A Cybernetic Performance System for Live Performance

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A cybernetic performance system allows the performer autonomy over their technical environment. The system looks to enable a process where the physical and technical design are created concurrently, resulting in an authentic relationship between the performer and their digital environment when producing live, performative work. The installation looks to demonstrate the process of incorporating a performer, technology, and technologist into the cybernetic performance system.

1. INTRODUCTION

Carried out at the Institute of Creative Technologies at De Montfort University, this project is one of a series of experiments investigating the use of cybernetic systems in the creation of live performance. This practice-based research looks to use the process and outcomes to gain new knowledge (Candy and Edmonds, 2018, 63), studying the cybernetic relationship of a performer, interactive system and technologist and its potential effect on creative practice.

2. THE ARTISTS

Craig Appleby is a Creative Technologist with experience in performance, theatre and events. His research focus is the integration of performers with technology, and the impact this has on the creative process and practice.

The performer in the piece is Kalli Vratti, a Dance graduate from De Montfort University. Originally trained in Greece, Kalli’s previous work focused on movement researching and improvisation. Her interest in storytelling leads to the use of scripts when creating work.

3. THE WORK

The installation will allow the user to control lighting with their movements. Using motion tracking data of the user to manipulate the parameters of lighting in the space, the user will be able to engage with the system as a performer, creating their own lighting by moving, dancing, or playing in the space, giving them creative control over their environment.

The video to be shown (Appleby, 2021) demonstrates the full system, with the dancers X and Z coordinates in the space determining the hue and saturation (Fig 1) of the lighting wash, whilst the Y coordinates of each hand control intensity of the side lighting on each corresponding side (Fig 2). There are also distance thresholds at the back and front of the performance space, triggering a blackout and strobe effect respectively.

For the gallery installation, this has been scaled down to side lighting intensity and hue/saturation control.

3.1 How it works

The skeletal data of the performer is tracked via a Kinect v2 camera feeding directly into Isadora, a modular coding program.

The data from the motion tracking is decoded into x, y and z coordinates of selected point of the body. In this case, it is the hands and the centre point of the torso. These coordinates are then fed into a lighting control board via OSC over Wifi. The different OSC commands control different parameters for different lights.

Each value from the coordinate data is scaled to a different range depending on what fixture it is sent to. The two main ranges are 0-100 for percentage and 0-255 for DMX (lighting control protocol).
3.2 Research Outcomes
The original research project showed clear evidence that the system directly influenced the performers creative choices. The cybernetic relationship between performer, technologist and system allowed for the piece to evolve over time. This could enable new methods and direction for creating art in performative practice, moving away from a standard practice of physical choreography and technical design as separate sections of the creative process. This development could lead to a more authentic relationship between performer and technology.

4. CYBERNETIC PERFORMANCE SYSTEM

The research behind the project is the theory of a Cybernetic Performance System (CPS). Originally inspired by Steve Dixon’s Cybernetic Existentialism (2016), a CPS incorporates the performer into their technological environment, giving them autonomy when working with such things a lighting. This cybernetic feedback loop (Fig 3) informs the performer’s creative process. The intention is for the system to be flexible to best suit the needs of the performer and their creative ambition. This is reflected in the set-up of the Isadora patch and OSC. Once the input values have been established, these can be manipulated and scaled as appropriate, then transmitted to wherever they are needed. This could be to an external piece of equipment like a lighting control board (as exampled in this project) or different software on the same device, or kept within the original software to control audio, video and so on.

5. REFERENCES
Appleby, C (2021) ‘I trust my wings, I’m reaching you’ - A Cybernetic Performance System for Live Performance [online video], Available at: https://youtu.be/1A3rkxxyb20
Candy, L and Edmonds, E (2018) Practice-Based Research in the Creative Arts, Leonardo, 51(1) pp.63-69
Dixon, S (2016) Cybernetic Existentialism, International Journal of Performance Arts and Digital Media, Vol 12(1) pp.11-30