

Opportunities and Challenges of Emerging Human-Al Interactions to Support Healthcare in the Global South

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ABSTRACT

Advances in AI and emerging technologies offer opportunities to deliver societal benefits in low- and middle-income countries (LMICs) that would contribute to achieve the United Nations Sustainable Development Goals. AI systems in healthcare may contribute to develop assistive technologies, bridging the digital divide, improving the quality of life, and developing more personalised and precise medicine. Given the imbalanced research on emerging healthcare technologies across Global North and Global South, there is a strong imperative to develop a larger corpus of understanding of humancentred AI design practices in healthcare and the particularities of the region. This understanding is crucial for the successful adoption of innovative solutions offered by emerging technologies in LMICs. In this workshop, we aim to engage in a thorough discussion with researchers and practitioners about barriers of development, adoption, interaction and envisioned benefits of developing collaborative technologies to support the healthcare context in the Latin-American and Caribbean region. In this workshop We want to unpack the sociotechnical challenges of AI systems in healthcare and good practices would be critical for human-AI collaboration.

CCS CONCEPTS

Human-centered computing → Computer supported cooperative work; Collaborative interaction; Interaction paradigms;
Computing methodologies → Artificial intelligence.

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KEYWORDS

Latin America, Global South, Healthcare, Human-centred AI, human-AI interaction, human-AI collaboration, emerging technologies

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1 BACKGROUND

The burden on the healthcare system is increasing globally, and emerging technologies such as AI will provide opportunities to drive innovation and deliver societal benefits [11]. In low- and middle-income countries (LMICs), the long-term benefits of appropriate adoption of AI-driven systems can help countries achieve the United Nations Sustainable Development Goals [10, 11]. An interdisciplinary approach that considers human-centred AI design may help prevent underperformance in the integration of systems [12]. Therefore, attention to the challenges and opportunities of collaboration with AI systems is fundamental in the Global South¹.

Progress in the fields of visual computing, natural language processing, robotics, virtual and augmented reality offer new opportunities to develop assistive technologies in the healthcare context [1, 10], contributing to bridging the digital divide (e.g., between urban and rural areas), improving the quality of life through effective health systems, transforming healthcare provision by more personalised, predictive, participatory, precise and preventive medicine enabled by intelligent and autonomous systems [2, 10].

Researchers in CSCW, HCI, and Digital Health have made significant contributions, providing a thorough understanding of how

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¹Global South comprises Africa, Latin America and the Caribbean, Asia (excluding Israel, Japan, South Korea), and Oceania (excluding Australia and New Zealand)

technological artifacts embedded in the medical domain can support collaborative practices in healthcare [6]. There is a particular focus on Human-AI collaboration to understand partnerships and interactions between AI systems and humans in various broad domains beyond technical capabilities [3, 8, 9, 15, 16]. Human-AI collaboration can potentially help with a wide range of tasks, including risk prediction, resource allocation, information sharing, collaborative decision-making support for human stakeholders, and optimisation of the use of scarce resources through decision-making [9].

The potential of emerging technologies is promising, but they also bring a number of uncertainties related to unexpected and unwanted uses and outcomes [7, 18]. Much of these uncertainties and unanticipated consequences arise from complexities of the sociotechnical contexts of healthcare systems in which new technologies are deployed and adopted. While CSCW has long acknowledged and articulated these sociotechnical challenges of integrating technology into collaborative healthcare systems, much of its research has focused on high income countries and the perspectives of the Global North. There is a strong imperative to extend this research to consider the unique challenges of emerging technology design and use in other sociotechnical contexts of healthcare such as low- and middle-income countries or the Global South where there are unique public health concerns, healthcare systems and practices more scarce healthcare resource [10, 11, 22].

For example, Okolo et al. investigated how low-resource communities, particularly community health workers (CHWs) in rural India, perceived the integration of AI. They found several obstacles to overcome, including dealing with mistakes and misdiagnoses, data access and surveillance, security, privacy, and a lack of laws and regulations that protect people from the risks or consequences of AI [13]. Similarly, a survey conducted with experts on AI for social good (AI4SG) in the global south revealed that explainable AI (XAI) - which is a critical element to ensure accountability, transparency, and adoption of AI systems - is difficult to incorporate due to the different levels of data and AI literacy [14]. Results from the implementation of an AI system for resource allocation in a maternal health programme in India, highlighted the need for a thorough understanding of context before integrating AI, pointing out the success metrics that would apply to AI interventions and providing guidance on how to do so while taking sociocultural contexts into account [9]. Research conducted in Latin America that applies AI for precision medicine in oncology has revealed similar obstacles, including fragmented data capture, a lack of access to structured datasets integrating phenomics and genomics, lack of healthcare providers AI-qualified, different levels of AI literacy, regulations, infrastructure and internet, as well as data digitalization, inadequate data collection and utilisation practices [5, 21].

In Latin America, where the public health care model is widely used, there is currently a much smaller body of research dedicated to such sociotechnical understanding of emerging technology design and use. Thus, contextualizing the potential use of this technologies in this model is important for these countries. Costa Rica (host of this year's CSCW) has used a social public health model that reaches most of its population. Among the successful strategies that have been presented are oral health at a preventive level, and access to any medicines and treatments regardless of the disease and cost. A direct consequence of its public health model is its citizens'

considerably high life expectancy [17]. Nonetheless, there are also challenges such as recent years-long waiting lists and incidents of lack of empathy by personnel during prenatal and childbirth care. In Chile, the health care model is mixed, with national health insurance and private companies, where people pay for an insurance package according to their economic conditions. One of Chile's challenges concerning public health is equal access to health services, regardless of the economic factor. In Ecuador, hospital workers revealed challenges in the health information infrastructure, including fragmented systems and lack of interoperability between the Electronic Medical Records (EMR) and the billing system. This forces patients to repeat information and makes care coordination difficult since EMRs are not shared between hospitals. Additionally, language barriers with the Quechua-speaking indigenous population complicate communication. Digital health could improve interpretation and offer inclusive health messages, considering sociocultural factors, to improve understanding and accessibility of health services [4]. Therefore, public health is a relevant element to improve the quality of life in Latin American countries and where the use of collaborative technologies can provide support to the challenges that arise in each country. A roadmap for action on AI in Latin America identifies challenges and obstacles that widen the AI gap in the region. Countries such as Argentina, Brazil, Chile, Colombia, Mexico, Perú and Uruguay have developed their national strategies for AI [12, 19], but there still lacks a component to identify the multiple socio-technical challenges and human-AI collaboration factors that would be key to understanding how to align these technologies with the collaborative ecosystems of clinical practices [8].

Given these imbalances in research on emerging healthcare technologies across high and low income countries and across Global North and Global South [10, 11, 13], there is a strong imperative to develop a larger corpus of understanding of human-centred AI design practices in healthcare and the particularities of the region. This understanding is crucial for the successful adoption of innovative solutions offered in LMICs [20]. Hence, we aim to engage in a thorough discussion with researchers and practitioners about the requirements, potential approaches, and envisioned benefits of developing collaborative emerging technologies to support the healthcare context in the Latin-American and Caribbean region. We want to unpack the sociotechnical challenges of emerging technologies in healthcare and what collaborative and good practices would be critical for human-AI collaboration.

2 WORKSHOP GOALS

The aim is to bring together researchers and practitioners from disciplines such as interaction design, human factors, computer science, art, digital health, science and technology studies, CSCW, and HCI to foster a discussion about human-AI collaboration in healthcare, sociotechnical challenges emerged from existing designs and studies in the region, and explore how socio-economic issues might impact emerging technologies development and adoption. We will invite contributions, but not limited, to:

- Emerging technologies in healthcare and barriers of development, adoption, and interaction.
- Lessons and challenges arising from the design and adoption of AI and data driven healthcare practices in LMICs.

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- Human-AI collaboration practices in healthcare
- Empirical research on the study of AI for healthcare in relation to contexts such robot interaction, maternal health, precision medicine and precision oncology, dental health, and waiting lists for healthcare attention
- Methods and approaches for studying the use of Humancentred AI for healthcare
- Ethical challenges and regulations of integrating AI in healthcare
- Opportunities to learn from good practices in public health useful to integrate on AI adoption in healthcare

2.1 Pre-workshop Plans

The call for participation will be distributed through academic mailing lists and existing networks. We will actively invite for submissions (via personal contacts and targeted invitations) from a broad range of researchers and practitioners whose work relates to the topic or who can make a significant contribution to the workshop.

2.2 Workshop Structure

We propose the following activities:

Introductions and welcome: We will start with an ice breaker followed by brief presentations from participants. Participants will be asked to share what they are bringing to the workshop as well as what they hope to take away from the day. This opening session will be designed to be fast-paced, with participants asked to write on sticky notes topics, questions, and ideas throughout the presentation and discussions for later ideation activities.

Themes sorting: We will use the sticky notes to engage in a playful affinity diagramming-esque session, focusing on identifying the core areas within the presented topics. It will allow us to situate and explore directions based upon participants' areas of work. During the exercise we will encourage participants to form groups to support later activities. The size of groups will be constrained to 4 or so attendees, preferably including one workshop organiser.

Interactive Co-design session: Groups will be asked to co-create a scenario that unpacks design and benefits emerging technologies in a healthcare and the human-AI collaboration (or disadvantages of a poorly designed human-AI collaboration). Groups will be free on what or how to design their scenarios, and will be provided with a minimal set of materials (e.g. paper, pens, and other basic stationary). For example, groups could choose to take a provocative approach to highlight ways in which the emerging technologies in healthcare might cause problems if poorly designed, or they might choose an interactive approach whereby the audience could be involved. We will encourage to include ideas from their own work. Discussion-Groups: Groups will present their ideas during a plenary, with a discussion structured around the topics, issues, and ideas of each group. The goal is to provocatively identify new and challenging sociotechnical issues. It could include ideas around ethical challenges, opportunities, challenges and economic factors.

2.3 Post-workshop Plans

The results of the workshop will be summarized and published on the workshop's website. Depending on the maturity of the submissions and the outcome of the workshop, we aim to put together CSCW Companion '24, November 9-13, 2024, San Jose, Costa Rica

Morning Session	
9:00	Coffee and preparation
9:30	Introduction and welcome
10:00	Lightning talks
10:45	Coffee break
11:00	Lightning talks
12:00	Lunch Break
Afternoon Session	
14:00	Interactive co-design session
15:15	Coffee break
15:30	Discussion - Groups
16:45	Closing

Table 1: Activities will distributed according to this schedule

a special journal issue with an appropriate publisher to promote this research area. We aim to foster a community that collaborates on preparing an article for ACM Interactions discussing the present state of emerging technologies for public health in the region. Participants will be also invited to collaborate on any of these initiatives.

3 CALL FOR PARTICIPATION

This one-day workshop brings together researchers to explore collaborative aspects, interactional, ethical, and practical challenges of emerging technologies for public health with a focus on human-AI collaboration to identify good practices, lessons learned, under explored domains, and exchange insights on new approaches for developing Human-centred AI for healthcare in Latam and the Caribbean (LAC). We seek to open a dialogue with a futuristic vision about directions and challenges of emerging technologies in healthcare and barriers of development, adoption and interaction. Interested participants should submit a 3–6 page position paper in the ACM Extended Abstracts format (incl. references) describing their ongoing work related to the workshop including, but not limited to:

- Human-AI collaboration practices in healthcare.
- Lessons and challenges arising from the design and adoption of AI and data driven healthcare practices in LMICs.
- Empirical research on the study of AI for healthcare in relation to contexts such robot interaction, maternal health, precision medicine and precision oncology, dental health, and waiting lists for healthcare attention.
- Methods and approaches for studying the use of Humancentred AI for healthcare.
- Ethical challenges and regulations of emerging technologies for healthcare.
- Opportunities to learn from good practices in public health to integrate on AI adoption including a broad scope of design, prototype emerging technologies (e.g., robots and embedded systems, agents and others).

We will select papers based on: a) relevance to the workshop, b) quality of the submission, and c) the diversity of the participants. We would like to welcome 15-20 participants (excluding the organisers) to ensure effective and focused discussion during the sessions. Upon acceptance, we will encourage participants to record a short 3-5 minute video presenting their submission, which will be available to watch before the workshop. At least one author must attend the workshop and all participants must register for the workshop and at least one day of the conference. Workshop details will be available

4 ORGANISERS

Carolina Fuentes is assistant professor at the School of Computer Science and Informatics at Cardiff University. Her research focused on HCI, human-centred AI and the socio-technical challenges of emerging technologies. She is part of the Interdisciplinary Precision Oncology Hub at Cardiff University and the Centre for Artificial Intelligence, Robotics and Human-Machine Systems.

at https://sites.google.com/view/emerging-tech-health-lac/

Iyubanit Rodriguez is an associate professor at the University of Costa Rica in the Business Informatics program. Her research focuses on HCI, User Experience, Healthcare and Gender in STEM programs and in technologies to improve people's quality of life.

Gabriela Cajamarca is assistant professor at the Universidad Yachay Tech in Ecuador, her research is at the intersection of Human-Computer Interaction, and Ubiquitous Computing, with special interest in the fields of Health and Wellness. She is part of the Data Science and Analytics research group, and is also a mentor for IEEE Women in Engineering at Yachay Tech University.

Laura Cabrera Quiros is an associate professor at the Costa Rican Institute of Technology, working in the Electronics Engineering department. Her research focuses on the use of machine learning and non-invasive technologies (e.g. wearable and embedded devices, cameras and other sensors) for social signal processing and affective computing applications. She has been area chair or part of the organization of conferences such as ACM ICMI and ACM Multimedia.

Andrés Lucero is associate professor of interaction design at Aalto University in Finland. His research interests include HCI, design, and play. He has co-organised workshops at CSCW and DIS, as well as co-edited follow-up special issues from those workshops.

Valeria Herskovic is an associate professor at the Department of Computer Science, Pontificia Universidad Católica de Chile. Her research is the areas of HCI and health informatics, focused on older people and people with low digital skills in Chile. She also coorganizes the local women in computing conference, Chilewic.

Kenton O'Hara is a Professor of Human-Computer Interaction at the University of Bristol. His research adopts a sociotechnical perspective on Human-AI interaction in the context of collaborative work practices, with a particular interest in Healthcare. He has co-organised several successful workshops at CHI and served as Workshops Chair at CSCW and OzCHI conferences.

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