The Editor's Spotlight: TOCHI Issue 24:4

Drenched in Sunshine. Contrary to its well-earned reputation, not so much as a molecule of drizzle has fallen upon the Seattle area in nearly 2 months, a record dry spell.

As such, your friend and humble editor-in-chief may have been in dereliction of his duties, on rare occasions, to enjoy summits and secret hidey-holes here and there in the glorious Cascade Range. Indeed, despite months of warm weather, I recently found myself kicking steps up a steep slope of suncupped snow late in the day, with nary a sign of fellow travelers to be seen.

But alas, even the most dedicated acolytes of TOCHI must take a short break from the dizzying progress of the HCI field every now and again.

A Special Issue: Building the Future? I'm proud to announce the third special issue of my tenure at TOCHI, this one focused on Human Building Interaction (HBI).

This special issue will probe the fascinating intersection of HCI and architecture. Built environments increasingly incorporate interactivity and context-aware automation, raising whole new possibilities for interactive experiences (and the study thereof) with architectural spaces.

Authors should submit abstracts of prospective contributions by December 8th, 2017, and full submissions are due on January 12, 2018, with publication of accepted articles slated for early 2019.

For the complete call and submission details, please visit:

<http://tochi.acm.org/call-for-papers-special-issue-on-human-building-interaction/>.

Publications Board. I also recently attended the ACM Publications Board Meeting, held in downtown Seattle this year, on behalf of TOCHI.

There, I was pleased to reacquaint myself with chairs Joe Konstan, a well-known figure to the HCI community, and Jack Davidson, a systems professor whom I've known since I crossed paths with him in the early 90s at my alma mater, the University of Virginia. I somehow managed to pass his Compilers course in graduate school despite my distinct lack of aptitude for the subject matter. I remember thinking that my 3,000 line parser written in Python was exceedingly clever, until Jack showed the class his 1,000-line program, written old-school style in straight C no less, that accomplished the same task far more elegantly.

At the Publications Board meeting, Jack demonstrated some compelling proof-of-concept work he had spearheaded to allow the ACM Digital Library to host rich systems artifacts such as code and running prototypes. In my view, it would be wonderful if the HCI field could embrace such practices to make interactive demonstrations part of our archival knowledge; all too often the interaction techniques and system prototypes that we build and study are, sadly, obsolete (and lost to history) even before the laser-toner bonds to the papers we submit about them.

It was also wonderful to meet the inimitable Laura Lander, ACM Journals Manager, there. For those of you who don't know her, she is the one-woman army that keeps *all* of ACM's journals running behind the scenes—and there are dozens of them. I have no idea how this remarkable woman manages to do it.

Indeed, as I quipped to Laura shortly after meeting her:

"I'm stunned to discover that there's only one of you!"

This issue of TOCHI, as always, covers a lot of ground, but I was pleased to see that two key contributions in 24:4 touch on my own research area, interaction techniques and input devices.

One article deals with the study of expertise, and the acquisition thereof, while another looks at fundamental issues in the dynamics of human pointing actions.

And as such I am pleased to feature both efforts in my Editor's Spotlight this month.

IN THE SPOTLIGHT, PART 1: PERSISTENCE OF EXPERT INTERACTION TECHNIQUES

As I was reading this article, the following insight crystallized in my mind:

Expertise is the clay of natural interaction.

What I mean by this is that all interfaces follow a progression from pure novice use—characterized by effortful and inefficient problem-solving behavior—to a more expert style of interaction, where one has the basic operations mastered, and they quickly become skills that one can draw upon with little conscious effort. In time, then, the user becomes less aware of the interface and (if designed well) it gradually dissipates into the background of attention. One can then focus on the meaningful tasks at hand—the actual work that you care about—rather than the tools necessary to get things done.

The goal, then, of the accomplished interaction designer is often to accelerate this transition from novice to expert behavior such that users quickly move beyond problem-solving behavior and on into skilled performance that gets better and better with practice.

There are many tricks and tools to foster this transition. For example, the designer can draw on pre-existing skills—either from the real world or from previous products and technologies that the user is likely familiar with—as a catalyst for this process. But this isn't always possible. At times, it's necessary for users to adopt an expert way of doing things to jump to a new level of proficiency. Yet, leaping across such performance gaps is fraught with peril. Keyboard hotkeys are the classic example: once known, they are dramatically faster than selecting commands from a pull-down menu, yet most users never learn the vast majority of such shortcuts.

This TOCHI article looks deeply into these types of issues and explores particularly the role that training can have in the persistence of expert interaction techniques. The technique in this case is a multi-touch way of selecting commands on a touchscreen known as FastTap menus. The “novice” way of invoking a command is to tap once on the menu, and then tap again on one of the commands from a grid of options that pops up. But once the user learns where the commands are in the menu, simultaneously touching the thumb (to open the menu) and the forefinger (to indicate the desired command) collapses this interaction into a single “expert” transaction.

The key issue is that the user must *decide* to switch to this expert method, and presumably such on-going decision costs may become a tax upon their continued use. The article probes this from a number of directions, showing that training in the form of a game that imposes performance limits can quickly transition users to the expert form of the gesture. Yet, in open-ended tasks, not all users continue with their hard-won expert skills. Why is this the case? What factors influence this jump in performance (or the failure to make the leap) in different users?

The authors carefully circle around these questions with a series of studies that move us closer to the truth here, and illustrate just how hard it can be to get users to make such leaps. And while this article certainly isn't the final word on the topic, I came away with many ideas and insights to foster the acquisition of skill in my own designs, interaction techniques, and gestures—and my

hope is that your experience of the article will yield similar insights that can be applied to your own efforts.

Benjamin Lafreniere, Carl Gutwin, and Andy Cockburn. 2017. *Investigating the Post-Training Persistence of Expert Interaction Techniques*. ACM Trans. Comput.-Hum. Interact. 24, 4, Article 29 (August 2017), 46 pages.

<https://doi.org/10.1145/3119928>

IN THE SPOTLIGHT, PART 2: CONTROL-THEORETIC MODELS OF POINTING

This manuscript quickly delivered that electric caterpillar sensation creeping up the back of my neck:

Here was an important piece of work.

And it made me regret once again that I hadn't sought out courses in control theory long ago. Although few computer scientists are exposed to the topic during their professional training, I had no excuse. During college I worked summers at a tiny company that build high-precision rotary tables for testing guidance systems. My immediate supervisor had been an expert in control theory; watching him develop test routines to slew multi-million-dollar payloads at high radial velocities gave me a visceral understanding of terms such as *underdamped*, *feedback loops*, and *unstable*. So I knew it was a subject of real practical utility.

And yet, here I find myself, ostensibly an expert in input devices and interaction techniques, lacking a deep understanding of a key theoretical foundation that could have given me key insights over the years!

Fortunately, my regret can end there, for these accomplished authors have finally connected the topics in a decisive manner.

Many readers of TOCHI have likely heard of Fitts' Law—a topic that, in my long experience, often produces groans from the uninitiated. But Fitts' Law is not to be so easily dismissed, because it offers an experimental paradigm—centered around a simple mathematical relationship that connects the difficulty of pointing motions (as characterized by distance and target size) to movement time—and as such has been widely applied as a sensitive measure of pointing techniques and input devices.

Yet, I can still recall my keen disappointment when I applied Fitts' Law to my own research for the first time. Because Fitts' Law does not truly predict the movement time of individual pointing actions. It only predicts the *average* movement time of a set of pointing actions considered as a whole. Those 99% *R*-squared correlations suddenly felt like a cheat—much of the variability of human pointing behavior simply gets averaged into oblivion.

This is where control theory, as made abundantly clear by this article, gets really interesting. Control theory offers a real-time model that can characterize detailed properties of *individual* pointing actions on a moment-by-moment basis. Qualities such as the velocity and acceleration profiles of pointing movements become amenable to study. It seems to offer a rich paradigm to pose and answer research questions, in a principled way, that have not been readily accessible to experimental scrutiny before. And a close reading shows that this article is just a start—an entire research agenda spanning years could clearly be built upon this foundation—which I'm eager to see enrich the literature moving forward.

I'll not attempt to further summarize this article here as I could not possibly do proper justice to it. Although application of control theory to HCI is not unprecedented, my sense is that the insights offered by this work will prove essential to advance the state-of-the-art in pointing, input devices, and interaction techniques—and theories thereof—moving forward. Students,

practitioners, and (perhaps especially) seasoned researchers in this area should consider this article a must read.

Joerg Muller, Antti Oulasvirta, and Rod Murray-Smith. 2017. *Control Theoretic Models of Pointing*. ACM Trans. Comput.-Hum. Interact. 24, 4, Article 27 (August 2017), 36 pages.

<https://doi.org/10.1145/3121431>

OVERVIEW OF VOLUME 24, ISSUE NUMBER 1: CRAFTING INTERACTIVE DECORATION, SELF-ASSESSMENT OF COMPETENCE IN CROWD WORK, AND RAPID PROTOTYPING OF OUTDOOR GAMES

Other topics illuminated by this month's TOCHI include the following:

Crafting Interactive Decoration. This article documents a research-through-design exploration of how visual tagging techniques can be integrated in a highly aesthetic manner within the decorative patterns of a number of decorated artifacts.

The illustrations are delightful and show how this approach deals not so much with the technology of tagging, but how tags themselves can be co-opted as a design material by highly creative crafters and makers. A guitar etched with visual codes inspired by traditional Celtic knotwork patterns offered a particularly striking example.

Those interested in design research and visual codes in particular will find this work a compelling read.

(<https://doi.org/10.1145/3058552>).

Using Worker Self-Assessments for Competence-based Pre-Selection in Crowdsourcing Microtasks. The Dunning-Kruger effect—a “cognitive bias that entails inflated self-assessment and illusory superiority among incompetent individuals”—may be the ultimate subtext for our times, given the “leadership” driving idiotic “populist” movements such as #Brexit, in the U.K., and repeated attempts to suppress voter rights and abolish affordable healthcare, right here in the good ‘ol U. S. of A.

But this article fortunately puts this effect to good scientific use by studying how it can be used to gain insights into the nature of crowd work, and particularly as part of a strategy to recruit better crowdworkers who will produce higher quality results.

The authors demonstrate that, indeed, crowd workers often lack awareness about their true level of competence, and tend to take on tasks that may be beyond their current abilities. But by recognizing this, self-assessments of competence can be combined with performance-based worker pre-selection techniques to improve task outcomes.

(<https://doi.org/10.1145/3119930>).

Design and Evaluation of RaPIDO—A Platform for Rapid Prototyping of Interactive Outdoor Games. This work presents a classic toolkit (or platform) paper, one geared in this instance to making it easier for non-computer-scientists to create interactive outdoor games that are mobile and involve multiple co-located users. In particular, it focuses on pervasive games where groups play outdoors in a single location, and where physical and embodied interaction is an integral part of game play.

The results show that novices could indeed create simple games quite easily using RaPIDO, no small feat given the difficulty of the distributed programming tasks otherwise required. Longitudinal analysis of two design cases showed how would-be game designers can design a game concept and realize its technological embodiment concurrently, in ways that allowed people outside of computer science to explore how technology can enhance outdoor gameplay.

(<https://doi.org/10.1145/3105704>).

Reality Smokescreen. As I was wrapping up this editorial, the rarefied smoke of distant wildfires settled over Puget Sound, and our region's signature views of my beloved mountains became but a distant dream.

In this powerful symbol of a world going up in smoke, the daylight has taken on an otherworldly orange-gamboge cast, and the full moon—rather than being a familiar friend in the night sky—finds itself transformed into a radioactive exomoon circling some nigh-inconceivable alien planet.

And yet this has quickly become normalized as our new daily reality.

An out-of-body feeling—much like the Dunning-Kruger illusion of superiority among incompetent individuals—that is all too much a sign of our times.

Ken Hinckley

Editor-in-Chief

Redmond, Washington

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