Designing with, through, and for Human-Nature Interaction

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Abstract

Human-nature interaction, joining the agendas of sustainable interaction design and nonanthropocentric HCI, takes up the challenges presented by climate change and environmental crisis. My dissertation research focuses on studying sustainable farming practices through posthuman concepts to experiment ways of designing with, through, and for human-nature interaction. Specifically, my work aims to discover and develop alternative design paradigms and practices for sustaining both human and non-human life.

Author Keywords

Human-nature interaction; posthuman; decentering humans; sustainable HCI; sustainable agriculture.

CSS Concepts

• Human-centered computing → Interaction design theory, concepts and paradigms

Research Situation

My research focuses on human-nature interaction and sustainable agriculture to attend to the challenges associated with environmental crisis. Specifically, I engage in posthuman theories and investigate through on the ground experimental farming, collaborative food making, decomposition in agriculture, and design to explore ways of working with nature, as opposed to controlling or working against it (figure 1). Building on my on-going ethnographic study on small-scale, sustainable farming practices in Taiwan and Indiana, my works propose decentering the human in design— I combine together posthuman literature, critical qualitative methodologies, and research through design to envision more ethical and responsible ways of engaging in technological interventions. This line of research has led to a series of top-tier ACM conference publications, including CHI2019 [12], TEI2019 [13], DIS2018 [10], and LIMITS2018 [11]. In Summer 2019, I will join the Urban Innovation Initiative at Microsoft

Figure 1: Ethnographic works in small-scale, sustainable farms in Yilan, Taiwan and Indiana, USA.

Research as an intern to build new technologies for sustainable urban environments. Following my previous works, the goal of my dissertation is to develop alternative design paradigms to think about how technology can better connect human with nature.

Context and Motivation

Prior to my doctoral studies, I was a product designer at an international personal computer design firm in Taiwan. Having witnessed truck after truck of hardware and electronic waste being transported to landfills every year, I am committed to forging together a stronger connection between design practices and environmental sustainability. I build on the values and frameworks of sustainable HCI, grounded on my ethnographic work on eco-friendly farming experiments. However, I push for a broader definition of sustainability by bringing to the forefront the moments "when species meet" [4]; I am interested in exploring the possibilities and challenges in decentering the human in interaction design.

To do so, I turn to posthuman theories which consider humans, nonhumans, culture, and nature as intricately entangled and thus challenges the taken-for-granted ontological boundaries [5,6]. My research draws substantially on anthropologist Anna Tsing's theoretical concept, "arts of noticing", to see "the divergent, layered, and conjoined projects that make up worlds" [18:22], to cultivate the ability to acknowledge and simultaneously step in and out of familiar frames of reference [8,12], and to imagine alternative futures by questions about "what is and what can be" [1].

Background and Related Works

Two interaction design research communities emerged with the attempt to address challenges associated with environmental crisis through design: sustainable HCI and nonanthropocentric HCI. Within the corpus of sustainable interaction design, studies on sustainable agriculture are increasing of interest for it offers the opportunities to move from individual persuasive technological design towards addressing the broader socioenvironmental challenges associated with food production, distribution, and consumption [2,14]. More recently, scholars in nonanthropocentric HCI reflect on the limits of human-centric design and argue the need to establish an alternative design agenda to encompass the multispecies worldview [17]; this body of research provides insight into nurturing interspecies cohabitation [16], collaboration [3], and collaborative survival [7,9].

Posthuman concepts are particularly useful in resisting falling into habitual anthropocentric perspectives; as STS scholar Puig de la Bellacasa puts, "they enrich our perception of the complex articulations of agency, decentering individual human agency and considering the social as a tissue of associations between humans, nonhumans, and objects working in the realisation of new relational formations." [15:7]. However, the ability to move from automatic perceptions toward seeing the entanglement between human and nature is not easily cultivated; to Tsing, to "notice differently" requires shifting attention between multiple threads of a relationship [18].

With the interest in designing with, through, and for human-nature interaction, my interest is to translate abstract posthuman concepts into more trackable interaction design theories or actionable design strategies. For example, in [13], my co-authors and I unpack through Haraway's posthuman theory natureculture the process of decomposition. Through a

Figure 2: A series of ceramics experiments using the notion of decomposition to facilitate natureculture co-creation.

series of design curation, analysis, and experiment, we propose "scaffolding" and as an interaction design theory accompanied by its actionable tactics for those who are interesting in natureculture co-creation. In [11,12], we report our 2-year ethnography working alongside with small-scale farmers and how we learn to see weeds and pests as companions. Through embodied understanding of the earth, we reflect on ways of cultivating intimacy with the biosphere with and through technology.

Research Goals and Methods

When human activities render resource exhaustion, species extinction, and other forms of conflicts between humans and the environment, new ways of noticing, responding, and imagining are needed to move toward to preferable futures. As a result, the methods involve in my dissertation research are multifold, including qualitative social science methods (e.g., ethnography, interviewing, observation, and artifact analysis), art-based inquiry methodologies (e.g., research through design and speculative design), and approaches originated from the humanities (e.g., interaction criticism and close reading).

My on-going ethnography focuses on sustainable farming experiments, including eco-friendly farming, small-scale farming, organic farming, and AgTech. Common across these practices is the farmers' commitment to explore and practice the alternatives to industrial agriculture, with a particular focus on reducing the use of pesticides in farming and integrating more harmonious between land, people, environment, and resources. In these alternative farming practices, the farm is not so much a controlled system but an assemblage characterized by multiple

systems or rationalities always evolving and changing. By working alongside with the farmers, I reflect on posthumanist values and learn to "notice differently".

Based on my dissertation research, I am developing "arts of noticing" as appropriate for interaction design research, that is, to think through posthuman lens how technology can better support resilient communal life. In [10], my co-authors and I combine together visual thinking and critical reflection to "see" the theoretical concept of natureculture by capturing through photographs different interfaces of human-nature interaction. In [13], the posthuman concept natureculture is further consolidated through a series of design-based inquiry approaches and materialized using ceramics as a medium (figure 2). Very recently, I experiment embodied knowledge as yet another way of knowing. In reflecting the encounters I have with eco-friendly farmers, animals, plants, and soil [12], I look into nontraditional users (e.g., nonhumans) and emerging forms of uses (e.g., interactions between human and other species) to help open a design space for technological interventions.

Building on my previous ethnographic and design works, I am currently designing a sensory sound box for deployment that tracks different attributes of compost (e.g., temperature, humidity, biometric movement) and translate the digital readings into music compositions. Through this design, I wish to explore a more embodied and aesthetic form of human-nature interaction. The next stage of my dissertation research involves further consolidating posthuman concepts into interaction design theories by creating, deploying, and reflecting on interactive artifacts and farming tools.

Acknowledgements

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