Speaker 1:

Welcome to the Michigan Minds Podcast, a quick and informative analysis of today's top issues from University of Michigan faculty.

Speaker 2:

Thank you so much for joining me today on Michigan Minds. But before we get started, could you please introduce yourself and share a little bit about your role at the University of Michigan?

Speaker 3:

My name is Michael [inaudible 00:00:29]. I am associate Professor of Performing Arts Technology in the school of Music, Theater, and Dance, where I work on incorporating technology into live music performance.

Speaker 2:

What is telematic music performance?

Speaker 3:

Telematic music performance is really just the idea that we can play music together, live in real time while being not present in the same space as each other. So, we are in different physical places, but we're still playing together at the same time.

Speaker 2:

Thank you so much for sharing that insight. Recently you have focused on a pilot project funded by the arts initiative, which is an initiative that invites members of our UM community to enhance human connections, inspire collaborative creativity, and create a more equitable world for all. Can you please share a little bit about your project, visualizing telematic performances and how this work came about and how you and your team identified the need for this project?

Speaker 3:

Telematic music performance has been around for about 20 years or so in practice. I guess people have theorized about it for a long time before that. But about 20 years ago people started experimenting with using advanced networking technologies to be able to play music together with audio, with sounds sent over the internet, where the performers could be in different geographic locations. And this works pretty well. It has worked pretty well, so that musicians can actually play good music together over reasonable distances, maybe about across half of the continent. And people have been experimenting with this ever since then in different ways. There have been really large scale productions of operatic and symphonic works with musicians all across the world, and to small scale performances of people jamming together in their living rooms.

So, this is something that musicians have been really interested in. And I was involved in some research a number of years ago that tried to quantify the effects of the delays in the network, inherent in the network of how that actually affects people's ability to perform. So, I've been involved in this kind of work. And one of the things that often comes up is, "Yes, we can hear each other really well and we can play together with just sound." But when musicians perform together in real life, they move a lot and it's really important that they be able to see each other.

There's a lot of information that musicians use to coordinate their performances with each other to evoke meanings for audience members. When we just have sound, this visual information movement is missing. So, the natural instinct is, "Okay, well let's add video so we can see each other on a video screen." And there's a bunch of technological reasons why that doesn't work very well. It's just video takes a long time to encode and transmit. But also there's some interesting research from other fields, human computer interaction, human robot interaction that's showed that having a physical presence moving with you in space is more engaging and more persuasive and more satisfying for people than watching someone on a video screen.

We're, of course, probably familiar with this for the last two years of seeing each other on Zoom on computer monitors. But some of this research by Wendy Jude that really inspired me was they looked at just information kiosks in a public place and showed that just having a really simple waving arm, just basically a stick on a motor with a glove on it, engaged people with information kiosks more than having the same image on a video screen. So, there's something special about having something moving three dimensionally in space with you.

I was inspired by this idea and thought, "Well, video doesn't work that well in telematic performance anyways, technologically. Maybe we can just make simple kinetic sculptures or little robots that will convey, capture and display the important qualities of performers movements to help them coordinate with each other in performance and to help them make their music more compelling and expressing and expressive."

Speaker 2:

Thank you so much for that insight, and it sounds like such great and interesting research that you got to continue. As you've mentioned, your project dives deep into understanding the gestures musicians make when sharing a performance. With the limitations of the pandemic, musicians had to find a new way to share their art. Can you discuss the research conducted that focused on these cues and how they're shared?

Speaker 3:

There's been a lot of interest in musical gesture in general in the past number of years. Another technology that has become widespread that's enabled our research is the use of infrared motion capture. And this is something that you've probably seen, if you see behind the scenes footage of how digital animated movies are made, where they put a human in this tight fitting body suit with these little reflective dots on them, and they use that movement in order to animate the character.

Well, we're using the same technology. We're not animating digital character, but we're using that technology to, in real time, capture the performers' movements. And other people have been doing this kind of work on musical gesture and have showed things like the relationship between how people perceive musical tension. There's moments in music where things get tense and anxious, and what the musical sound does at that moment, and what their bodies do at that moment.

And actually, some interesting work looked at can you perceive musical tension without even listening to the music, just watching the performer's body or an animation of their body? All of this work really inspired us and we have an infrared motion capture system in the performing arts technology department. So, we thought this would be a great way to be able to capture musician's movements.

The pandemic gave this whole idea of gesture and movement and music performance a new sense of urgency. Before it was kind of, "Yeah, this was something that's missing. And this whole telematic music thing is this grand experiment anyway." But once the pandemic happened, people really had to try to do this for real because people's livelihoods were really on the line. And that was when I proposed this project. I got Professor Matt Albert involved. He is the Chair of the Department of Chamber music in the of School, Music, Theater and dance, along with my colleague John Grando in the performing arts technology department.

And Matt is a violinist and violist, whose real expertise is in playing chamber music. Chamber music is music with small groups of performers without a conductor. This is especially the kind of situation where musicians need to be able to use gesture and movement in order to coordinate with each other. And he was especially frustrated, because he at that point had not only had a bunch of gigs canceled probably, but was trying to have to do things like perform with other people, give lessons over the internet.

And so, all of a sudden there's this real sense of urgency to what we were doing. And people came up with creative ways to make music together, to fake playing live. Usually they would just have a metronome playing and everyone would record themselves to the metronome and then reassemble the parts of the piece later. And it was better than not having music for a while, but it doesn't really capture the magic of live performance. So, this idea of, "We want to be able to really play with each other for real and have it feel real," was really, I guess, timely for this project. And it gave it really a sense of urgency and momentum.

Speaker 2:

Thank you so much for sharing that insight. This work requires innovation and collaboration between many groups to achieve the desired levels of understanding of telematic performances. Could you share how your research transitioned from research to a tangible visual element?

Speaker 3:

I've always been a person who has trouble of identifying myself in terms of my research and professional practice. People ask me, "Are you a composer or an engineer?" And I say, "Yes." This idea of collaboration and interdisciplinarity is really built into the fabric of who I am and who I identify with as a researcher. And I've, over the years, learned that I do my best work in collaboration with people who have fundamentally different views than I do. There are a lot of academics who don't work that way. There's a lot of scholars who like to sit alone in their office with a cup of coffee in a book and write. That's not me. So, this kind of project really was perfect for me in that I was able to bring together people like Matt, who has a very different professional existence to me, as a working musician, and a bunch of students. We have students involved in the project from SMTD, from the College of Engineering, from across campus, as well.

Early on in this project. In fact, when we were conceiving the project in response to the call by the arts initiative, we made a conscious choice to approach this not by doing isolated studies and experiments in a laboratory. We wanted to explore these questions around movement, physical presence and gesture in telematic performance by doing it, by making things and trying them in performances. So, we moved really quickly from the conceptual stage to actually making things. That was really our idea, in part because we just felt a bit anxious to make stuff, because we'd all been sitting isolated for some time because of the pandemic. But also, it's an interesting way to approach this kind of problem, because we really just allowed all of the problems and challenges to bubble up through practice, through making things.

What we did, actually, in the project early on is we had put a musician in motion capture suit made recordings of them. And then instead of making robot right away to display their movement, we just used abstract, screen-based visualizations. For one thing, this was easier to do during the pandemic, where we couldn't really be in the workshop making things. But it also allowed us to really zoom in on what are the simplest but most expressive qualities of human movement in this kind of context that we could display.

Our first thing we made was just a picture of a cube. It was an animation of a floating cube in space, and the cube just expanded, and contracted, and rotated as the musicians played. And it was surprisingly expressive and compelling when we looked at it. And so, that gave us insight that even something that doesn't look like a person, something that's really abstract and something that has really limited degrees that it can move, can be compelling. Then, we set out to try to make these robots that do similar things.

Speaker 2:

Thank you for sharing that. Visualizing telematic performance is an example of arts research, an area that's not always well understood across our university community. How do you describe arts research?

Speaker 3:

Well, as I said, we could have approached this more like scientists or engineers. We could have done studies and experiments in a lab and shown through statistics that this particular condition of having a robot in the room with you makes more enjoyable or interesting music by however we want to kind of measure that. And we might still do something like that down the road as a part of this project.

For me, arts research is... Well, arts research can be different things. For me, arts research can be different things. It can be, in this case, answering questions and making discoveries through artistic practice, which doesn't just mean, "I'm going to make art and tell a story about it," but it's actually sort of coming into an artistic project with a set of questions that you're interested in exploring, and maybe some kind of hypothesis about how those questions will unfold or be born out through artistic practice. But then, really the answers to those questions are embodied in the work that you make, as much as they are in what you can write about it and what you can say about it. So, this is to say that to really get a sense of what this project is about, you should probably come see our performance in on December 3rd because it's really the making of the work that tells a story, as much as anything else.

Speaker 2:

Absolutely. And you just mentioned, but you'll be holding a public workshop and a performance that showcases the work that you have created. How might this performance inform the next stage of your team's work and research?

Speaker 3:

We've actually structured the project around this series of these workshop performances. And we've already had two, one in December 2021, and one in April 2022. And those were the first public displays of our admittedly crude little robots... Actually, one of them is pretty big. Big robots that we used as a platform to gain... Well, first of all to just see what happens when we put performers in this situation, but then also to show them to the public and gain insights and feedback from people about how they were perceived and understood, and ideas about what we might do differently.

So, the third of this series of public workshop performances is happening on December 3rd and it's going to be the biggest, most ambitious one because the previous two we did a simulated telematic performance where we had musicians playing together, but they were in different rooms in the same building. This solved a lot of technological problems for us. In this case, we're actually doing a real telematic music performance with collaborators at the University of Virginia. There will be a musician and a robot in Virginia, and there will be three musicians, in this case, they'll be playing separately at the University of Michigan, and a robot.

And so, the robot in Virginia will display the movements of the musicians from Michigan, and the robot that we have here will display the movements of the performer in Virginia. This is very scary for me, and admittedly ambitious, because there's all kinds of things that can go wrong, but we're on track to doing it and we're really excited about it. It's going to be a lot of fun.

As far as what happens after this, we'll see. I don't think we actually have a real firm expectation of what comes next. I think we're going to just be guided by the process and guided by what we discover through doing this. It could be that the whole thing doesn't work. One of the fun things about these robots... This is a little bit silly, but I've never really worked with robots before, but people who do think a lot about the risk factors of them. So, one thing that I think lends to this spirit of live performance is that they're a little bit dangerous. If you get too close to it and it moves the wrong way, it can hurt you, which is funny to think about, in a way. I mean, obviously not getting hurt. Getting hurt is not funny. But really, that kind of risk and that sense of something could go wrong, something could break is really sort part of what live music performance is all about.

There's this sense of danger and intrigue and "What's going to happen next?" Because it's so unpredictable and because there's humans involved. That's something that we're starting to discover is an important feature of this that's different than looking at something on a screen. So, I think we might dig into that, really work with that sense of how these things have unpredictability or autonomy in them that can emulate that sense, that magic that we get in live music performance.

Speaker 2:

Thank you so much for sharing that. And it sounds like such an exciting event with both universities collaborating together. As working together across geographic differences becomes much more common now and in the future, do you think that telematic performance will become more widespread than it is in music and other kinds of performances?

Speaker 3:

I'm already thinking about... Well, we're already thinking about the theatrical implications of this. And in some ways, this would be really easier to do if it weren't music, because music is so time critical. When we're just doing dialogue based theater, where obviously timing is important, but maybe less important down to the millisecond scale, which is what we're worried about. So, I think that in the art world has a lot of potential and there have been... I honestly don't know about what kinds of experiments people have done in the theatrical world with telematics.

I know that in dance, there have been some really interesting works in the past with dancers and robots. I don't know that's been done in the telematic condition, but I think the idea of using mechatronic choreography, especially in ways that we can reembody presence virtually are really compelling.

One of the stories we tell about this project, though, is that we could kind of imagine... And maybe this is a little bit of a fantasy, but wouldn't it be more interesting if instead of being looking at each other on a screen in the Zoom call, if we could have this little appliance on our desk that could be dancing around and gesticulating as I'm waving my hands trying to animate my conversation?

I think it'd be more fun, in some ways. And I think making these kinds of technological interactions more fun and playful is something that I'm really interested in, beyond just the artistic value. I think for our eyes, it's probably... Someone who's more expert in vision and health could correct me, but I think instinctively it feels like better to be able to not focus on a single point in space on this flat screen, however many inches in front of me. But if there was this little appliance on my desk dancing around that I could watch in three dimensions, it might be better for my health. I can imagine this world filled with these little robotic avatars that we might use to animate our virtual interactions.

Speaker 2:

Thank you so much for sharing that. And that would be so interesting. What is one takeaway you hope everyone listening will have from the information that you've shared today?

Speaker 3:

One takeaway could be... And I know this has happened to me, is once you start thinking about all of the subtle movements that people use to coordinate their daily interactions, you become really attuned to it and you become attuned to how much we move, and how we move in expressive ways. And so, if we start to become attuned to how these subtle bodily gestures are very much in negotiation, in the sense that we learn each other's gestural repertoires and learn how to respond to them and learn how to communicate through them, you start to become sensitized to the fact that these are also as important in artistic interactions, too.

And so, we consume music as much with our eyes as we do with our ears, I think. And I think that's, in many ways, unanswered to the eternal question of, "what is it about live music performance that still makes people want to go see concerts and see musicians perform, when arguably listening on good quality speakers to a really well made studio recording can sound better than maybe a live performance where there's prone to be mistakes and there might be acoustic issues with the room?"

So, there's something special about being in the room with performers, and I think a lot of that is in how they move. And a lot of that is about that unpredictability that I mentioned before, of not knowing exactly what's going to come next, which is something that I think is conveyed as much through their bodies as it is through their sound.

Speaker 2:

Thank you for sharing that. And before we wrap up today, is there anything else that you would like to share about your work or your arts initiative pilot project?

Speaker 3:

Well, the public is welcome to come to our final showcase workshop, December 3rd, Saturday. We're doing two performances of the program because the room has limited capacity. They're at three o'clock and four o'clock in the More building, the music building on North campus. And that's open to the public, first come, first serve seating. I want to also just express my gratitude to the arts initiative for facilitating this work because we couldn't have done it without that support. Just that this project is ongoing and it's going to morph and take different forms and enter different phases, but we see this as a long-term proposition that was really kickstarted by the arts initiative. We're really grateful to have been able to get the ball rolling.

Speaker 2:

Thank you so much for the insight that you've provided today, and thank you so much for your time.

Speaker 3:

Thank you.

Speaker 1:

Thank you for listening to the Michigan Minds podcast, a production of the University of Michigan. Join the conversation on social media with hashtag [inaudible 00:24:34].