

Reimagining the Goals and Methods of UX for ML/AI

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Abstract

This position paper for the “Designing the User Experience of Machine Learning Systems” symposium challenges UX conventions and proposes new approaches for Machine Learning (ML) and Artificial Intelligence (AI). Through live demos and a presentation, I’ll discuss how designers can reimagine the goals and focus of UX for the unique potentials of ML/AI. Using animistic design as an example, I’ll propose how using simple intelligence, machine learning, and autonomous personalities can allow the designer to shift from crafting task oriented experiences for *users*, to building evolving, diverse, autonomous *ecologies* that support collaborative exploration and creativity for machine and human participants alike.

A new context requires new approaches

Machine Learning (ML) and Artificial Intelligence (AI) based systems are significantly different contexts for design than that of traditional mobile, web, service and product design. ML/AI systems are often non-visual and focused on complex behaviors and extended interactions with multiple people and digital systems, balancing goals through a collaborative approach that is not only focused on task completion.

For example, autonomous cars will simultaneously interact with passengers, pedestrians, cyclists, police officers, and traffic control personnel. These interactions will span time: pre-ride, ride, post-ride, and modes of communication: voice, gesture, facial expressions, tangible interaction. Using its own intentions, the vehicle negotiates the often competing goals and communications of people, while at the same time negotiating with many other autonomous systems such as other vehicles, smart sensors, intelligent light posts, and municipal traffic management systems.

This is a complex and different design context. An *evolving, negotiated, inconsistent, improvised, serendipitous* interaction that does not easily resolve to task accomplishment, efficiency, certainty, ROI, customer expectations, or for that matter, one user’s experience. And this

different complexity is not a problem to be eliminated, but is a necessary and useful outcome. When ML/AI systems are constantly learning, adapting, and renegotiating in a context of other evolving autonomous systems and humans, the design constraints and goals are different from conventional UX. For example, in a future of pervasive autonomous vehicles, the overall success or health of the transit ecosystem may become the highest priority, creating a different emphasis than designers are accustomed to.

Similarly, in AR/VR contexts, multiple ML/AI driven virtual entities will “live” and interact with each other and people inside mixed reality environments. These smart virtual entities will autonomously gather and represent data, assist humans, construct and modify virtual elements, and collaborate with ML/AI systems out in the real world.

Because autonomous virtual entities are unconstrained by the limits of physics, scale, and economy, there is a bigger potential for manifesting their POV, intentions, and “ideas” through action in the virtual or mixed environment. Multiple smart virtual entities can actively collaborate in much more “tangible” ways, working side-by-side with people to create virtual buildings, artwork, products, data-scapes, biological models and so on.

Will conventional approaches to User Experience (UX) work well in contexts like this? What would a journey map look like? How would user interviews work? What would a content strategy be? How would a competitive analysis be useful? Would personas be an effective model for understanding interactions?

How would these methods work when the interactions are complex negotiations between multiple autonomous ML/AI systems, each with different characteristics? Who is the “user,” or is “user” even an appropriate way to understand the problem?

Whether autonomous cars or VR robot collaborators, the ways in which autonomous things behave, interact, communicate, embody a “lived” history, evolve, and thrive will call for new design methods and patterns.

Because of this, the advent of ML/AI requires the reimagining of design conventions. To create systems that successfully use the affordances and constraints of ML/AI

to the fullest, the strategy for design must itself be re-designed. Autonomous cars need ethics, chatbots need personality, smart cities need to open-source themselves, and IoT systems need act out human intentions.

In this context, the concept of Human Centered Design (HCD) starts to break down, and this is an important shift for designers. When digital participants have their own goals, needs, intentions, ethics, moods and methods, an organic, unpredictable and evolving system is created. The human is no longer the center. Instead, the center of design becomes the system and its outcomes. Design moves towards building emergent ecologies.

The different character of these rich ecologies, and the new interactions, methods and patterns they require, offers opportunities to move beyond automation systems that replace humans, and instead allow designers to build new ways to augment human creativity, labor, learning, and collaboration by seeing ML/AI entities as peers that collaborate across common and competing goals.

Reimagining Goals and Methods

I'm not arguing that UX conventions like HCD be abandoned, but instead that they be secondary to newly imagined approaches that fully embrace the potentials of ML/AI.

By challenging symposium participants to take a fresh look at ML/AI and interaction design, my goal is to provoke a discussion that explores a range of new approaches. To move the field forward at this early stage, we have an opportunity to rethink the role of design, break from conventions, and invent new standards.

As part of the presentation, I'm proposing and demoing my Animistic Design approach that highlights some new strategies to address the challenges I've raised. This can help provide an example and strawman for the brainstorming.

Animistic Design

I've been exploring the Animistic Design approach to interaction over the last five years, and it uses the natural tendency of people to perceive inanimate things as being alive. In adults, this perception is understood to be a fiction, yet it remains a powerful metaphor that can open up the black box of "smart" entities.

Animistic Design proposes that smart digital entities adopt distinct personalities that inform their perceived sense of aliveness. And rather than having people work with a single, authoritative system, this approach has people engage with multiple smart systems, where each entity has its own intentions, expertise, moods, goals, data sources and methods. These are not, in my vision, cute

anthropomorphic dolls. Instead, Animistic Design strives for a more "native" digital animism, that embodies (metaphorically at least) the inherent characteristics of computational/mechanical systems.

Heterogeneous Multiplicity

By designing a multiplicity of heterogeneous, autonomous personalities that interact with each other, humans and shared data, an ecology is created. This ecology changes over time as conversations occur, material is introduced, patterns are learned, and relationships are developed.

The goal for the designer then, is to create a rich, serendipitous and diverse milieu in which the independent things and people are conversing, exchanging, competing, provoking, making and collaborating well.

Colleagues Not Slaves

This approach contrasts with the solutionistic, master-slave relationship people seem to have with their devices, where we want our things to accomplish our tasks, and we issue commands. This is, of course, valuable at times. But there is also new potential if people work in a more interactive, conversational and propositional way with smart systems. What if we treated smart systems as idiosyncratic colleagues rather than as slaves?

Humble ML/AI

ML/AI systems have significant limits, and are often not that smart, but are instead what I call "dumb-smart" due to their limited comprehension, narrow skills, and fallibility. This dumb-smartness can be leveraged and turned into an advantage by enabling people to interact simultaneously with multiple systems.

Designing diverse ecologies with a humbler approach to ML/AI allows designers to move away from trying to provide single, correct answers. When there are multiple perspectives, "actually-smart" humans can work out which threads to follow, make new connections and give feedback to their hand-picked, menagerie of risk-taking personalities so they further evolve.

Integrating human intelligence, selectivity, and discrimination into a multiplicitous ML/AI ecology makes ML/AI system less brittle and able to tolerate errors more gracefully. And by embracing risk, unpredictability, and multiple points of view, there is an added benefit of a useful and relevant serendipity.

Transparency

Using Animistic Design, designers can telegraph point-of-view and limitations by giving smart devices appropriate personality behaviors. This can provide a much-needed

transparency to the inner-workings of smart systems. Not a literal transparency, but a *curated, designed, metaphorical* transparency that's an interpretation of (often) inherently inscrutable ML/AI systems.

Distributed Cognition

The theory of Distributed Cognition recognizes that people don't only think inside their brain, but extend their thinking into the environment through the things they interact with. Their external milieu becomes an active thinking and creative medium: tangible, alive and interactive. The mind arises within and through a person's milieu.

By assembling a tangible ecology of embodied animistic devices in a workspace, we allow people to leverage distributed cognition. One idea or concept can live here "in" *this* physical smart object, and another idea is over there "in" *that* smart object.

Through this physical embodiment, people can manipulate ideas in a spatial way, working *with* the ambiguous and diverse character of complex problems instead of *reducing* the complexity. Look at a typical design studio and you'll see the walls covered with different materials that stimulate the creative process. What if those things could have a conversation with you?

Ecology Centered Design

Animistic Design is an alternative to Human Centered Design that proposes an Ecology Centered Design. Additional details on Animistic Design and its theoretical basis can be found in the referenced supporting papers and articles.

Animistic Demo

In my symposium presentation, I'll give a short demo of Colleague, an animistically designed system.

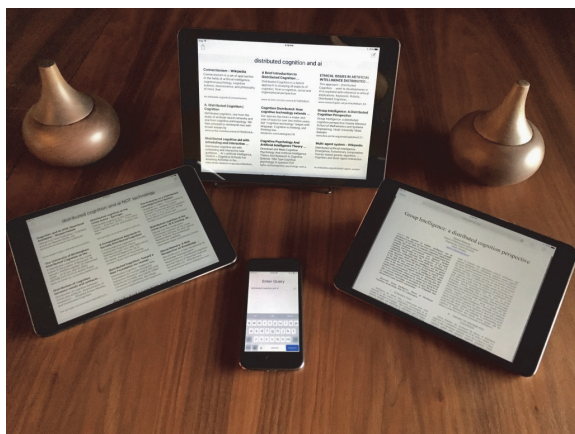


Figure 1 – Three Colleagues and one Wrangler

The "Colleague" system is currently in development, and is composed of three iPads (the Colleagues) and one iPod Touch (the Wrangler). The devices communicate with each other and a shared database of curated content. The Colleagues deliver results in response to prompts from the human via the Wrangler, and occasionally prompts from each other.

Figure 1 shows the four devices together, where each Colleague has responded to a Wrangler query. The Colleague on the right is showing a paper from its search that has been opened by the user selecting a single search result, while the others are showing a grid of results.

In figure 2, we see a screen shot from the Wrangler, where the person has typed in their query.

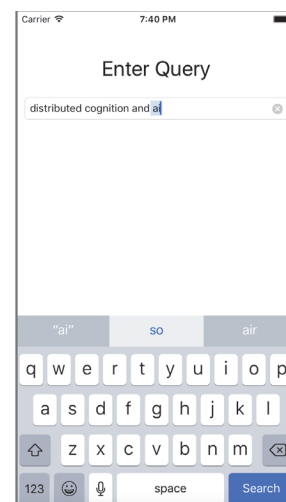


Figure 2 – The Wrangler App

When a query is sent, the Colleague devices respond immediately, each in their own way, to the query.

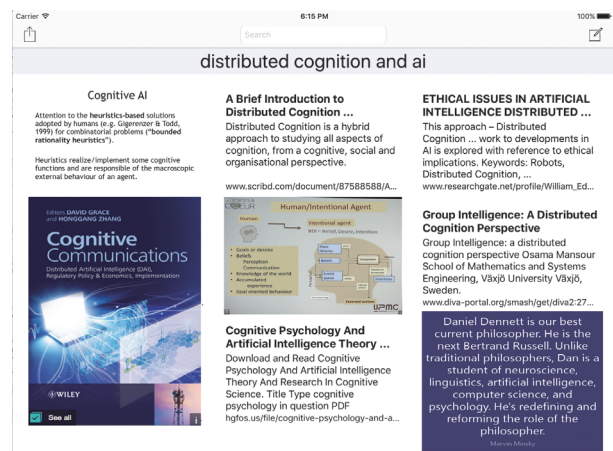


Figure 3 – Colleague 1's search results

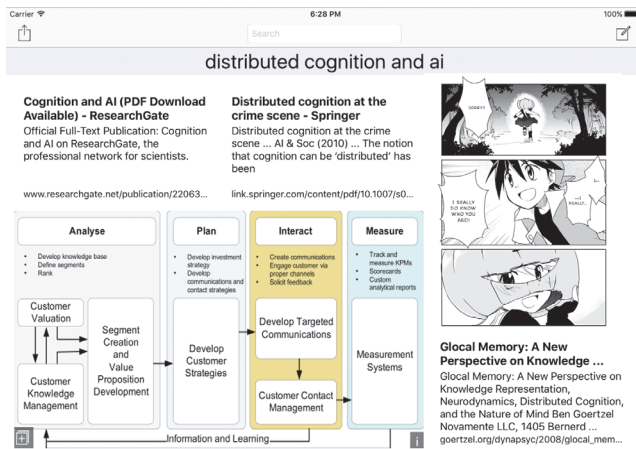


Figure 4 – Colleague 2's search results

Figures 3 and 4 show different websites and images found by different Colleagues searching for “distributed cognition and ai” based on their own personality.

In Figure 5, we see an early version of the personality editor that is part of each Colleague. This interface allows the designer to experiment and configure the way the “colleague” responds.

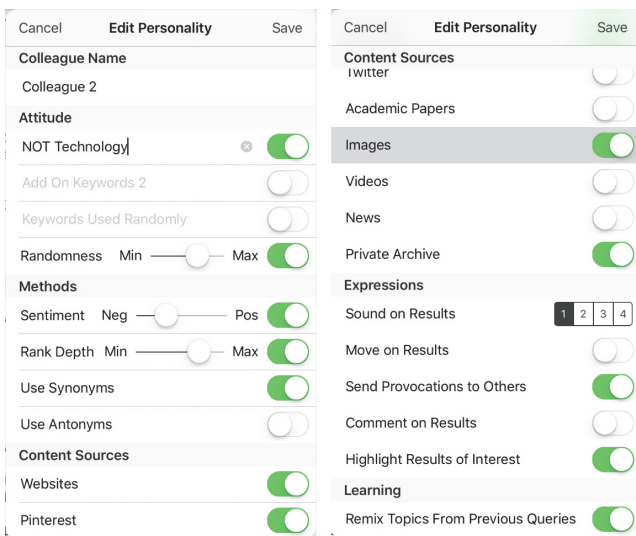


Figure 5 – The personality editor

The editor has several sections focused on different aspects of a digital personality. In the “Attitude” section, the search queries can be configured to have add-on keywords and search logic applied to each search so that they are biased and unique compared to other colleagues. In addition, a collection of keywords can be set so that a random keyword will be randomly added to the query for the search.

In the “Methods” section, the Colleague can be configured to skew the results shown by selecting based on result

sentiment, rank depth, and matches to synonyms or antonyms of topic words found in a query.

The “Content Sources” section configures searches to draw or not on sources such websites, images, academic papers, or social media for results.

In the “Expressions” section the behavior of the Colleague is modified, for example, to make a specific sound or physically move when it has completed a search. In addition, a Colleague can express itself by occasionally sending its own query to other Colleagues, or making critical comments about the results it finds.

The Colleague project will continue to evolve, and a more complete version of the working apps will be shown at the symposium. Progress on the project can be followed here: <https://colleagueai.tumblr.com>

Current Research

As an educator, entrepreneur, researcher and practicing designer, I’ve been involved in interaction design for nearly 30 years. My current research interests are tools for design experimentation in new technologies, and developing Animistic Design and other approaches for ML/AI.

For the past five years, I’ve been experimenting with Animistic Design through a series of projects, prototypes, and writing. This has resulted in talks in the US and Europe, a 2013 CHI paper with Joshua McVeigh-Schultz (“AniThings: animism and heterogeneous multiplicity”), a 2016 journal article with Dr. Betti Marenko in Digital Creativity, the Post-Anthropocentric Creativity Issue (“Animistic design: how to reimagine digital interaction between the human and the nonhuman”), and the first in a series of non-academic articles on Medium (“Rethink IxD”).

In addition, some of my graduate students have created their own projects in response to Animistic Design, for example the recent “Trans-Actor” project by Sche-I Wang, Lee Cody and Xing Lu.

Supporting Papers and Articles

van Allen, P., and McVeigh-Schultz, J. 2013. “AniThings: Animism and Heterogeneous Multiplicity.” CHI 2013, New York, ACM Press. 2247–2256.

Marenko, B., and van Allen, P. “Animistic Design: How to Reimagine Digital Interaction between the Human and the Non-human.” *Digital Creativity* 27, no. 1 (January 2, 2016): 52–70. doi:10.1080/14626268.2016.1145127.

van Allen, P. “Rethink IxD.” *Medium*, May 9, 2016. <https://medium.com/@philvanallen/rethink-ixd-e489b843bfb6#.li2322ker>

Cody, L., Wang, S., and Lu, X. “Trans-Actor” July, 2016. <http://leecody.com/trans-actor-a-ux-for-ai/>