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How ICRA 2020 Went From Paris to the Cloud

By Sinan Haliyo

2020 is the year of tremendous disruption, and it has reached our community like a tidal wave, sweeping across all continents. Our flagship conference, the IEEE International Conference on Robotics and Automation (ICRA), was not safe either. Originally scheduled to be held in Paris, France, from 31 May to June 5, we had to transform our esteemed annual meeting to a virtual event.

It came as quite a blow to the ICRA Organizing Committee, who had been working extremely hard for the past two years to make it a maximally memorable experience. ICRA had never been held in France despite its thriving robotics community, and its growing popularity warranted a huge mobilization to host the event with proverbial French hospitality. In recent years, ICRA's attendance has risen significantly from a few hundred to 3,500 at ICRA 2019 in Montreal, and we were expecting an even greater number of attendees in Paris. The largest conference venue in Paris, Palais des Congrès, was reserved with its freshly renovated 3,700-seat amphitheater, 30 pristine conference and meeting rooms, and a 4,000-m² exhibition area. The industrial exhibition would have been the largest ever, as Paris has attracted an unprecedented number of professionals. Tapping into the liveliness of the Parisian arts scene, an exhibition regarding the impact of robotics and technology on modern interactions was curated in collaboration with the prestigious École des Arts

Décoratifs, thanks to a considerable budget. Additionally, the Palais de Congrès' amphitheater is the largest performing arts venue in Paris, and we had planned to share with you two pieces from its rich portfolio of entertainment: Aurélien Bory's live robotics performance "Sans Objet" as well as a live orchestra screening of the cult-classic *The Terminator*. With considerable string-pulling, the Louvre Museum agreed to host the gala evening, with a private visit of its collections—an honor generally reserved only to official state affairs. Naturally, the complete conference schedule, with numerous keynotes, 1,500 presentations on 12 tracks, 80 workshops, and various meetings, was carefully laid out.

When Europe started the lockdowns for quarantine measures in March, the Organizing Committee realized that all their efforts would go to ashes. Although we tried to keep our hopes high to believe that the event could still be held in person, by April it was quite clear that attendees from Asia wouldn't be able to travel and that more restrictions were on the way. Finally, when the French administration forbade all meetings of more than 1,000 people (later to be banned completely), we realized that we needed to go back to the drawing board.

It was out of question to simply drop Paris 2020 from the ICRA schedule or to push every event to next year. At that time, not knowing how the pandemic would evolve, we focused on two options: to postpone the event for a few months, maybe until the end of 2020, or to go completely virtual and keep the original dates. The poll taken at that point showed that the lat-

ter choice was the preference of the community. However, even today it seems that this option would still not be possible. Together with its scientific glamour, ICRA is undoubtedly the largest social event of our community, and we obviously did not want to let it go. But, even at that time, postponing it was not so straightforward either, as lots of other events were being cancelled and rescheduled. By the end of April, a little more than a month before the originally scheduled launching of the event, the Organizing Committee, after thorough consideration, decided to keep the dates and to go virtual, setting sail into uncharted waters. Naturally, nobody on the team had had a similar experience before, and few conferences around us had taken this new route. For example, the 2020 IEEE Conference on Virtual Reality and 3D User Interfaces was successfully held virtually some weeks previously, but attendance for that event is usually much lower, and that community is naturally more familiar with everything virtual.

In the absence of role models and a trustworthy supplier with a turnkey solution, we started to design the conference from scratch by recycling our usual conference tools. An unexpected drawback came from China, where a significant portion of our attendees would be accessing our conference. Many of the well-known video-hosting solutions such as YouTube or Dailymotion used on network platforms were blocked by the Great Firewall.

The first hard decision was how to handle the technical presentations. We had to keep all 1,500 live on the original schedule. This seemed quite hard both

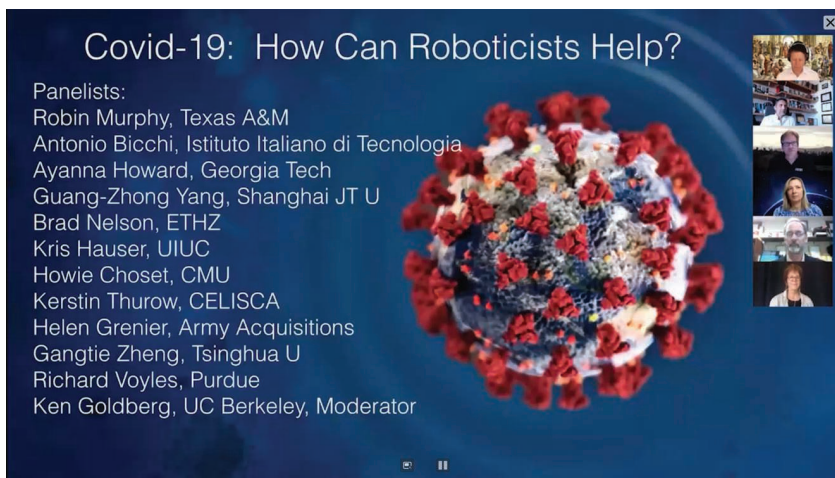


Figure 1. The 1 June plenary panel.

technically and with respect to the time zone differences, as our audience spanned from Japan to California and even farther. Holding these talks asynchronously while retaining the possibility to make changes efficiently pushed us to look for a well-developed corporate communication framework. Hence, we settled on Slack. Although not designed for this purpose, Slack offers a very interesting set of tools, such as multichannel chat threads, integration with major video conferencing tools, member administration, and so on. During the lockdown, its usage rose considerably in a few months, and, as a growing number of institutions and labs adopted it, many participants were already familiar with the platform.

The IEEE Robotics and Automation Society (RAS) also has a couple of digital tools previously used for conferences; these were upgraded for the purpose. PaperCept, which has been used extensively for paper submissions and proceedings at RAS conferences, and InfoVaya, the platform used as a companion app and personal scheduler, all went through major developments to provide a backbone for the online conference. The Organizing Committee is very grateful to both teams for their support and the countless hours they spent on these developments on such short notice.

To implement this asynchronous approach, we then asked our speakers to record a video of their presentation to be distributed to all attendees at the

launch of the conference. We set up a chat channel for each paper on Slack, where all interested parties could ask questions and discuss them with the presenters. Fortunately, Slack has an accessible application programming interface, which allowed for the creation of these 1,500 channels, linking each to the paper's PDF and presentation. An additional advantage stemming from the use of Slack is the ease with which one can chat and reach out to others. Additionally, the upcoming generation of young roboticists is apparently quite comfortable with this mode of communication. More than 6,000 messages were exchanged on the first day of the conference. Moreover, the community quickly played along and spontaneously came up with novel propositions, such as focused topic discussion channels, online happy hour meetings, sessions of



Figure 2. Plenary Speaker and IEEE Fellow Lydia E. Kavraki presented "Planning in Robotics and Beyond" on 2 June 2020.

binge-watching presentation videos, and so forth. It was a true joy to see the young generation getting involved so readily and starting to animate the online space.

Another advantage of adopting this asynchronous communication was that it enabled us to extend the originally planned five-day period to three months. Hoping that little maintenance would be required once things were on the rails technically, an extension until the end of August became possible. However, an important piece of the puzzle was how to maintain the original conference feel. We focused on plenary and keynote talks, which attract a large audience and are always the high points of ICRA. We turned to IEEE.tv for a real-time video-streaming solution. As matter of fact, IEEE.tv has been quietly growing for the past several years and has progressed from hosting prerecorded talks to providing real-time discussions and Q&A tools. ICRA 2020 took advantage of this real-time opportunity, as we scheduled a plenary or keynote talk for each day of the conference over two weeks during midday hours in Europe, the only time period roughly convenient for everyone from Japan to California. In total, an opening plenary panel on COVID-19 (see Figure 1) and 12 talks were broadcast (see Figures 2 and 3), which incited lively responses. Because these live events did not require registration to participate, they attracted an audience of approximately 1,500 for some presentations, each was followed by intense Q&A sessions, and recordings of the proceedings have surpassed 20,000 viewings as of today.

The RAS staff and the Student Activities Committee organized online events to enliven the social activities. Thanks to our community's members' willingness to participate in the games, the traditional Lunch with Leaders was moved online. The Robot Trivia, SAC Logo Contest Video Challenges, and Women in Engineering events were all moved online and were a great success. The first-ever virtual RAS Town Hall Meeting was also held.

On the workshops' front, most remained with ICRA and adapted their

sessions to virtual versions. Organizers were free to choose the when and the how of their workshops, and the participation of the attendees was registration free. Most organizers used a combination of real-time video conference presentations with discussions on Slack, and a few experimented with different approaches, such as weekly seminars. Their feedback was quite positive, and their attendance was much higher compared to previous years. All had the feeling that their purpose was fulfilled.

Regarding registrations, fees were revised and lowered to €100 in general and to €25 for students. As a result, this ICRA was the most accessible ever, with nearly 5,500 participants from 82 different countries.

In conclusion, ICRA 2020 was a huge experiment for creating large-scale virtual meetings among our rather tech-savvy community. Lowering the material barrier to join, the conference attracted a larger crowd of enthusiastic



Figure 3. Keynote Speaker Jaeheung Park delivered his talk “Compliant Whole-Body Control for Real-World Interactions” on 11 June 2020.

students and professionals, with an unprecedented number from developing countries. During the Q&A sessions, the questions and comments coming from all over the world all at the

same time provided a very impressive, unusual, and memorable sight!

Looking back a month later, there is certainly a lot of pride in our hearts to have pulled this off under these unfavorable circumstances. We can now say that it was worth all the blood, sweat, and tears the team put in. It was a first try for our community; obviously, we didn’t get everything right, and there is still plenty of room for improvement. However, facing these times of deep worldwide concerns regarding growing climate changes, the uncertain future of health issues, and travel bans, we feel that virtual conferences are likely here to stay.

Still, our disappointment is real that we couldn’t welcome you in Paris—one of the most wonderful cities in the world—for ICRA this year. We hope that, in the near future, our robotics community will have the chance to experience France and its capital.

Au revoir!