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# Platforms for Multilingual Tele-Immersive Storytelling and Improvisation

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## Abstract

In 2020-2021, a pandemic caused a global shut down of the performance of live theatre. This led to many artists without creative outlets, many companies having to modify their programming, and, in an unfortunately large number of cases, the complete shutdown of theatres and companies. This circumscription led to a burst of technological innovation to support new ways to connect performers and audiences. In this work, we present two such innovations: *Rosetta Code* and *Virtual Director*. *Rosetta Code* is a tool for improvisation, live or online, which allows for simultaneous translation, enabled by artificial intelligence. The *Virtual Director* is a platform for tele-immersive performance. In the hands of multilingual cast members, the Virtual Director augments Rosetta Code to create online multilingual improv shows. We describe these platforms and provide descriptions and reflections on two performances of Improbabilities Online which used the Virtual Director to bring together audience members and performers from around the world. These performances were part of the 2020 Paris Fringe and Improbabilities Online received positive reviews and an award for the Most Innovative Show of the festival. We conclude this work by discussing the potential for mixed-presence international shows as we emerge from physical and social distancing requirements and how our tools will continue to support online and on-site performances. We have sparked a creative ratcheting effect: performers are enabled to tell new and interesting stories, and are inspired to suggest innovations which improve the tools with which they perform. These innovations are deployed in future performances. This positive feedback loop is a metaphor for the fundamental theory of improvisation: Accept and Expand.

**Keywords:** theatre, improvisation, immersive, multilingual, interactive, performance

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# 1 Introduction

Live theatre is a casualty of the current COVID-19 pandemic. Social and physical distancing requirements preclude assemblies necessary for participatory theatre. These restrictions have significantly reduced public performances, pressured many performing arts institutions to modify their programming, and in many cases forced the complete shut-down of arts organizations. Many of the world's most popular stages, including all Broadway theatres in New York, USA and West End theatres in London, United Kingdom, have plans to remain closed until at least the middle of 2021.<sup>1</sup> Early studies on the impact of social distancing restrictions on live arts professionals report substantial reductions in income for artists and increases in anxiety, depression and overall mental health (Spiro et al. 2020). The long term impact of shuttering theatres and the effects of social isolation on creativity in the performing arts industry remains to be seen. While some performing artists have been able to shift to digital mediums to somewhat mitigate the impact on their creativity, artists that rely heavily on the live presence of not only an audience, but their fellow performers have had little recourse to maintain their craft. Improvisational art forms in particular have struggled to find footing in digital mediums.

Theatrical improvisation relies on performers and audiences gathering in the same space and using that shared physical proximity to collaboratively build stories. The pandemic caused a global creative constipation through social and physical distancing requirements. Virtual gatherings using video-conferencing platforms are, at best, an ersatz solution for audiences longing for connection in an ever more disconnected world. These technologies have been linked to a phenomenon labelled 'Zoom-gloom' or 'Zoom fatigue', which has been studied in several recent works (Bailenson 2021; Fauville et al. 2021). Some improvisational theatre groups have embraced tele-conferencing and streaming for workshops, practice, and performance. But, due to how demanding it is to set these sorts of systems up, and the aforementioned Zoom-gloom which both performers and audiences are all too accustomed to, many are preferring to temporarily pause while waiting for the conditions of performance to resume (Berger 2020). The live performance limitation is a global issue; the world-wide community has been brought together online to share stories of adversity and challenge. A list of 'Improv Theatres That Shut Down in 2020' has been circulated and updated over the last year has over 60 theatres that have closed in the United States and Canada alone (Johnson 2020).<sup>2</sup> We believe that live theatre cannot wait for the pandemic to wane. Instead of re-streaming previously recorded live performances, we advocate for embracing technology, and specifically innovative platforms for tele-immersive storytelling and improvisation.

# 2 Virtual Director

Many live performers struggle with the desire to be as live and in the moment as possible while dealing with the physical impossibilities introduced by virtual improvisation. The laws of physics, that is, the speed of light, defines a theoretical maximum for the speed of information transfer. This is the maximum rate at which information from one performer can reach another performer or an audience observer. When audience and performer are co-located in a theatre, this information can happen at the speed of sound for jokes, laughter, and applause, and at the speed of light for body language and scenic painting. When performers are not co-located with audience members, it takes a non-insignificant amount of time for the information round trip to occur. While this is generally under a half-second, it can feel like a lifetime. Thus, platforms must be designed in such a way to handle issues of latency and lag introduced by these delays. And, as the number one rule in comedy is timing, handling these issues effectively is paramount for translating the comedy from the performers to the observers.

Theatres around the world have tried countless ways to incorporate live and prerecorded content for performance, hosting, and audience interaction. But, the platforms often stand in the way rather than uplift. These tools need to be easy enough for performers to use and improve audience enjoyment.

To handle these requirements, we built a platform for online performance. Our system, called the *Virtual Director*<sup>3</sup>, enables actors to simulate feelings of presence with stage partners while performing and storytelling remotely (Branch et al. 2021). Our research combines cinematic and video communication technologies with the theatrical practice of improvisational and scripted theatre, and aims at recreating presence, virtually. Virtual Director relies on commodity software (i.e. TouchDesigner<sup>4</sup> and web browsers such as Google Chrome), widely adopted video conferencing tools (e.g. Zoom, Microsoft Teams), and popular streaming platforms (e.g. YouTube, Twitch). Our solution 'piggy-backs' on these digital platforms for streaming and video conferencing for participatory online performances. This makes using the tools as easy as using common consumer software. These technologies have evolved significantly with a year of development and global dependence for tele-work and remote education. Software such as Open Broadcaster Software (OBS), OBS.Ninja<sup>5</sup>, and even Zoom's and Google Meet's capabilities have improved significantly through 2020 and 2021.

<sup>1</sup><https://broadway.com/announcement/covid-19-update/>

<sup>2</sup>Thank you to Noah Johnson & Levity Theatre (<https://levitytheatre.com/>) for compiling this grim list.

<sup>3</sup>'Tele-Immersive Improv': <https://youtube.com/watch?v=LkqfRWH3iKU>

<sup>4</sup><https://derivative.ca/>

<sup>5</sup><https://obsproject.com/>, <https://obs.ninja/>



Figure 1: Examples of the immersive multi-performer virtual stage. In these images, one can see multiple performers—who are not physically co-located, and who are connecting from different countries—composed together in a virtual scene. The real-time masking and composition is done by the Virtual Director software.

While a full system description is out of the scope for this particular work, we encourage readers to see (Branch et al. 2021) for complete details. Next, we discuss how the Virtual Director system was tested with 2 small ‘live’ public performances featuring a variety of improvisational teams and 2 performances with Improbabilities Online at the 2020 Paris Fringe festival.

## 2.1 Early public trials

While developing Virtual Director we conducted two trials of the platform in front of live audiences with short performances from four different improv theatre teams. The teams were solicited from an open call for two-person improv teams who had been working together for at least a year and were interested in trying out new tools for streaming performance. Each team trained with the software for two weeks prior to performing for small audiences who watched the live shows from within a Zoom conference call. Twinprov<sup>6</sup> and the Jess’s’s’s<sup>7</sup> performed for the show Double Incidentally May 31, 2020 for 15 audience members. Sudden Knot and Assimilate performed for Digital Improv Presents June 14th the following month for 21 audience members. Each team performed for approximately 20 minutes. We conducted surveys after each performance and received 13 responses. Twelve of the thirteen respondents ‘agreed’ or ‘strongly agreed’ to feeling present with the performers as well as agreeing they could ‘easily visualize the world created by the performers,’ demonstrating that the platform was successful in bringing a sense of cohesion and shared presence between remote participants. Answers to our open ended questions yielded a more nuanced appreciation of the impact of the technology on the potential of live streamed performance. We include the following quotes from audience members (A1-A7) for discussion answering ‘How did you feel about the presence of the technology in the show?’:

*It was certainly interesting, and the visuals helped to create an extra dimension for us as the audience. (A1)*

*Really engaging, and the connections between performers particularly stood out! (A2)*

<sup>6</sup><https://www.facebook.com/twinprovimprov>

<sup>7</sup><https://www.facebook.com/jesssssimprov>

*It was terrific, the second part with the filter was super cool and I loved seeing them on green screen as well as in the virtual environment - it was distracting but not detracting if that makes sense (and really the distraction pulled me in deeper).(A3)*

*I felt I was a part of it - especially at the top and end, there is something powerful for an audience member to share the screen with the performers. (A4)*

*Felt great - would be awesome to have ongoing cues or coordination where artists knew the bounds of the technology and explored it more. (A5)*

*I would like to see actors working more in different levels of the virtual space. Playing with their size inside the screen could be really engaging for the audience and both challenging and exciting for actors. (A6)*

*It was something I was aware of, but it added to the feel and vibe of the show - even when things didn't work as well as you might have hoped, it all just added to the fun. (A7)*

The range of responses we share capture both the sense of pleasure audience members expressed in being part of a visually co-located performance, as well how the presence of technology stimulated their imaginations about what might be possible with a platform that could immerse audiences and performers inside a shared visual space.

## 2.2 Performances at the Paris Fringe Festival

We deployed Virtual Director within the context of an Improbotics Online show as part of the community-based performances at the 2020 online Paris Fringe festival. Improbotics<sup>8</sup> started as a research and performance project exploring Turing's imitation game using machine intelligence in improvised theatre (Turing 2009; Mathewson and Mirowski 2018; Mirowski and Mathewson 2019). To ensure that the audience understood the context for the performance, the description of the show was as follows: *Improbotics Online is a fully online, live improvised performance in an immersive virtual reality stage where human improvisers interact with artificial intelligence.*

We performed the show twice, on the 6<sup>th</sup> and 21<sup>st</sup> of June 2020. The show won a 'Ballsy Award', and was also awarded the 'Most Innovative Show' at the 2020 Paris Fringe.<sup>9</sup> The performance received a four-out-of-five star review on June 7, 2020 and the complete text of the review is included for context as an appendix to this work. We include a quote from the review here for discussion:

The translation of the stage show into an online performance was not entirely seamless – however I do not feel it is important to mark **Improbotics Online** down for this, as a lot of the witty and interesting moments occurred during the slight awkward panic of being live and online. –Jake Mace

This review acknowledges that even the unique moments when the performance was not seamless were still interesting. This delightful balance between 'everything is under control' and 'potential panic' is delight inducing from an audience point of view. In a way, this risk is analogous to the 'ring-of-fire' that a trapezist would leap through in the big tent at a circus (Johnstone 2012).

To see the show, we have posted a short trailer and a full performance, accessible at <https://improbotics.org/online/>. In the next section, we briefly describe several interesting qualitative observations that we synthesized from the audience members and performers during and after these performances.

## 2.3 Performer-Audience Interaction

We now examine the perception of the performance by audiences and their participation in collective storytelling. Our audience was interested in the new interaction formats and performance modalities presented as part of Improbotics Online. Our streamed performances redefined the nature of live performance, and we identified 4 levels of participation: (1) **participating as a performer**, (2) **privileged audience member**, (3) **general audience member**, (4) **onlookers watching the show recording, post-performance**.

We briefly summarize each of these modes of participation, comparing and contrasting the qualitative experiences. First, our tool enabled visual collocation and presence among performers. These are the professional improvisors who perform the show, they represent the cast of performers. Second, Virtual Director enabled visual collocation and audio interaction between selected privileged audience member and the performers, or recreated visual presence if we placed them in a virtual "amphitheatre". Third, general audience members audiences could interact indirectly via synchronous chat.

<sup>8</sup><https://improbotics.org>

<sup>9</sup><https://twitter.com/leparisfringe/status/1279062282723622915>



Finally, onlookers can watch, or re-watch the performance, as we post the recording of the performance to the internet for asynchronous enjoyment.

Our initial study on the impact of visual co-location on remote improvised demonstrated how being visually co-located enhanced the sense of presence with remote scene partners in a way that traditional 'grid' arrangements of popular conference tools did not. Subjects of the study reported how this sense of presence with each other contributed to their ability to enter into a state of 'flow' during performance that in turn led to enhanced feelings of creativity and the idea that online improvisation could be an entirely new medium distinct from physically staged improvisation (Branch et al. 2021).

We noted a similar idea emerging from our audience feedback about how online performance could be considered a new medium with different rules and expectations from physically staged performance. The 'extra dimension' of a shared visual environment for one audience member that added to their enjoyment was the same dimension leading another to imagine how the addition of dynamic visual environments could be better exploited with actors 'working more in different levels of the virtual space.' Traditional improvisation is bound by physical laws that digital improvisers are not inherently bound to meaning 'space' now has additional expressive potential as performers can appear bigger or smaller taking up space in new ways that impact storytelling.

During our initial audience study we experimented with keeping the audience visually present throughout different moments of the show by instructing them to keep their cameras and microphones on. The feeling that 'there is something powerful for an audience member to share the screen with the performers' was echoed by another who reported 'My attention felt more present and necessary'. Co-locating all audience members with performers during shows streamed to larger audiences on social media platforms such as Youtube however cannot take advantage of webcams the way video conferencing tools can, so require different methods for engaging with audiences.

For our Paris Fringe shows we instead explored how live chat could be incorporated into performances. We added functionality to Virtual Director that could display the results from a web-server that audience members could send suggestions to in addition to commenting with each other during performances via the built in chat functions of Youtube. Curated suggestions from both sources would then appear inside the virtual environment inhabited by the performers between scenes.

These different modes of interaction are all complimentary to the performance experience. They all contributed to a sense of collaborative collective storytelling in a shared 'space'. As a performer, you need to consider the performance from each of these perspectives, and understand how to engage with these perspectives in the moment. Additional analyses of the performers' experience of presence in tele-immersive virtual spaces is covered in work by Branch et al. (2021).

Having tools such as the Virtual Director accessible to us, and rehearsing and performing with them led to a creative ratcheting effect. The more that we shared these tools with brilliant performers and professional improvisors, the more interesting and innovative ideas they had to tune and modify them and use them in interesting ways. For instance, the shared virtual environments of online rehearsals and performances with Virtual Director resemble cinema much more than theatre and led to the novel adoption of cinematic techniques for improvised storytelling. During rehearsals improvisers began exploring how they could move props on and off screen, make their heads disappear by placing green fabric in front of their faces, and composite their bodies onto each other by overlapping their images on screen.

With Virtual Director performers can not only enter and exit the playing space by moving off camera, but they can also reference and incorporate physical props and costumes dynamically into scenes as they develop. Our platform also provided the addition of a 'virtual camera' as another scene partner that could interact with the performance. The environments of Virtual Director are built inside a 3D environment where performers are placed on transparent digital planes sandwiched between foreground and background elements which can subsequently be viewed from different angles. This allowed us to incorporate virtual camera controls to our platform so that an operator could 'pan' and 'zoom' into different areas of the screen like a sitcom or movie.

In addition to new cinematic techniques, virtual performance also led to novel incorporation of communication tools that bridged not only physical distance, but language barriers. Prior to the pandemic, Improbotics had long been adapting technology from state-of-the-art language models, to digital avatars, to translation systems to explore how humans can improvise with technology (Mathewson and Mirowski 2017). In physically co-located shows, the role of these technologies could often be difficult for audiences to distinguish. With online performances however, we discovered not only how we could make these novel tools more visually present, but how we could incorporate them more meaningfully into performance.

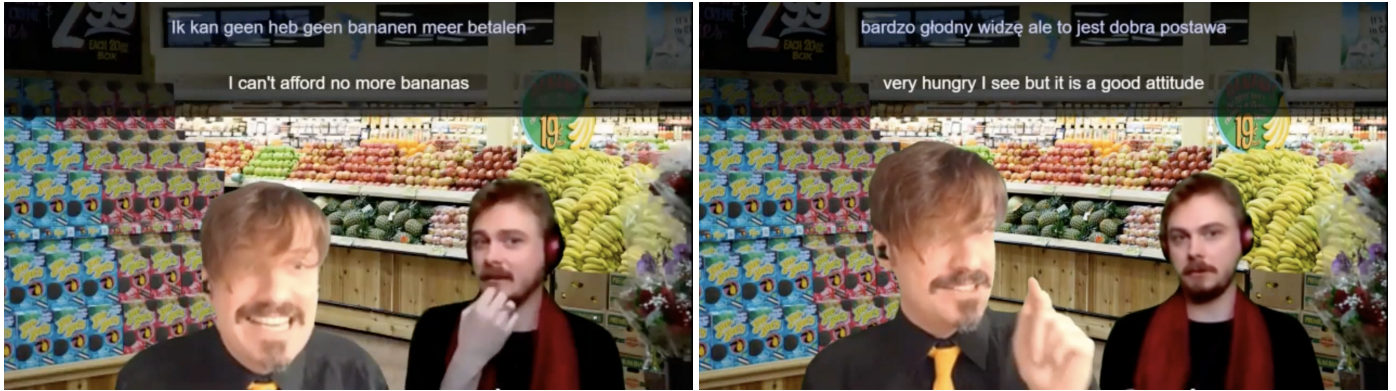


Figure 2: Examples of the immersive multi-performer virtual stage combined with real-time translation for two performers who are not physically co-located and who are speaking in two different languages (Dutch and Polish) with live translation into English. The real-time masking and composition is done by the Virtual Director software, combined with the Google Speech Recognition and Translation APIs.

### 3 Multilingual Performance and Actor Interaction

As an international theatre troupe, Improbotics has cast members representing multiple nationalities and languages. In 2019 we began exploring novel multilingual improvisational formats by exploiting live translation and speech recognition technology in a show called Rosetta Code.

Using Google’s API for speech recognition, for real-time translation, and for text-to-speech generation, we built a program to listen to improvisers speaking in a language foreign to their scene partner’s and to send them the near real-time translation via headset, as well as to display the result of speech recognition and of real-time translation on a screen. In this way we enabled actors to improvise in multiple languages while being understood by cast members and audiences. The show was performed on stage in November 2019 at the Rich Mix Theatre<sup>10</sup> in London, as part of the Voila Festival of European Theatre (Mirowski, Mathewson, et al. 2020).

While we had some successes with this format it could at times be difficult for audiences to track how the translations were taking place as we relied on projections that did not always sync smoothly with the performance. Moreover, capturing the speech of individual performers, without cross-talk from their stage partners, proved challenging and required them to hold a dynamic microphone with an on-off switch in their hand. Moving to an online platform with Virtual Director not only began to solve many of these challenges (for example, speech recognition could be run independently on each performer’s computer), but also introduced new ways to incorporate translations into the show.

Our original system which enabled a low-latency, multilingual experience for performers and audiences alike, challenged contemporary theatre which is often performed and enjoyed in a single language. Building up on an existing multilingual improv stage show (Mirowski, Mathewson, et al. 2020), we combined tele-immersion with translation to create a multilingual performance that transcends typical physical limitations of the stage. As the performers spoke in different languages, real-time translation of their lines was displayed on the screen, like the subtitles in a foreign film. The cohesive environment of the virtual stage enabled us to use subtitling more effectively so that audiences could see the translations and the performance simultaneously, in a way that projections alone could not do.

Moreover, the addition of virtual environments meant we could provide a more cohesive narrative experience and context for multilingual improv with performers appearing to be in the same physical location. When performing in physically co-located shows, the stage is empty and requires improvisers to not only spontaneously generate meaningful dialogue, but also verbally ‘paint’ the visual environment of the scene through that dialogue. With multilingual performance it there is a significant cognitive demand on both performers and audiences to keep track of physical details being described throughout the scene, and there is subsequently little agreement about the physical reality of the space. Performing tele-presently with Virtual Director meant performers and audiences could immediately understand where the scene was taking place, alleviating much of that cognitive burden.

<sup>10</sup><https://richmix.org.uk/events/rosetta-code/>

## 4 Discussion and Conclusions

One consideration is that our system de-centers the place of the actors on the digital stage. No longer is there a human front-and-center, but rather, there is a window (sometimes quite literally a digital window) within which performers are co-located. This has a potential to shift the audiences focus from the acting and emotion of the live performer to the technological choices that are supporting the experience. While this risk is real, we have found that the balance enables us to explore mixed human-machine storytelling in a way that would otherwise not be possible. That is, we are able to have humans and machines perform scenes together and it ‘looks and feels’ similar to having two humans perform together. This delicate balance on the cusp of the uncanny valley is a fun and playful experience for performers, and it allows us to tell stories that are otherwise more demanding on the audiences’ suspension of disbelief.

Once we assemble again in a post-pandemic world, we will keep the tele-immersion and translation tools to create mixed-presence connected international shows. What we aimed to do with our Virtual Director work was not to repeat or replicate the experience the interactive and embodied experience in a shared theatre setting. Rather, we aimed to augment the creativity and storytelling capabilities of human performers with technology that can be used in multiple settings (Mirowski and Mathewson 2019).

These tools will enable the next generation of on-site improvisational theatre as well. Performers will be able to build immersive lighting, visual, and audio experiences in the moment, and from the stage. Audiences will be empowered to immerse themselves in the collective creation of the show through textual interaction, through their voices, or even by moving around the space. These platforms are built in such a way that they can easily be adopted by improvisational theatres anywhere on earth. We are already sharing this technology with other performers around the world. These groups have engaged with our platforms to enable their shows. This global impact is a testament to the impact of platform development. Finally, as we slowly and cautiously migrate back into the theatres, our technologies will continue to enable live theatre experiences in novel and immersive ways.

## References

- Bailenson, Jeremy N. (Feb. 23, 2021). “Nonverbal Overload: A Theoretical Argument for the Causes of Zoom Fatigue”. In: *Technology, Mind, and Behavior* 2.1. <https://tmb.apaopen.org/pub/nonverbal-overload>. DOI: 10.1037/tmb0000030. URL: <https://tmb.apaopen.org/pub/nonverbal-overload>.
- Berger, Nicholas (Apr. 2020). *The Forgotten Art of Assembly*. URL: <https://medium.com/@nicholasberger/the-forgotten-art-of-assembly-a94e164edf0f>.
- Branch, Boyd, Christos Efstratiou, Piotr Mirowski, Kory W. Mathewson, and Paul Allain (2021). “Tele-Immersive Improv: Effects of Immersive Visualisations on Rehearsing and Performing Theatre Online”. In:
- Fauville, Geraldine, Mufan Luo, Anna Carolina Muller Queiroz, Jeremy N Bailenson, and Jeff Hancock (2021). “Zoom Exhaustion & Fatigue Scale”. In: *Available at SSRN* 3786329.
- Johnson, Noah (2020). *Improv Theaters That Shut Down in 2020*. URL: [https://docs.google.com/spreadsheets/u/1/d/115zmaMOfBZKpxINnfWH9wekYGds17bpJb5G1K-7Y\\_hg/htmlview](https://docs.google.com/spreadsheets/u/1/d/115zmaMOfBZKpxINnfWH9wekYGds17bpJb5G1K-7Y_hg/htmlview).
- Johnstone, Keith (2012). *Improv: Improvisation and the theatre*. Routledge.
- Mathewson, Kory W. and Piotr Mirowski (2017). “Improvised theatre alongside artificial intelligences”. In: *Proceedings of the AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment*. Vol. 13. 1.
- (2018). “Improbots: Exploring the imitation game using machine intelligence in improvised theatre”. In: *Proceedings of the AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment*. Vol. 14. 1.
- Mirowski, Piotr and Kory W. Mathewson (2019). “Human improvised theatre augmented with artificial intelligence”. In: *Proceedings of the 2019 on Creativity and Cognition*, pp. 527–530.
- Mirowski, Piotr, Kory W. Mathewson, Boyd Branch, Thomas Winters, Ben Verhoeven, and Jenny Elfving (2020). “Rosetta Code: Improv in Any Language”. In: *Proceedings of the 11th International Conference on Computational Creativity*. Association for Computational Creativity, pp. 115–122.
- Spiro, Neta, Rosie Perkins, Sasha Kaye, Urszula Tymoszyk, Adele Mason-Bertrand, Isabelle Cossette, Solange Glasser, and Aaron Williamon (2020). “The effects of COVID-19 lockdown 1.0 on working patterns, income, and wellbeing among performing arts professionals in the United Kingdom (April–June 2020)”. In: *Frontiers in psychology* 11.
- Turing, Alan M (2009). “Computing machinery and intelligence”. In: *Parsing the turing test*. Springer, pp. 23–65.

## 5 Appendix 1: REVIEW: Improbots Online, Paris Fringe 2020, 4/5 Stars

*This review was posted to BingeFringe.com June 7, 2020 and is authored by Jake Mace.*<sup>11</sup>

In events reminiscent of a mix between a Franz Kafka novel and an episode of Black Mirror written on an acid trip, Alex the Artificially Intelligent Avatar has joined an improv troupe. Alex’s automatically generated lines are slotted

<sup>11</sup><https://bingefringe.com/2020/06/07/review-improbots-online-paris-fringe-2020/>

into the architecture of stories created by audience suggestions through a website. These suggestions are then beamed back to YouTube in the style of a Raoul Hausmann collage as the bodies of the improvisers are inserted into different backgrounds by virtual director Boyd Branch.

Improbabilities Online was split into 3 sections. In the first, Alex is inserted directly into the scene, creating some incredibly surreal interaction between a photorealistic AI cat and a man who just wants to swim. In the second section two-hander scenes are played out by the improvisers but one's body is inhabited by Alex, becoming a "Cyborg" and only speaking lines generated by the robot.

Possibly the most entertaining section of the show took the form of a narrative across many scenes where one of the improvisers was a "Cyborg" and the audience has to guess which. This led to a hysterical moment where in the middle of an intense scene about a woman who suspects her boyfriend has been cheating on her while he's at the gym, improviser Harry Turnbull (seemingly inhabited by Alex) blurts out the line "The number of troops in Afghanistan in the past three years has risen directly in tandem with President Obama's strategy."

Other standout lines from the AI include "I'm your Mum, you're my Brother, what do you think of my Dad?" and "I'm an alcoholic, so I don't mind." Alex, either intentionally or unintentionally, seems hellbent on disrupting any scene that they are dropped into the middle of.

The translation of the stage show into an online performance was not entirely seamless – however I do not feel it is important to mark Improbabilities Online down for this, as a lot of the witty and interesting moments occurred during the slight awkward panic of being live and online. If anything, the online show seemed to thrive on the anarchy that the format provided. All of the performers showed excellent form to carry the show through despite being scattered all over the world.

Live suggestions from the audience were integrated into the show's last segment and the performers seem to feed perfectly off of these as well as bouncing around Alex's chaos-bringing presence. The narrative of this final segment took many surprising turns. It eventually landed on the story of a grunt being sent by a wizard to find him a Scandinavian wife as he had turned his previous girlfriend into a Pumpkin Spiced Latte while in the Starbucks queue.

His quest leads us to a woman who still bathes with her forty one year old adult son. On their first date, the wizard gets cold feet and turns himself into a cat, before through a number of tangential encounters lead us back to some sort of conclusion.

The implementation of the AI into these traditional Improv troupe games is genius and the pace of the event doesn't skip a beat, even in between the monumental technical efforts undertaken to splice each player into a scene. This is exactly the kind of response that the creative world will have to look towards as we continue to learn to live with the current tricky situation regarding lockdowns and restrictions on how readily artists can perform together and in front of live audiences.

Overall, the show was raucous fun, pure anarchy and a dystopian vision of an Artificially Intelligent future where the Turing Test might be decided by how readily you can hold back your views about the deployment of US troops into the Middle East.

Improbabilities Online is not to be missed this Paris Fringe. A second performance will be held on the Paris Fringe Youtube Channel on the 21st June 2020 at 21.30 Paris Time, for absolutely free. You can read more about future Improbabilities performances on their website.