CHI 2015 Papers and Notes

Reviews of submission #1951: "ePort3DAr: Combining 3D Interactive Smart

Spaces and Mobile Computing for Construction Collaboration"

------------------------ Submission 1951, Review 4 ------------------------

Reviewer: primary

Your Assessment of this Paper's Contribution to HCI

Overall Rating

2.0 - Possibly Reject: The submission is weak and probably shouldn't be accepted, but there is some chance it should get in.

Expertise

4 (Expert )

The Review

The Meta-Review

Reviewers liked the concept and the vision of this work, and R3

appreciated the unique configurations, even if the authors are using

known technology.

R2 and R3 point out that there is little novelty for the specific system

or the proposed interaction techniques.

Authors also do not provide a clear motivation for their design decisions

and R3, in particular, points to numerous related projects, directions

and alternative configurations that are not discussed nor referenced. The

authors would benefit from placing their interaction techniques and

configurations in the context of a larger design space and in relation to

previous work. Reviewers, for example, ask whether \_actual\_ AR could be a

strong candidate for these scenarios.

Reviewers find that the user study description is unclear and that more

information is needed on the baseline "blueprint" interface. Even so,

reviewers point out that there are many different approaches that would

be more appropriate to compare against, rather than a "book"?.

Reviewers also found the paper difficult to read and suggest careful

proof reading by a native English speaker.

All in all, the scenarios explored are interesting, but given the lack of

generalizable results (R1), and the unclear motivation for many of the

design choices, this paper is unfortunately not mature for publication at

CHI.

------------------------ Submission 1951, Review 1 ------------------------

Reviewer: external

Your Assessment of this Paper's Contribution to HCI

The authors present a system that allows viewing building plans in

multiple views and with multiple ways of interaction. Changes to the

schematics are synced between users, e.g., allowing workers on site to

propose an update to the shared construction plans which is accepted at

an off-site office.

Overall Rating

2.0 - Possibly Reject: The submission is weak and probably shouldn't be accepted, but there is some chance it should get in.

Expertise

3 (Knowledgeable)

The Review

This paper essentially describes one specific system. Accordingly, much

of the writing focuses on components, interactions, and scenario

description. While the system is interesting, I was ultimately left

wondering what the more general takeaway here is. It's not clear what

others can learn from this specific case to inform their own system

designs. While there is a study, I was left with many questions regarding

it and at this point don't see some more general emergent effect.

I found this paper rather hard to read. The system description meanders

and often repeats itself. The design choices sometimes feel arbitrary and

the whole thing feels a bit thrown together. I was a bit put off by the

terms used to describe this this system. The authors make multiple

mentions of this being an AR system. However, there really is no AR part

in this. There is a projection of 3D content on the wall. But this does

in no way constitute augmented reality. The phone application also does

not seem to have this functionality. I also don't get how this system is

an "interactive 3D smart space". What's a "smart space" after all

exactly? The system uses space for projection and tracks hands in the

space. In my understanding, this doesn't yet make the space itself smart.

The mobile setup in a way is space agnostic after all. Unfortunately, the

paper, at times, reads a bit like a buzzword hodgepodge.

The authors did run a study to find out whether their system offers a

more efficient way to complete common construction tasks. It is not clear

what they compare themselves against though. The other condition is

described as a "conventional 2D drawing based approach". I'm just not

sure what this is exactly. It should be made very clear what the

comparison is and how participants interacted in this case. It is also

not described whether the study was between or within groups and whether

there was any counterbalancing. From the "Test Plan" section it seems

like participants always used one system first and then the other. It

also reads as if participants received extensive instructions on the

proposed system but no instructions on the comparison system before the

start of the study. While we can assume that the participants as

architecture students have some familiarity with blueprints, they

probably don't have much hands-on experience of using them in-the-field

(they're still students after all). I'm also curious how the tasks were

timed. Some of them don't quite have a specific ending time. For example,

the exploration task seems rather open ended and the discussion task

times similarly depend highly on other factors.

I have some slight problems with the problem description of the paper.

The authors state that architects "are using new computing technology to

enhance creativity and aid in communication between stakeholders", yet

construction engineers and people on site "might not be familiar with new

technology". This and the following parts read very condescending to me.

I don't subscribe to this view where engineers are inherently more

backwards and unfriendly to technological progress than architects. As

the study seems to have been run at an architecture school, this might

explain the view described here. If there is an inherent difference in

those two groups it would be helpful to provide a reference, otherwise

this just comes of as prejudice. One could even argue that this system

doesn't really strive for collaboration, but instead is designed for

people in the field to provide data back to the architect who then can

approve of this input. Regarding the input, I'm not sure dragging parts

on a phone is a good way to handle changes. For blueprints to be updated

with changes, wouldn't precise measurements be needed? If, e.g.,

something went wrong with placing the door, I'm sure stakeholders would

want more accurate information than a worker dragging it a bit to the

side.

Overall, I think this is an interesting system and certainly looking at

blueprints can be more efficient in a projection than with blueprints

(especially on larger sites). However, I don't quite see what general

lesson is to be learnt here. But if this is just a description of one

specific system, the value to others isn't as obvious.

------------------------ Submission 1951, Review 2 ------------------------

Reviewer: external

Your Assessment of this Paper's Contribution to HCI

This paper presents the design, implementation, and evaluation of a

prototype of a collaboration system, supporting hand-guestures, mobile

phones, and projectors.

I feel that the prototype itself is not so exciting. It merely combines

several well-known techniques. The interesting part of this paper could

have been the experiment, but there are also problems.

Overall Rating

2.0 - Possibly Reject: The submission is weak and probably shouldn't be accepted, but there is some chance it should get in.

Expertise

3 (Knowledgeable)

The Review

The paper spends 5.5 pages to motivate and describe the prototype and 2.5

pages on the experiment. I think that most features of the prototype have

already been published previsouly. So, basically, the focus should have

been on the user study instead.

The user study is pretty basic. 5 tasks were done in succession (the

order of tasks should have been randomized!). The elementary tasks such

as viewing a 3D model (task 1) have been investigated in many experiments

in the IEEE VR and IEEE 3DUI community (many citations to these

communities are missing). The user study could have been more interesting

if:

- Real workers were used (as Figure 1 seems to suggest)

- More complex and application-domain-specific tasks had been executed

In my view, the submission is overly verbose. Due to the small novelty, 5

pages should have been enough.

------------------------ Submission 1951, Review 3 ------------------------

Reviewer: external

Your Assessment of this Paper's Contribution to HCI

This paper contributes a system using multiple display and input devices

to aid in collaborative construction management. The system uses a

projector to create two ad-hoc displays in an ‚ÄòL‚Äô configuration,

along with a Leap Motion controller for spatial input, an Anoto

(micro-dot pattern) pen for stylus input, and a smart phone for

additional display and touch/accelerometer input. While each individual

component and the core interactions in general are not significantly

novel, the paper combines multiple devices into a unique combination of

display / input modalities. Furthermore, the paper explores a domain

specific application of construction management. Finally, the paper

contributes a user study comparing their system to 2D blueprints (This

wasn‚Äôt entirely clear to me. The paper states they compare to a ‚Äòbook

of 2D blueprints approach‚Äô). Overall, it is an interesting system

targeted to a domain that could benefit from on-site digital construction

management solutions.

Overall Rating

2.0 - Possibly Reject: The submission is weak and probably shouldn't be accepted, but there is some chance it should get in.

Expertise

3 (Knowledgeable)

The Review

This work was an interesting read. The system combines known display and

interaction techniques into a unique configuration and targets an

interesting application domain. I see great value in such ad-hoc

multimodal interactive systems. In fact a lot of the marketing effort for

pico projectors featured architects / construction workers looking at

blueprints at construction sites. There is obvious demand for intuitive

ad-hoc interactive systems in this domain.

While I see great value in the goal and the multimodal approach, I have

some concerns that reduced my review score. Primarily, the multimodal

system is interesting, but it not clear that it is the best solution for

this domain. Why not just use a single projected display running a CAD

program? Or why not use a mobile phone/tablet app? Or why not use

augmented reality to preview the model deviations and changes?

It seems that the user study compares the system to a ‚Äòbook of 2D

blueprints‚Äô. It seems like a better comparison would be to a single

laptop running CAD / SketchUp (or mentioned above...a single projected

display running CAD/SketchUp). In the user study, I would imagine that

the performance improvements of the system are probably largely due to

the fact that the user is interacting with a digital interactive system

(vs analog paper), and not because of the unique device configuration.

Therefore, it is hard to extract any lessons learned or take-aways from

the user study.

The individual interaction techniques do not appear to be novel. There is

a large body of research in spatial input for rotating / scaling 3d

objects and for multi-scale navigation (pan+zoom). The most interesting

and novel interactions involve querying the specific floor plan via

spatial input and the touch interactions on the horizontal surface which

control the vertical display. These interactions are particularly

relevant given the new Sprout display by HP (http://sprout.hp.com/) which

combines stylus input on a horizontal projected display with a

traditional vertical monitor.

As a personal opinion, it would be interesting to see the system

implemented with a brighter short throw projector, e.g. InFocus IN126ST.

What would these scenarios look like with a much larger (10 ft+) display

for group collaboration / review? The current configuration could be

easily approximated by two tablets.

The paper should also address other work in AR for construction

management (e.g. the work by Mani Golparvar's lab,

http://scholar.google.com/scholar?hl=en&q=Mani+Golparvar).

Finally, the paper suffers from some stylistic and language issues, which

ultimately make the paper difficult to understand. In my opinion, the

paper could be condescend by omitting some of the system implementation

and focusing on the interaction techniques. Figure 2 is barely referenced

and provides little value for its size, along with figures 3a, & 4. Also,

the questions from the user study are included by reference only, which

is inconvenient for understanding the user study.

Overall, I think this is interesting work that is not yet ready for

publication at CHI. I look forward to seeing this work published in the

future as it is pursuing very interesting ideas with a unique device

configuration.