Affective interaction and affective computing - past, present and future

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HCI researchers recognize affect and emotion as fundamental parts of human experience however conceptualizing emotions as ineffable, embodied, situated, or culturally bound does not fit within some of the dominant paradigm of Affective computing and emotion AI research focused mostly on recognition and classification of basic emotions. An alternative term, *Affective Interaction*, has emerged to bring together a growing body of research which treats emotion and affect within HCI in similar ways. This workshop brings the research community together to examine various perspectives on affect, and specifically contrast Affective Interaction with Affective Computing. The aim is to discuss opportunities and limitations associated with each perspective, reconcile with advances in the science of emotion, and to speculate on future research directions. We believe that bringing together HCI researchers around Affective Interaction is vitally important because the broad reach of Affective Computing techniques may be obscuring advances in emotion research that show evidence that emotion defies easy categories and is culturally situated.

CCS Concepts: • **Do Not Use This Code → Generate the Correct Terms for Your Paper**; *Generate the Correct Terms for Your Paper*; Generate the Correct Terms for Your Paper; Generate the Correct Terms for Your Paper.

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1 MOTIVATION

Affective Computing [35] was introduced amid a growing academic interest in emotion. Human-computer interaction (HCI) researchers in this space have focused on Electromyography (EMG) to measure emotional facial expressions (e.g., Hazlett [20]) or use computer vision techniques to classify facial markers based on Ekman's [14] discrete emotions. Such classifiers have grown in popularity, and today are offered as services from research technique companies such as iMotions [25], and large multinational corporations such as Microsoft Azure [44]. With the introduction of AI, there is an ever growing interest in integrating the knowledge of emotion and affect into technology systems.

Alongside these trends, other paradigms emerged to offer alternative understanding of emotions. Isbister, Höök and colleagues [26] developed amorphously shaped objects to use in co-constructing emotional understanding during gameplay, while Sas and colleagues developed body-centric tools for sensory design [18] or emotional communication [41]. Boehner et al. [6] designed an image filter system where affect was understood as culturally and socially mediated and situated, while Höök and colleagues employed affective loop and embodiment [23] for novel interfaces leveraging ambiguity to support emotional awareness and reflection.

Harrison, Sengers and Tatar [19] might situate these articles within the Third Paradigm of HCI, and we largely agree, however we also point to convergent concepts of emotion through typical scientific methods by psychologists and neuroscientists, including Feldman-Barrett [3]. Following two decades of research, Feldman-Barrett asserted that there exists a range or group of affective experiences with observable properties rather than distinct "natural-kind" emotions [3]. Based on past experiences within the social context that shapes our development, we make meaning of *felt emotions*. Socialization, language, culture, spiritual, and faith-based practices [32], as well as contextual factors become core to our emotional responses and how we interpret situations. Importantly, Feldman-Barret suggests that assumptions about universality of emotions do not have valid empirical support. The HCI and computer science fields have been lagging behind in terms of acknowledging the new science of emotions and affect. The consequences are serious as claims to predict or identify emotions can have serious socio-technical and political consequences in areas of application such as healthcare, surveillance, AI and more, as well as ethical ones for both wellbeing and mental health [40].

We argue that HCI is implicated in these trends because of the widespread adoption of Affective Computing techniques, and a growing industry surrounding them. We also argue that the dominance of Affective Computing views can be limiting HCI. As Feldman-Barret reframed [3] Ekman's seminal work [14] to draw attention to the importance of labeling in emotion socialization, we aim to hold space for reframing of Affective Computing to understand the challenges and opportunities for Affective Interaction.

1.1 Background and Significance

In a 2021 interview [8], psychologist professor Lisa Feldman-Barret summarized their cumulative research on affect [3–5] and discussed misconceptions about a universal model of emotions and outlined decades of scientific research to establish that the so called basic emotions cannot be scientifically distinguished, or automatically captured using AI algorithms and technologies such as biosensors. The idea that we should be able to distinguish discrete basic emotions (such as anger, contempt, disgust, enjoyment, fear, sadness, surprise) was popularized in the 1990s by American Psychologist Paul Ekman [14]. His interest in non-verbal communication followed by field work in Papua New Guinea laid the foundation to the universal theory of emotions. The theory advocated for universality of micro expressions (such as facial expressions) hypothesizing that emotion variability can be observed and assessed. This in turn led to a range of

technologies being explored in computer science and HCI with the aim to capture, label, predict, or model basic human emotions [10, 43], laying the foundation for growing research in AI and commercial applications in health, education, and surveillance technology. Feldman-Barret [8] challenged this view and offered a theory of emotions which argues for situating emotion categories (rather than discrete states) in social, cultural, and language contexts. Feldman-Barret carefully described [8] that Paul Ekman's observation of emotion expressions and behavior was important, but perhaps for different reasons that most are led to believe. Feldman-Barret suggested that rather than proving universality of emotional expressions, Ekman had in fact theorized the value of labeling, locating, and communicating affective states which can be useful for socializing emotion learning, everyday activities and behavior, education and more, but not in a universal way.

The HCI trends emerging from different perspectives on emotion and affect are varied, but examining the contrasts between *Affective Computing* [35] and *Affective Interaction* [30] can provide a starting point. The former recognizes emotions as objectively identifiable, while the second advocates for grounding categories of emotions in their social context. This is not to suggest a strict dichotomy in HCI applications as we value a range of closely aligned perspectives with the above. We also position our workshop within the growing body of HCI-AI work including for instance emerging HCI work on AI for mental health [2, 42, 46]. Understanding these trends can guide our position along a spectrum of affective research in HCI in order to better explore, assess, and design for affect. In this workshop, we explore these perspectives, their tensions, the advances in the past twenty years of affect and emotion research in HCI, in order to discuss and reflect on the future directions for this field.

1.2 Proposed Topics for Discussion

Workshop discussions will focus on conceptual foundations and theory of, or related to both Affective Computing, and Affective Interaction, methods for discussing and understanding implications and ethics of each, trans-disciplinary collaborations, case studies and technology critique, future directions and issues arising from various approaches to affect in AI. We propose to collectively pursue an understanding of Affective Interaction and ask questions that can form and inform a future research road map in HCI across a range of domains such as healthcare, work, education, and more. We plan to bring together a substantial group of researchers to discuss their perspectives, and reflect on a wide range of technology research and design exemplars. We hope to contribute to shaping a strong articulation of past and future HCI research that acknowledges affect and emotions as complex, embodied, socially and culturally-situated. To achieve these goals, we will scaffold critical engagement and reflection on the following six challenges.

Challenge 1: The science of affect. We seek to shed light on conceptual foundations of affect in Affective Interaction and Affective Computing by drawing contrasts between them, as well as well potential for leveraging their complementary foci. We want to "name" an alternative approach to Affective Computing, so that the next generation of scholars can see that perspective as a choice. Rather than treating affect as discrete data to collect and generate, we view Affective Interaction as dynamic narratives of human experiences, that are holistic (body, mind) and dynamically shaped rather than discretely labeled. Affective Interaction urges HCI practitioners to prioritize situated interpretation of affect rather than reducing affect to categories that can be induced and measured. As a consequence, this view will also change how we recognize and act upon potential relevant topics such as affective benefit, goals, values, and harm.

Challenge 2: Affective need, harm and wellbeing. The area of mental health and wellbeing in HCI is rapidly growing and a variety of systems for the self-management of wellbeing are popularized, such as therapeutic components in depression [7]. However, many self-care technologies are still based on behavioral models and do not take into account the affective and emotional aspects of care, for example in coping with chronic diseases [21]. This seems

paradoxical, given that the number of app-based technologies promising personalized services for chronic disease care is increasing [33] and a growing body of research within scientific fields, such as clinical psychology [28], nursing [27], medicine [34] and HCI [29], points to the importance of considering emotional states in order to develop lasting health outcomes. This calls for a continued exploration and measurement of complex affective needs and goals prior to developing affective technologies. Further, failure to do so in design may result in failure to identify and anticipate affective harm such as distress and trauma caused by technologies. Recent trends in trauma-informed design have begun to address these issues [1].

Challenge 3: Affective value. There have been philosophical arguments that values and affect are deeply interlinked because "value contraventions can and do elicit negative emotional responses, and that this is appropriate" [17]. However, this perspective has been under-explored in both Affective Computing and Affective Interaction. If we define a value as a belief about what is good or bad, or how people should act [31], then violation of this belief should engender negative experiences underlined by frustration, anger or sorrow. Deonna and Teroni [13] linked affect with values and argued our experiences of affect solidify our understanding of what our own values are. Recent evidence has emerged demonstrating that values about environmental concerns can predict emotional intensity [11] as well as the type or quality of experienced emotions [12]. In 2023, Conte et al [11] further showed that cognitive appraisal mediates the effect of values on emotional experience, paving the way for new theories about the link between values and emotions. This emerging evidence is consistent with Feldman-Barret's fundamental insight that emotions seem to have a distributed physiological pattern, unique to individuals and informed by various environmental and contextual factors. If emotions are deeply linked to our sense of values, then our unique belief systems would offer an expansive basis for exploring and understanding emotional responses.

Challenge 4: Emotion evaluation and emotion tracking. Widely accepted views on core affect and basic emotions are seen within a number of popular HCI practices. For example, User Experience (UX) researchers use core affect for emotional assessment with tools such as the Self-Assessment Manikin (SAM) [9] and the PANAS scale [45]. Basic emotion representations are included as design features in many personal technologies such as emotion and mood tracking apps. And finally, Affective Computing which widely influenced the field is based on what Feldman-Barrett describes as natural-kind view of emotions; the assumption that core affect can be measured through coordinated changes in sensory, physiological, motor and perceptual functions [4], and elicited the same as basic emotions (e.g. anger, happiness). We agree with Feldman-Barrett that the natural view of emotions has provided useful boundaries for scientific studies of emotions, allowing scientists to ask major questions and design formative experiments. Similarly, the 'natural-kinds' view has provided a grounding of HCI research and innovations in the past two decades. However, the new perspectives on emotions challenge many of these trends. How can HCI designers create an emotion tracking app if there is no one emotion that we can label? Affective Interaction helps researchers shift their perspective [39],: rather than building systems that label emotions how can we instead build systems that help people make meaning of their emotional experiences?

Challenge 5: Emotion AI and data. The evolving science of emotion and affect has implications for AI technologies and generative platforms that center these concepts, claiming emotion detection based on data sources [36] and promising experience personalization and enhanced communication in key domains such as work, healthcare, education, creativity, accessibility or security. These claims have serious sociotechnical and ethical implications such as privacy violations due to persuasive data harvesting demands, surveillance or emotional labor [37]. Further, emotion AI systems [47] with applications such as mental health, rely on emotion labeling, sentiment analysis and detection of human emotion with high degree of confidence. Nuances in context, culture of emotion expression, language, neurodiversity, to name a few,

challenge this confidence and therefore create an urgency for HCI research to reconcile with advances in the science of emotion.

Challenge 6: Affect, embodiment and the more-than human. We want to bring together the collective of researchers who integrate the Affective Interaction approach in their research, where technologies support a more diverse and embodied spectrum of affective experience. Affective Interaction is situated within a largely phenomenological understanding of embodiment and bodies. In 4th Wave HCI approaches such as Entanglement HCI [15] there has been a general turn towards expanding and enriching our understanding of bodies as diverse, multifarious and more-than human [22]. Early foundational work within Affective Interaction [23] has led to a more direct engagement with the human body and soma [24]. In addition, within affect theory and philosophy there has been a rekindling of Spinoza's work on bodies as never only human (e.g. Fritsch [16] and Ryding et al. [38]). It seems that an affective approach might simultaneously lead to an expanded exploration of the human body, and its potential to open up to the non- and more-than human. The challenge, however, is how this dual nature of affect might be instrumentalized within HCI and design.

2 WORKSHOP ORGANIZERS

Naseem Ahmadpour is a researcher in the field of HCI. She is the associate dean of research at the school of Architecture, Design and Planning and leads Affective Interactions lab at the University of Sydney. Her research examines affective experiences and harms of sociotechnical systems such as Virtual Reality (VR) technology that increasingly shape the future of care and work. Her recent work questions the prevalence of datafication in virtual care and proposes better framing of ethical consequences in this space.

Danielle Lottridge is an associate professor in the School of Computer Science at the University of Auckland in New Zealand. Dr Lottridge conducts award-winning research in human-computer interaction that specializes in understanding affective interaction in the realms of creativity, health, and cyber security. Lottridge's research spans XR public installations, experiments, field studies, qualitative and statistical techniques such as factor and clusters analyses to better understand how people use technology and in turn how technology is shaping our minds, our bodies, and our lives.

Jonas Fritsch is an Associate Professor at the Digital Design Department at the IT University of Copenhagen. He is head of the Affective Interaction and Relations (AIR) Lab. His work revolves around a creative and careful thinking of interaction design, design processes, experience philosophy and affect theory through practical design experiments across human and more-than human bodies with interactive sound and physical interfaces.

Corina Sas is Professor in the School of Computing and Communications at Lancaster University, UK. Her HCI expertise is in emotional wellbeing and mental health technologies with a focus on emotional awareness and regulation, as well as their ethical challenges. She has explored a range of technologies from mobile apps and smart materials to biosensors and haptic actuators and how these can be better designed for affective interaction.

Marta E. Cecchinato is a Senior Lecturer in the Department of Computer and Information Science at Northumbria University, working in Human-Computer Interaction (HCI). Her research interests are around productivity and wellbeing in the digital age.

Daniel Harrison is an assistant professor in the School of Design, Arts and Creative Industries at Northumbria University, UK. His work focuses on health, wellbeing, and physical activity. He has researched personal informatics, loneliness, social isolation, and sportsHCI, emphasising inclusive design and considering users' needs and requirements.

Kia Höök is professor in Interaction Design at KTH. Her research interests include affective interaction, somaesthetic design, internet of things and anything that makes life with technology more meaningful, enjoyable, creative and aesthetically appealing.

Pin Sym Foong is Head of Design at the Telehealth Core, an internal digital health consultancy at the National University Health System in Singapore. Her research focuses on the intersection of aging, behavior change and chronic disease, with a recent focus on digital tools for values elicitation in high-stakes, high-subjectivity medical decisions.

Kiran Ijaz is Lecturer at the School of Architecture, Design and Planning, The University of Sydney. Her research explores technological design and development to support human flourishing. She has researched the impact of emerging technologies (XR), AI systems and mobile apps on health, education and users' data privacy.

Phillip Gough is a Senior Lecturer at the School of Architecture, Design and Planning, The University of Sydney and is a member of the Affective Interactions Lab. His research into biodesign investigates how the use of sustainable living materials impacts the user experience with technology, and ways of prototyping and fabricating designs using biomaterials.

Yidan Cao is a researcher and PhD student at at the Affective Interactions lab, School of Architecture, Design and Planning, The University of Sydney. Her research focuses on trauma-informed approaches, exploring how technology can support and enhance trauma-informed reflective practices within the mental health field.

Xuefei Li is a researcher and PhD student at the Affective Interactions lab, School of Architecture, Design, and Planning at the University of Sydney. Through a feminist lens, her research examines how technologies and social media impact experiences of women in flexible information work industry.

Shaimaa Lazem is an Associate Research Professor at the City of Scientific Research and Technological Applications (SRTA-City), Egypt. She is working on developing human-centered approaches to design Natural Language Processing (NLP) applications in Africa with support from Google 2020 Award for Inclusion Research and Google AI 2021 Award.

Thida Sachathep is a researcher and PhD student at at the Affective Interactions lab, School of Architecture, Design, and Planning at the University of Sydney. Her research sits at the intersection of HCI, advocacy and care work and explores various forms of harm, including emotional harm, caused by digital health technologies.

3 PRE-WORKSHOP PLAN

The workshop will be hybrid with an online pre-workshop component for all participants. The pre-workshop session will take place on Zoom during the week before the conference. Participants will be invited to reflect on, and discuss a collection of case studies submitted to the workshop, and conduct a mapping and speculating activity to sensitize different perspectives together. The outcome will remain live on Miro, and revisited on the day of the workshop.

3.1 Website and Plans to Publish Workshop Proceedings

The workshop website will be used as a platform to distribute information such as the call for contribution, workshop agenda, and logistical announcements. A collection of the accepted submissions will be stored on ArXiv with the link made available on the workshop website before the conference. A summary of workshop discussions will be posted on the website, to inform collaborations and discussion after the workshop. [Tentative workshop website: https://sites.google.com/view/affectiveinteraction-chi25?usp=sharing]

4 WORKSHOP MODALITY AND HYBRID FORMAT

The workshop on-site will be hybrid and open to all participants (in-person, online). Following on from the pre-workshop day, the online participants can continue the mapping activity asynchronously, to further engage in discussions of the proposed topics. Workshop activities will be designed for asynchronous interaction, enabling online participants to monitor the Miro board, have discussions online on Zoom if they wish (moderated by one of the workshop organizers), or pop-in at the end of the workshop to join the final discussion. In this way, the online participants will benefit from the discussion without needing to wait for on-site participants to finish their activity.

5 WORKSHOP STRUCTURE AND ACTIVITIES

The workshop will by driven by group discussion of submissions, mapping, synthesis and speculating future approaches on a Miro board. There will be no traditional presentations and instead we will focus on interactive sessions and asynchronous engagement with online participants.

Below is a tentative schedule (subject to change in accordance with CHI 2025 schedule). Participants will be encouraged to submit short case studies from their own practice or research in line with one or more of the proposed workshop challenges. The exact topics of group discussions and workshop activities will depend on the case study submissions. The organizing team will group the submissions thematically and will create the activities accordingly.

(1) (9.00-9.15) Welcome and introduction
(2) (9.15-9.45) Keynote by Danielle Lottridge
(3) (9.45-10.45) Introduction to concepts and mapping activity
(4) (10.45-12.00) Group discussion and speculative activity
(5) (12-13) Lunch
(6) (13-13.45) Presentation of speculative approach
(7) (13.45-14.30) Synthesis and future planning
(8) (14.30-15.30) Closing remarks

6 ACCESSIBILITY

All submissions must comply with CHI accessibility guidelines, which will be linked on the workshop website. We aim to prioritize accessibility in design and distribution of workshop materials used in-person and online. We will prepare guidelines for participants to ensure accessibility of workshop outputs are considered. We will aim to provide adequate support for asynchronous engagement.

7 POST-WORKSHOP PLANS

As part of the workshop, we will facilitate discussions around future collaborations and continued discussions of the proposed topics through distributed and online communities, for example through Slack or other platforms, depending on preferences of workshop participant. The workshop website will serve as a location to publish a workshop summary, make connections and link future events. The workshop Miro board will serve as a live repository of case studies, reflections, mapping and storytelling which can provide input for future events and workshops. A discussion during the workshop will guide decisions about extending collaborations with communities and researchers expertise in affect beyond HCI.

8 CALL FOR PARTICIPATION

This workshop aims to situate the lived experience of affect and affective interaction in a social, technical, embodied, political and cultural context whereby relational interactions occur with artefacts, technologies and systems. Affective interaction is interpretable by people. In contract, Affective Computing which widely influenced the field of HCI is based on the what is described as natural-kind view of emotions; the assumption that core affect can be measured through coordinated changes in sensory, physiological, motor and perceptual functions [4] and induced as the same as basic emotions (e.g. anger, happiness). Workshop submissions should be a 300 word paragraph, or a maximum 2 page position paper reflecting on specific cases of education, research, design, or art to critique affect or contrast Affective Interaction and/or Computing. Topics may include healthcare, digital wellbeing, work, art, algorithmic data and AI, ethics, justice and politics of technology/algorithms, the use of generative AI and more. We expect to host 35-50 participants at this workshop.

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