

The Editor's Spotlight: TOCHI Issue 23:2

I spent the weekend at my mountain aerie, tucked away high among the alpine crags of Washington's Cascade Range, where a passing squall showered me with some of the largest snowflakes I have ever witnessed.

The temperature hovered just above freezing, urging the wet and sticky snow crystals to join forces. The flakes rafted together, grew to fantastical proportions, and ultimately trellised themselves into huge ovoids that tumbled like hoar-frosted Fabergé eggs from the sky.

The landscape, already brocaded in an eight-foot snowpack, was being gifted with riches even greater still.

And so I feel it is with the April issue of TOCHI, which adds five exquisite new gems—each unique in its own right—to the annals of the field.

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It is, therefore, perhaps not surprising when I say that it was a difficult choice deciding which article to spotlight this month. As such, I decided to feature *two* articles most prominently below.

As it so happens, both consider the issues and challenges raised by mixed-reality spaces from unique perspectives.

And both take an inter-disciplinary tack on the difficult problems raised by this intriguing class of ubiquitous computing systems.

Nonetheless, as GPS and other sensors indeed live up to the name of this sub-field and become truly *ubiquitous*, it speaks to experiences (and usability problems) that we have all already likely encountered in one form or another as we fumble about in an unfamiliar city with our smartphones in hand.

Or that we will all likely encounter in the future, as our physical abilities inevitably change or diminish with age.

IN THE SPOTLIGHT, PART 1: LIONS, IMPALA, AND BIGRAPHS—A UNIQUE PERSPECTIVE ON MODELING PHYSICAL / VIRTUAL SPACES

They say the three most important things in real estate are location, location, and location—and so it seems with ubiquitous computing systems, and contextual interactions in general.

Yet what is less often recognized is that “location” is, in fact, a social construct every bit as much as it is physical property of the world—and which, furthermore, can only be sensed through particular technologies that have their own quirks. As the authors of this article make apparent, the result is a many-faceted terrain that offers shifting perspectives as one considers it from the point of view of human, technology, computational representation, and the physical landscape itself.

This article focuses on a particular mixed-reality game that features schoolchildren using handheld computers to join together into small prides of lions and launch attacks on (purely virtual) impalas that had to be discovered by exploring the physical environment. Although extremely simple in conception, difficulties encountered in the realization of this game highlight the devious problems and complexities that arise in many classes of ubiquitous computing systems.

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For example, due to noise and the limits of precision, a sensing technology (such as GPS) may interpret a small huddle of schoolchildren as occupying distinct physical areas, even though from the human perspective they are all clearly co-located, and engaged in a common activity, as dictated by the social grammar of *proxemics* and *f-formations* (to borrow two constructs from sociology that characterize how people tend to share physical space).

Such problems are well known in sensing systems, and a great deal of debate has gone back-and-forth about how to anticipate and design interactive experiences around these foibles of the technologies at our disposal.

But this article takes the unique step of recognizing that these perspectives can be codified, through the mathematical formalism of bigraphs. A series of simple production rules—which furthermore afford an intuitive diagrammatic representation—can then model the comings and goings of people, devices, and computational representations on the physical landscape. The result is a set of rules that allows one to model and formally reason about subtle mismatches between the human and technological perspectives.

While the article does not claim to offer a formal grammar of proxemics, the work certainly hints that such a direction may be possible. With the “Internet of Things” colliding at an ever-accelerating pace with the long-established “Social Expectations of Humans,” the tools and insights offered by this ambitious article may comprise a critical lens through which to reason about (if not reconcile) the critical design mismatches that inevitably arise between them.

Steve Benford, Muffy Calder, Tom Rodden, and Michele Sevegnani. 2016. On Lions, Impala, and Bigraphs: Modelling Interactions in Physical / Virtual Spaces. ACM Trans. Comput.-Hum. Interact. 23, 2, Article 9 (April 2016), 57 pages.
DOI=<http://dx.doi.org/10.1145/2882784>

IN THE SPOTLIGHT, PART 2: ACCESSIBLE PLAY IN EVERYDAY SPACES: MIXED REALITY GAMING FOR ADULT POWERED WHEELCHAIR USERS

One of the things that is all too easy to forget in the excitement about location sensing and ubiquitous computing is that the mobility of the user is taken for granted.

But for many individuals, simply getting around can be a huge challenge, and the continual status of diverse end users as an afterthought in design is an unpleasant truth that requires all of us would-be interaction designers to take a very hard look in the mirror indeed.

Something most people do not know about me is that my first wife died at the age of 29. For about the last six months of her life, she was largely confined to a wheelchair and needed oxygen everywhere she went. Yet she was vivacious and extremely bright, and had just finished her master’s degree. While I was on travel she went on a job interview. She arrived only to discover that from the lobby, a grand staircase led to her interviews on the second floor. The building was in an office park with no elevators.

I still remember vividly how she described that staircase, looming before her like an immense cliff.

Thus, I was very happy to see this article run through the gauntlet of the rigorous TOCHI peer-review process and come out the other end as a wonderful contribution that is the first to address the social entertainment needs of adult powered chair users in a social and mobile game setting, namely a mixed reality implementation of capture-the-flag.

The article contains a number of perspectives and insights that really make one stop and take notice. For example, a strong theme that emerged was the desire not only for accessible entertainment, but also inclusive play with non-powered chair users, such

as friends and family. The power of the activity to arouse the curiosity of bystanders and make them want to participate, as well, was also noted.

The purposeful moving-about engendered by the game was very freeing for the participants, but what perhaps most struck me in the entire article was a comment from the mother of one participant. While thrilled to see her daughter enjoying herself and engaging with others on this occasion, the mother reported that otherwise her daughter “mostly stays at home by herself.”

Perhaps this article can be the first small step towards righting this injustice.

The article concludes with an informative set of theoretically and empirically informed guidelines for includifying (or making inclusive) games originally designed for people without disabilities, through the use of technological augmentations such as mixed reality. And although there is obviously still a very long way to go in these directions, it was heartening to see some concrete progress in the form of this TOCHI contribution.

Katie Seaborn, Jamal Edey, Gregory Dolinar, Margot Whitfield, Paula Gardner, Carmen Branje, and Deborah Fels. 2016. Accessible Play in Everyday Spaces: Mixed Reality Gaming for Adult Powered Chair Users. ACM Trans. Comput.-Hum. Interact. 23, 2, Article 12 (April 2016), 28 pages.

DOI=<http://dx.doi.org/10.1145/2893182>

OVERVIEW OF VOLUME 23, ISSUE NUMBER 2: EXPLOITING MACHINES, SENSE MAKING IN EMBODIED INTERACTIONS, AND SHIFTING PERCEPTIONS ON TABLETOPS

I was impressed by the depth of thought and analysis that went into all of the contributions in this issue of TOCHI.

Three of the articles exceed fifty pages, often with rich illustrations, and through a concise and expertly paced presentation even the shortest article in this issue—a rare example of a TOCHI contribution that clocks in under 20 manuscript pages—packs a powerful punch.

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With the recent defeat of the 18-time world Go champion at the hands of our would-be artificial overlords, I suppose not many people are feeling particularly guilty about the possibility of exploiting machines at the moment.

Yet well-established results show that people react to computers as social entities, and as such feelings of guilt and envy—and the extent to which they may or may not manifest themselves—have an important role to play in a compelling vision of the future where man and machine are not pitted against one another, but rather take on complementary roles that promise to bring out the very best in human ability.

This first concise article presents two provocative studies that show people experience similar levels of envy for humans as they do for machines in the context of three different economic games (the public goods, ultimatum, and dictator games)—yet people experience considerably less guilt vis-a-vis machines. The authors discuss the theoretic and practical implications of these findings for human-machine interaction systems that manifest cooperation, fairness, reciprocity, and other desirable properties of human-human interaction.

(<http://dx.doi.org/10.1145/2890495>).

Given my childhood fascination with saurians of the Jurassic epoch, it is hard to go wrong with an article that features an installation named the *Jurasoscope* as one

of its principal objects of study, along with a generous helping of illustrations that prominently feature dinosaur bones.

With these (and many other) richly grounded artifacts, the authors investigate the phenomenon of ‘indexing’—that is, the mindful referencing back-and-forth between here and there, connecting objects and representations—in great depth. The scholarship in this article is wonderful, drawing numerous and varied connections throughout the human-computer interaction literature (and beyond), while unpacking in great depth carefully considered and deeply nuanced aspects of these behaviors.

As such I suspect this article has great potential to cross-fertilize insights well beyond the heritage and museum context that serves as its primary focus. To name just one example, I was struck by the possibility that these insights could inform the back-and-forth of reading and writing characteristic of *active reading*, an area that (given my inclinations as a reader, writer, and vagabond of digital pen-and-tablet experiences) has long lurked at the nexus of my intellectual passions.

So, I strongly encourage you to check out this article, as well, because I suspect the work offers many more latent connections and potentials of this sort for the curious and probing mind.

(<http://dx.doi.org/10.1145/2882785>).

And the final article I wish to alert you to here offers a tour-de-force with regards to 3D object perception on tabletop displays. The possible presence of multiple users makes it difficult to choose a projection geometry, or to take full advantage of depth cues such as motion parallax that are *de rigueur* in other contexts.

Poor choices can result in distorted images and incorrect interpretations of objects, which of course would defeat the purpose of bringing these technologies to bear in the first place.

The authors present a series of studies that probe these issues in great detail. One of the surprises (for me, at least) was that using a fixed center of projection above the table reduced errors and improved accuracy in most of the tasks studied. Another was that this further implies that technological efforts to make the point-of-view and the center-of-projection coincide (in fish-tank virtual reality, for example) may ultimately be fruitless—or possibly even counterproductive. As someone who spent a lot of time in the virtual environments literature—albeit so long ago that this activity seemingly took place in another lifetime—that suggestion arrived as quite a shock.

(<http://dx.doi.org/10.1145/2845081>).

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So, with that I put Issue 23:2 of this treasured volume of *Transactions on Computer-Human Interaction* in your curious hands, my friend. Study it well and great knowledge will be yours.

I am happy to report that we already have three articles queued up for our June issue, so I am in the rather enviable position of having a firm conception of the content we will be publishing by the time early summer rolls around.

But keep an eye out on the ACM Digital Library for these contributions to show up well before then, as they exit production and make their grand entrance to the scientific literature. We always strive to make new work available on-line at the earliest possible opportunity.

I am just hoping that enough of this epic snowpack—bejeweled by a hoarfrost of Fabergé eggs though it may be—will melt by then to allow a doughty old Editor-in-Chief to engage in some airy wandering among those crags that beckon from on high.

K. Hinckley

Editor-in-Chief

Snoqualmie Pass, Washington

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