robotcowboy

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ABSTRACT

This article presents the human-computer mobile performance project entitled "*robotcowboy*". *robotcowboy* [sic] consists of a "one-man band" wearable computer system dubbed "*unit*" composed of a mobile computer and various input devices such as midi controllers, game controllers, and environmental sensors.

Keywords

wearable computing, mobile music, performance art

1.INTRODUCTION

"By its very nature, performance [art] defies precise or easy definition beyond the simple declaration that it is live art by artists."[1]

r*obotcowboy* is a performance project centered around using the power of the computer for active, mobile expression. The main goal of the project is mobility : performers can use the system as an instrument - an extension of themselves. They are free to roam the stage, the street, and the world performing computer-based music, becoming "more then an extra" to the machine. In the vein of Terre Theimlitz smashing a laptop on stage, it is an attempt to challenge the nature of live computer music performance: "a type of risk or 'break' with the electronic spectacle, in order the develop a genuinely new practice". [2]

2.BACKGROUND

Performance art and music have a close relationship which is utilized by one-man bands, DEVO, and Maywa Denki, among others. The one-man band, as a performance, is a "single musician playing more

Conference'04, Month 1–2, 2004, City, State, Country.

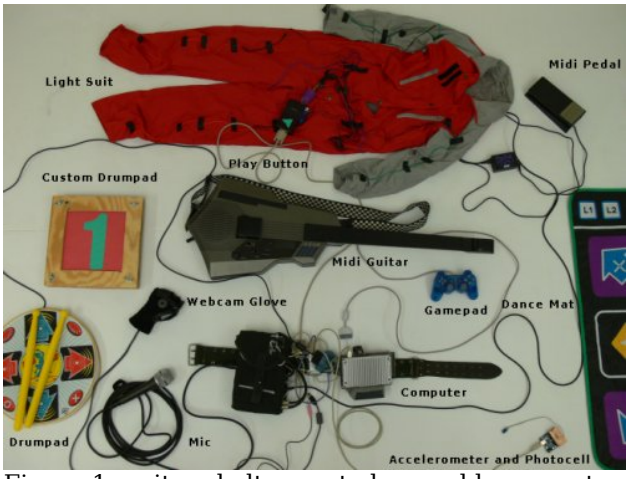

Figure 1: unit - a belt-mounted wearable computer, sound card, device hub and input devices

than one instrument at the same time" and its artistic motivations mirror the essence of art:

"There is something deeper at work in this extraordinary impulse to play it all, alone, at one time, with all the requisite physical agility, and to play it so joyfully. There is a radical independence at work here, an urge to confront and explore human capabilities and possibilities, an urge to realise a unique and playful thought."[3]

As an acoustic one-band roams his environment and interacts with people and objects, so can his digital version. Previous mobile music projects have focused on the "soundwalk" - mapping environmental information into live sound: Gaye, Mazé, and Holmquist's *Sonic City,* which maps "mobility as interaction" through the everyday walk of a city dweller to generate sound using movement, light, and sound sensors [4]; and Maeybayashi's *Sonic Interface* is "an extension for the ears" which highlights previously unnoticed sound through realtime remixing as the user traverses the environment [5]. Several projects have also built active wearable instruments, notably: *Bodycoder*, a body sensor array which controls live sound through a Max/MSP environment [6]; the MIT Musical

Jacket, a capacitive fabric keypad and tiny General Midi synthesizer [7]; and *CosTune*, a wireless jam session involving users wearing custom mobile gestural instruments including gloves, a jacket, and pants [8].

3.IMPLEMENTATION

The *robotcowboy unit* system consists of a “one-man band” Xybernaut MA V wearable computer and various input devices such as midi controllers, game controllers, and environmental sensors. The main aim of the system is for mobile computer performance in both traditional venues as well as out on the street. Utilizing a wearable computer mounted on a belt (see Figure 1), as opposed to a laptop, allows much more flexibility for use in ’digital busking’ — digital music performed on the street — since it is designed to be worn, hardened for active use, and power efficient. An external sound card functions as a microphone preamp, stage monitor, and midi interface and a direct box allows for a seamless connection to an existing amplifier system – walk on stage, plug in, and go.

Audio is generated in realtime via Miller Puckette's graphical audio programming environment Pure Data [9] running on GNU/Linux. Pure Data was chosen for its audio application prototyping speed, cross platform compatibility, and the relative easy of use for designing complicated and intriguing audio results. Linux is a free, open source operating system designed after Unix and allows for a high degree of customization and optimization. The Pure Data patches used in *robotcowboy* are designed to generate audio results based on incoming input data in realtime, there is very little sequencing. As a result, each performance of the same patch will follow the same theme but will vary due to imperfect timing, changing sensor data, and shaky human hands. Aesthetically, this is a vital decision in that allowing for error will result in a much more rich output and interaction between performer and machine.

Input device audio mapping is kept simple in order ensure ease of use and link the motion of the performer with the sound being produced. Patch control is facilitated through a custom song selection application and is controlled by a serial play button, which returns audio feedback upon an action. Current input devices include drumpads, a gamepad, a webcam glove, a dance mat, a midi guitar, and an accelerometer and photocell (see Figure 1). The midi guitar contains an amplifier which is used when the user is mobile.

4.FUTURE

As of April 2007, *robotcowboy* is in the active testing and experimental stage with more patches, audio mappings, and interactive audience performances on the way. Extended software interfaces for Bluetooth-enabled mobile phones will be investigated for audience participation ala *CosTune*.

5.CLOSING

robotcowboy aims to be a human-computer performance system allowing the user to produce a dynamic audio-visual experience for the audience. There is a history of one-man band acts and performance troupes producing music in the course of the exhibitions, why not attempt to combine both using wearable computer technology?

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7.REFERENCES

[1] Goldberg, R. *Performance Art: From Futurism to the Present*, World of Art. Thames & Hudson, 3rd Ed., 2001, 7-9.

[2] Jager, T. *The (Anti-)Laptop Aesthetic.* Contemporary Music Review, Vol. 22, Issue 4, 2003, 53-57.

[3] Rammel, H. *Joe Barrick's One-Man Band: A History of the Piatarbajo and Other One-Man Bands,* Musical Traditions, (MT98), 2001.

[4] Gaye, L., Mazé, R., and Holmquist, L. Sonic City: The Urban Environment as a Musical Interface, In *Conference on NIME (NIME-03)* (Montreal, Canada, 2003), National University of Singapore, 2003, 109-115.

[5] Kato, S. *Soundwalk, Digital Media, and Sound Art*. In WFAE *Symposium 2003*. (Australia, March 19-23), 2003.

[6] Bromwich, M. A. and Wilson, J. A.: ‘BODYCODER’: A Sensor Suit and Vocal Performance Mechanism for Real-time Performance, Proc. International Computer Music Conference 1998, 292-295.

[7] MIT Media Lab. Musical Jacket Project, http://www.media.mit.edu/hyperins/levis/

[8] Nishimoto, K., Maekawa, T., Tada, Y., Mase, K., and Nakatsu, R. Networked wearable musical instruments will bring a new musicalculture. In *IWCS 2001*. (Zurich, Switzerland, 2001).

[9] Puckette, M. Pure Data: another integrated computer music environment. In *Second Intercollege Computer Music Concerts (Tachikawa, 1997), 37-41.*