

## **Makers of Imaginary Worlds**

Artists in Residence Case Study

Title of Work: **The Close Encounter**

Abstract:

Our installation with 'NED' - the Never-Ending Dancer, a costumed Robotic arm that uses a facial recognition system to imitate a person's movements. It's often young children and families' first close encounter with a robot that is not a toy. The aesthetic dimension of the environment and costuming the robot is central to facilitating an open engagement that not only enhances curiosity and trust but helps to promote communication, and a young child's willingness to interact.

The Close Encounter moves away from the mirrored encounters with the audience to embedding AI as a central feature to combine both controlled and improvised movements. The robot will learn from choreographed movements of professional dancers and audience interactions, to create a generative conversational model to enhance the playful, fun relationship between the participant and the robot. The work will explore Gordon Pask's conversation theory and poetic system to help enhance trust between the robot and participants and experiment with the potential of robot audition and computational auditory scene analysis, soundtracking & localisation of sound in the installation.

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With this learning system, we are trying to achieve an experience of collaboration and relationship between the audience and the robotic arm through dance, one of the oldest and most universal artforms. Dance uses the body to create action in space and time, and is often

accompanied by music. A robotic arm has limitations: its only expression is through its arm, however by extending robots reach through its costume and additional sensors attached to it to help it read its human partner we hope to create a larger character that not only draws on costume traditions from street theatre and carnival costumes but sensing technologies.

In addition, we hope that the use of robot audition can help develop a robot ears that work in the real world, so the robot can not only listen but respond to the music through its movement.

Our work is public facing and is about the experimentation of humans with machines, in particular helping researchers understanding the relationship between robots and children and families. We hope that it may help give insights into how this user group perceives robotics and about human robot collaboration through dance.

The work draws on the relationship between aesthetics and trust particularly how audiences perceive robots and to a certain extent the role of suspension of disbelief in robotics. In costuming the robots we are also looking at how the arts help us to re-imagine and change the way we think about robots and AI.

### **Where is the risk/vulnerability?**

By adding AI we are creating a more complex personality for the robot, it becomes more intelligent and human like, reflecting the complexity of the natural world.

Over time there is a risk of the embedded AI becoming so autonomous that it doesn't connect or relate to the audience - if it goes rogue it can create new conditions for possible miscommunications between the robot and the human, thus disconnecting or breaking the dynamic of the engagement and risk creating a negative experience.

Looking at nature and the way it works in an ecological consciousness, when we are giving the robot AI it begins to act as itself in a random fashion. Trust fluctuates dynamically as the interaction unfolds over time.

## **Where is the user choice?**

The Close Encounter focuses on the audience relationship with the robot, the user (children and families) can choose to interact with the robot. When doing so they create a feedback loop with the robot, each movement that the user makes engages the robot to choreograph a new/remixed movement, expanding the robots' intelligence and advanced analytic capabilities. The interaction is not scripted, it's playful and responding in real time, encouraging the user to be more playful, and thus have more freedom and choices in how to interact and what movements to make. The user can choose not to interact, thus creating a stalemate of no interaction.

This could help researchers to understand *what* causes users to cooperate (or not) with robots and also *how* this cooperation comes about.

## **What are the standout characteristics of this work, its merits in context of TAS research and limitations?**

The playful nature of children, and their willingness to engage crucially can help to create playful characteristics in the robot behavior, thus possibly promoting a higher level of trust with AI and robots.

Building AI into the robot whereby the childrens' real time interaction is building the data library is helping to build the intelligence of the robot, rather than using strict data feeding. We can not foresee what a child will do, what the robot is learning is out of our control, the user is helping the machine learn. In Turing's early sketch of intelligent machines he suggests:

*"that intelligence might be multiple and relational: that it might take many different forms, and that it might exist between, rather than within, beings of all and diverse kinds."*

*Ways of Being* - James Bridle

We will be looking at whether trust can be built through the interactions, and continuously evaluating the intelligence of the robot and how it relates to the user.

The costuming of the robot creates an anthropomorphic imaginative aesthetic. We are looking to use this costume to extend the movements of an industrial robotic arm, increasing its presence through the natural kinetic movements that the costume affords.

### **What aspects of Trust explained/explored/exploited?**

Through the power and role of aesthetics in creating trustworthiness. The robot's appearance and the context of its environment essentially creates a bias for the audience to trust it, it looks like a bird, we give it a character and weave an imaginary story about it and create an anthropomorphism this helps the audience to perceive it as trustworthy and enter into a willing suspension of disbelief and interact with it.

If we think of human behaviour, often our first impressions are important. Research has shown that the average first impression is made in just 27 seconds of meeting, a third of those polled make up their minds in under 10 seconds. The user's first impression could play an important factor in how the interaction unfolds over time. The possibility in this scenario is that it could create a sense of overtrust from the user that spills into future robotic interactions, that narrows your sense of judgment and critical thinking.

### **Domain and setting – where does this work sit?**

The Close Encounter is an art installation that sits in the realm of visual arts for children and families. Makers of Imaginary Worlds push the boundaries of "Art" in the traditional sense, bringing work to communities and audiences in libraries, museums and other community settings. All research is undertaken in the wild, with researchers observing child robotic interactions.

### **Is there an application area or perspective that you explored?**

Description of technology, test environment: e.g., in-the-wild, live but lab, simulation, online but see 'domain and setting' - I think 'description of technology' is part of whether context-specific.

Robotics and machine learning in the wild. Children and Robots. Play and robots.

## References

<https://link.springer.com/article/10.1007/s43154-020-00029-y>  
<https://onlinelibrary.wiley.com/doi/full/10.1002/aisy.202000050>  
<https://www.frontiersin.org/articles/10.3389/frobt.2021.576664/full>  
<https://patricktresset.com/new/>

Resources – e.g., images, sketches, and notes.

Video link NED Dancing:

<https://drive.google.com/drive/u/0/search?q=ned>

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