in HIT, including developing design guidelines and applications for preventive healthcare. In particular, she has implemented and evaluated novel technologies to support parents of young children in tracking developmental progress and helping diagnose and treat sleep disorders. Kientz's team has designed and evaluated a number of systems, including Baby Steps (Kientz et al., 2009) and KidCam for new parents, and BuddyClock (Kim et al., 2008) and ShutEye for people with sleep disorders.

Hayes, co-chair of the CHI 2011 Health community, has focused her research for the last decade on issues related to the design, development, and use of technologies for recording and data analysis. She has conducted numerous research projects focused on the design and development of ubiquitous capture and access tools (Truong & Hayes, 2009) as well as on perceptions and understandings of these surveillance and recording technologies in healthcare (Hayes & Abowd, 2006; Hayes et al., 2008). One specific example of this approach is the FitBaby project, which focuses on the design, development, and evaluation of

mobile and collaborative technologies to support caregivers of premature infants in communicating with their social networks and professional caregivers (Liu et al., 2010).

Reddy, co-chair of the CHI 2011 Health Community, is an expert in qualitative research methods and with issues related to collaboration in healthcare. He has conducted a number of research projects examining collaborative information behavior in multidisciplinary patient care teams (Reddy & Spence, 2008), adoption and use of Health IT in collaborative environments (Reddy et al., 2006), and challenges to collaboration and coordination in hospitals (Reddy et al., 2009).

Conclusions

Increasingly, the CHI community is recognizing the importance of the health area. The substantial research efforts over the history of the CHI conference, various related workshops and most recently the creation of a Health Community at CHI all demonstrate the need for discussion during a dedicated session that a SIG will provide.

Acknowledgements

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Supplemental Material

Description of SIG Community

The attendees most interested in this SIG will be those already actively involved in the CHI Health community. Also, researchers who conduct research in the healthcare domain, such as medical informatics and wellness technologies. This SIG would interest them as it would provide a forum for them to address the common issues that they are facing in their individual research. It would potentially spur further collaborative research between parties with common research interests.

We also intend to reach out to those who are not actively engaged in healthcare at this time. We would include those that are interested in beginning research in a health environment but are unsure or unknowledgeable about how to start or the challenges that await them.

Assumed attendee background

Attendees will come from a variety of backgrounds, such as computer science, medicine, medical informatics, and related fields. Some attendees will be conducting ethnographies of hospital wards whereas others will be engaged in the development of wellness technologies. Thus, the particular research interests of the attendees will be very diverse; however, all of the attendees will be interested in common problems, such as where to get funding, where to publish, and how to gain access to hospitals and patient groups.

Approach for organization and presentation

The goals of the Health SIG at CHI are consistent with those articulated in ACM SIGCHI policies and descriptions and those recognized by various healthcare agencies around the world. They are to:

1. Bring together groups of active scientists from a variety of disciplines all focused on issues of human-computer interaction and health;
2. Guide the work of new researchers by having world experts provide them advice;
3. Provide encouragement and support for engagement in research in interactive systems for health;
4. Make it possible and rewarding for promising new entrants to the field, many of whom may be highly respected professionals in other fields but relatively new to HCI, to productively attend the CHI conference;
5. Illustrate the interrelationship and diversity of HCI research, in particular, as it related to HIT;
6. Make interdisciplinary researchers' experiences at the CHI conference enjoyable and rewarding, encouraging them to return and submit quality papers, panels, demonstrations, posters, etc. to the broader conference.

Thus, we will use a closed fishbowl format in order to encourage participation and discussion with the large group that we are expecting. With this format, four chairs are arranged in the front of the room. Initially, four SIG organizers will be sitting in these chairs and

will choose a topic to discuss for five minutes from the discussion list presented in the SIG abstract or as suggested by the audience. The fifth SIG organizer will facilitate and summarize at the end of the session.

For each topic, when time runs out, then at least one discussant steps down and new volunteers from the audience step up to be in the fishbowl. They can choose as a group to continue the topic for five more minutes or choose another topic from the list. If a topic is discussed for ten minutes, groups must pick another topic for discussion.

Informal schedule

The 90 minutes provided in the session will be used as follows: **15** mins – introduction, reason for SIG, presentation of format of discussion, topics up for discussion, request for additional topics. **60** mins – Fishbowl Discussion (6-12 topics discussed). **15** mins – Reflection on themes and issues raised and thoughts on priorities and actions, including building a web 2.0 forum, for the SIG community.

Primary Contact

Helena Mentis
hementis@microsoft.com