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Practicing What We Preach: IEEE VR 2009 Virtual Program Committee Meeting

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So, what do you do if you need a short, intense meeting with many participants from around the world, but they can't all gather at one location? What if you have many participating sites, so that videoconferencing or other technologies would be prohibitively expensive or difficult to manage? This situation is familiar to many in academia, from the yearly cycle of program committee (PC) meetings for scientific conferences.

We were the program chairs for IEEE Virtual Reality 2009. IEEE VR is the premier conference in its field, covering a wide range of technologies, systems, and evaluations of VR techniques. Circumstances led us to hold our PC meeting in Second Life (SL). Here we report on our and the PC members' experiences of this novel approach.

The Reviewing Process

The IEEE VR conference's core is a single-track technical program of paper and sketch presentations. The conference uses a rigorous double-blind review system, accepting approximately 25 percent of the full papers it receives. To cover the range of disciplines and reduce the reviewing load, its PC has a large membership of 55, drawn relatively equally from Europe, Asia, and the US.

Figure 1 shows a paper's flow through the review process. Normally, each step except the PC meeting is performed online, using a conference submission management system (CSMS). Each paper has one primary, two secondary, and two external reviewers.

The reviewing process culminates in a two-day PC meeting, led by the cochairs, where members discuss each paper and decide which to accept. IEEE VR has retained face-to-face PC meetings because experience has shown that they're valuable for maintaining high standards for papers. At face-to-face meetings, it's relatively easy to engage PC members in decision making, seek new reviews when necessary, or have a healthy discussion about the relative merits of a paper with diverse scores.

The VR 2009 PC Meeting

In previous years, IEEE VR would often piggyback its PC meeting onto another conference. Because the PC membership is always taken from across the globe, attendance in the previous two years reached only about 25 percent, owing to the cost and time necessary for travel. Unfortunately, for 2009, there was no suitable conference on which to piggyback.

To encourage broader attendance, we decided to hold the PC meeting in a distributed fashion. The cochairs discussed various options; after consulting with developers at Linden Lab, SL's producers, we chose SL for these reasons:

- ease of access to the virtual meeting site,
- cross-platform support of the SL client,
- low entry cost (access to SL is free),
- no practical limit on the number of participants (Skype can handle at most 25 people),
- the convenience and flexibility provided by the distributed solution, and
- the attractiveness of using a VR solution for a VR conference's PC meeting.

Using SL posed six potential barriers. The first was tied to implementing multiparty voice chat. It was unclear how usable the voice channel would be with so many people (up to 55) participating simultaneously.

The second potential barrier was adoption of SL. Many PC members had never used SL, and we wondered whether this would limit participation.

The third was accessing meeting content. Previous face-to-face meetings heavily used an LCD projector to focus on the submission under discussion. It was unclear how to reproduce this process in SL, because SL doesn't support displaying arbitrary Web content.

The fourth was avatar fidelity. It was unclear how well the discussion would flow in a virtual meeting, because many subtle face-to-face cues (such as those used for taking turns) would be missing.

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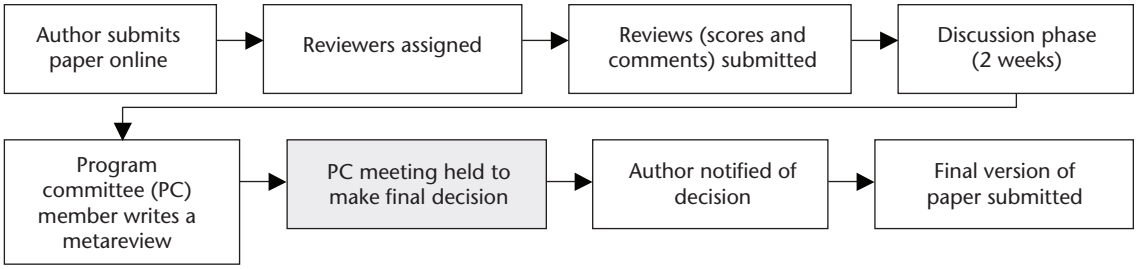

Figure 1. The process flow of a paper submitted for review. All the steps in the process are done electronically, with the exception of the face-to-face PC meeting.

The fifth was time zones. Because the PC is globally distributed, we had to determine the best time zone in which to hold the meeting.

The final potential barrier was reviewer conflicts. Because we use a double-blind review, reviewers with conflicts must "step outside" while the PC discusses their submissions. It was unclear how best to accomplish this.

The Virtual Meeting Space's "Physical" Layout

Before the meeting, a cochair created a private space in SL with a seating area, a waiting room, and some aesthetic elements, such as trees, to make the space more inviting (see Figure 2). We decided to create a meeting space that incorporated many aspects of a physical meeting space, to facilitate ease of use and support many social aspects of face-to-face meetings.[1] We chose an amphitheater-style layout, with three rows of seating (see Figure 3), because we thought most people would be familiar with this layout and it provided good line of sight for most participants. Participants could have their avatar sit on cushions simply by clicking on the cushions.

Premeeting Instructions

We created a Web page with instructions for the PC members, detailing how to prepare for the meeting and providing a list of useful settings for the SL client. To ensure good audio quality, we strongly encouraged participants to use a headset with a microphone. We also encouraged them to test out the SL space before the meeting.

One issue was identifying avatars. We asked members to pick an avatar name based on their real name (subject to SL rules), which would appear in a bubble above the avatar's head. For members with existing avatars (and more anonymous names), we provided a freely settable floating name tag. People could also customize their avatars to make them more memorable. It was easier to recognize the few who did this, after an initial introduction.

We knew it would be difficult to ensure that each paper's primary and secondary reviewers attended. So, we created a doodle poll (www.doodle.com) asking everyone to mark the hourly slots when they could attend. This at least let us know when few members planned to attend.

Communication Channels

The meeting utilized several parallel communication channels. SL offers public voice and text chat channels. In the voice channel, the audio is spatialized about the listener. The text channel prefixes each entry with the typist's avatar name. Any two participants can also open private peer-to-peer voice and text channels. Group voice and text channels restrict access to members of a specified group. The audio in the private and group channels isn't spatialized, so participants can be anywhere in the

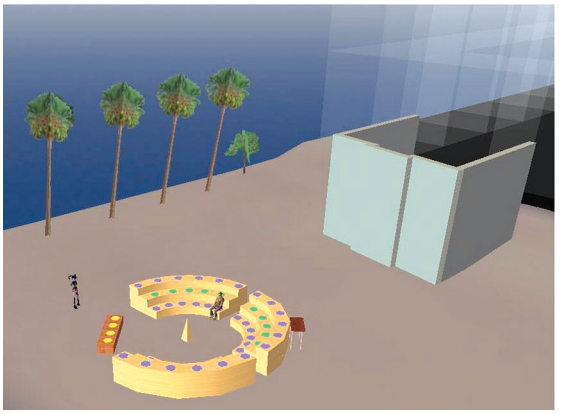

Figure 2. The layout of the virtual meeting space. The walls on the right enclose the waiting area. The cochairs sit on the low bench at the front, and the PC members sit on the amphitheater tiers.

Figure 3. The meeting space from a PC member's view (with chat window). This snapshot taken during the meeting shows that the heads of avatars of PC members whose computers have been idle for a period of time droop (see the avatars on the right).

virtual world. A user can join any number and combination of peer-to-peer and group text chat sessions, in addition to the public text chat session.

From a user-interface viewpoint, only one text chat channel is visible at a time (see the tabbed chat window in the top left of Figure 3). An indicator on the tabs lets the user know when someone has added a new text message to a given channel. When group voice chat is activated, the interface displays a list of all members currently in the call and inserts an animation next to the name of whoever is speaking. A similar animation appears above the head of the speaker's avatar.

Protocol during the Meeting

To keep the meeting flowing smoothly, we established a simple protocol based on face-to-face PC meetings. We discussed the papers primarily from highest to lowest scores. We announced the paper's number on the group channels and asked members with conflicts to move to the waiting room and leave the group channels. That paper's primary or secondary reviewers who were present described its contents and reviews and gave their recommendations, and the discussion started. (If neither the primary nor secondary reviewers were present, we postponed discussion of that paper.) At the discussion's end, the chair announced the decision and asked the conflicted members to return to the discussion area, using the public text channel and a large screen in the waiting area.

Postmeeting Usability Survey

To evaluate the meeting's effectiveness, we conducted an anonymous Web-based survey of the PC members. We received 42 responses; we summarize the most interesting results here.

One goal was to lower the barrier to attending the meeting. That worked fairly well, with 71 percent of the committee members attending some portion of the meeting. Only 50 percent of the respondents stated they would have attended a physical meeting, and 22 percent said their attendance would have depended on the location and their ability to get other funding for travel.

Using SL for events such as this means people can attend at a much finer-grained level than with a physical meeting. On average, the members attended for 5.5 hours, which is less than the one or two days for a physical meeting. With a face-to-face meeting, however, participants are present even for discussions of papers for which they have no responsibility, providing a good opportunity for discussion by a wider audience. In the distributed format, participants could choose to show up only when needed, which could degrade discussion. An additional danger is the ability to do other things during the meeting. Although this opportunity also exists in face-to-face settings, SL's comparatively low fidelity makes it easier. Participants estimated that their attention ranged between 10 and 100 percent, with the average around 60 percent.

Technical Issues

Even though most respondents (80 percent) had less than five hours' experience in SL, not many technical problems occurred except those associated with networking or audio setup. Some participants had problems getting SL to work through their institution's firewall, leading to a number participating from home to avoid these issues. One potential participant couldn't join the meeting because of technical problems stemming from firewall settings.

A common limitation was the number of pixels on the screen. Having SL, the CSMS, and the currently discussed paper's PDF file all on screen wasn't easy. About 40 percent of the participants used two or more monitors so that they could fit everything they needed to see.

Social Issues

SL doesn't feel like a face-to-face meeting (60 percent neutral or moderate disagreement). Even though respondents liked using SL for this kind of meeting (57 percent strong or moderate agreement), they wouldn't prefer it to a face-to-face meeting (42 percent strong or moderate disagreement). Identifying participants was an issue. About 75 percent didn't customize their avatar significantly, making the name tags or bubbles the primary means of identifying people (73 percent).

Several respondents commented that a core problem was the inability to see gestures or body language. This affected their ability to understand and judge presentations. More fundamentally, respondents had difficulty seeing how involved the other participants were and whether they were listening, reading papers, or doing something else. In the survey, many participants remarked that they saw no real need for, or added benefit from, the 3D environment, that a robust video chat system would have been just as effective. Other comments supported the use of SL, but with improved capabilities for a stronger sense of presence and document viewing.

Lessons Learned

We have four general observations. First, engagement with people wasn't as good as in a face-to-face context.[1] Many things, such as taking turns, went more slowly.

Second, the protocol of audio back-off and retry worked much better than other technologies, with only a few instances where people talked over one another. (Audio back-off and retry is when two or more people start talking at the same time and both stop, wait some random amount of time, and then start talking again. The first one who starts again keeps talking.)

Third, as with similar technologies, it seemed much easier to talk with people with whom you were already somewhat familiar.

Finally, scheduling is difficult. Having a set of participants that spans the globe made the overlap window for everybody fairly small. For example, this meant that people were frequently arriving or departing and would need to hand-off tasks or pick up the current status, occasionally disrupting others.

We found that some things could be done better using distributed meeting technologies such as SL. In a face-to-face PC meeting, even if those with conflicts leave the room, it's often obvious which PC member will speak for a given paper. Direct instant messaging to the cochairs was an excellent way for PC members to initiate conversation without breaching privacy.

Also, the time and cost commitments for the SL meeting were much less than those for a face-to-face meeting, taking travel into account. In addition, the meeting's impact on the environment decreased considerably.

For anyone attempting something similar, we have six suggestions. First, even though SL is easy to use, some premeeting experience is necessary for a smooth event.

Second, to maintain anonymity, be careful about what participants put in the text channels.

Third, at least two chairs should be present at any time, both for quality control and meeting flow control. This allows switching chairs between papers, resulting in better preparation, and accounts for breaks forced by external circumstances.

Fourth, some way to indicate which paper is being discussed and the papers' current status would be helpful. Newer versions of SL promise to allow displaying arbitrary Web content.

Fifth, an easily selectable list of canned avatar poses[2] for common situations such as "reading a paper," "on the phone," or "away for a short time" would be useful.

Finally, be prepared to deal with scheduling issues involving primary and secondary reviewers. At our meeting, there were periods we couldn't do anything because neither the primary nor the secondary reviewers of the unresolved papers were there. Changing to an availability rather than a priority order for the papers, and setting a paper-discussion schedule before the meeting, could help with this.

Our goal was a feasibility test to see whether SL is a viable alternative to face-to-face meetings. The main result is that, yes, it's feasible to run a committee meeting in SL and avoid the time and money associated with face-to-face meetings. However, some limitations must be overcome.

This foray into using VR technology to mediate a distributed PC meeting was very useful. Although none of us wants to see meetings in virtual spaces completely replace face-to-face meetings, virtual meetings are more attractive in some circumstances. And although this first attempt was far from perfect, there are clear, attainable steps we can take to close the gap between the usefulness of virtual and face-to-face meetings.

Acknowledgments

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