

Sampler Jacket – A Portable and natural interface for mixing up music

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ABSTRACT

This paper describes the process and implementation of a prototype for a new wearable interface for live music sampling and mixing. My prototype explores everyday physical metaphors for parameter and recording control in a music mixing environment. It achieves this by means of specialist hardware embedded in a regular jacket, combined with a considered software solution. The core functionality of this system can be broken down into 2 areas: sample control and sound manipulation. The system allows the user to record their own samples from a variety of portable sources, e.g. microphone, mp3 player, and various instruments (the author has identified this feature as having potential for deployment in more mainstream fields). A number of pre-recorded samples are also accessible to allow the wearer to get accustomed to the system quicker. Sound manipulation is achieved through a number of sensors attached to the jacket, which apply effects and distortions to the samples, again consistent with the physical metaphors/gestures present throughout the system.

KEYWORDS

Live music-mixing, novel interfaces, wearable computing, mobile music, live sampling, voice sample manipulation

INTRODUCTION

DJ'ing is a well-recognised and established practice that involves live mixing and scratching of records [1]. Born from the abuse of analog turntables and mixers, it now thrives in the digital domain also, with numerous software products emulating their ageing counterparts' behaviour. But why are these hardware and software solutions always stationary and constrained to existing on a stage of a venue or in a studio?

According to Juniper Research, the mobile music market is expected to raise \$9.3 billion in revenues by the end of 2009 [2]. In the last decade more people are listening to music "on the move" than ever before, so why are music mixing and manipulation tools not following the listening trends of the current generation and going mobile?

This project is a prototype interface that explores this area with careful consideration for the following: portability, efficient and natural human-computer interaction, audio nourishment and agency.

RELATED WORKS

I will now briefly present some projects in similar fields to the sampler jacket, which informed and influenced the direction my system has taken.

Mixxx: Towards Novel DJ Interfaces

This project consists of a hardware and software solution that provides a platform to conduct studies of new DJ interaction techniques [3]. I found the project & documentation very useful for isolating what basic features are required for sampling and mixing. It was also interesting to note the benefits of using sliders to control volume and pitch, and how professionals rely heavily on the tactile nature of this control method.

Zipper Orchestra

This project simply involves a canvas of zippers in front of a video-projection of 9 videos of people “unzipping” their clothes. This project explores the use of the zipper as an interface (controlling playback of the videos), and provides a technical solution for using it as a digital control mechanism [5]. The Sample Jacket was previously planned to heavily rely on this zipper control, however it now plays a less prominent role.

Tim Exile – Various compositions

This artist has greatly influenced my choice of aesthetic to demonstrate the sampler jacket, and his improvised videos [6] have inspired my choice of effects and treatments available to the samples that are accessed from the interface and software. His work mostly focuses on sampling his voice and applying effects to it, which inspired me to add a voice recording capacity to my interface. This allows for a greater degree of freedom and expression, and adds an analog quality to an otherwise “digital” experience.

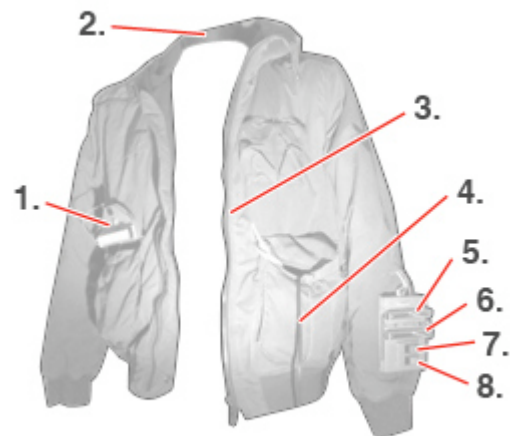
TECHNICAL BREAKDOWN

To achieve the desired functionality from the system, I required both a hardware and software solution, which I will proceed to cover in detail now.

Hardware

Due to the portable constraint of my system, all of the controls have to be accessible without being bulky or cumbersome, having similar considerations to those of a portable music player, e.g. iPod. To minimize the need

for yet another external device to carry around, I decided that utilizing wearable technology would be appropriate, and provide the platform to explore the physical gestures and metaphors used for controlling the system.



Mixing Controls

The mixing controls are handled through a simplified control panel that is attached to the sleeve of the jacket, easily accessible for any right handed wearer. Sliders provide tactile control over volume (5) and pitch (6), as mentioned is an important consideration.

Because of space concerns there are only 2 push-buttons which both have multiple uses (tap or hold). The left button (7) is responsible for loading pre-arranged samples into the currently selected buffer, and offers play/pause functionality as well. The right button (8) is responsible for “scrolling” through the tracks, and holding it activates the glitcher effect on the current track.

Sample Capture Control

To capture a sound sample, I wanted to explore the physical gesture of capturing something and storing it for later use. A pocket shares this metaphor, and was perfectly suited to the purpose of triggering

the record function of my system (1). A tilt sensor is attached to the lip of the pocket, which activates the recording of a sample when the pocket is opened and stops it when the pocket is closed. There is also an LED sound level meter on the inside of the pocket lip, which provides visual feedback when recording a sample. Recording can be done from a number of sources, firstly via a 3.5mm audio jack (4). This can be plugged in to MP3 players, mobile phones, or the line-out of any portable musical instruments (I experimented with sampling from a Stylophone). Wearers of the jacket can also record their voice from an in-built microphone near the jacket collar, for more expressive and experimental samples.

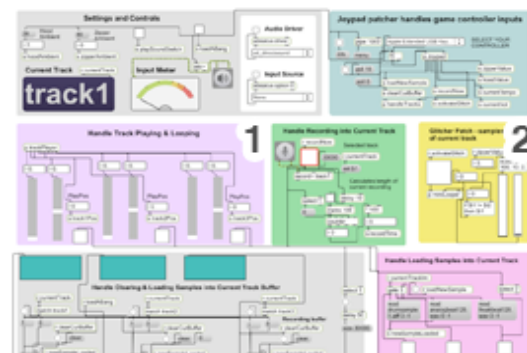
Expressive Sound Manipulation

To extend the functionality beyond that of a basic sampler, I implemented two features to the jacket that again explore physical gesture to allow the wearer more expressive influence over the sound generated. The first gesture is zipping up and unzipping the jacket. This simple action has a very tactile and physical quality embedded in it (the vibrations felt when moving the zipper) which I wanted to embrace with the treatment of the sound. This treatment consisted of a home-brew glitcher patch, which involves taking a sample of the current track and looping it, and adjusting the length of that loop giving the aesthetic that there is a hardware fault or skip during playback. I made the glitcher patch so that the wearer can “play-along” to the main loop with the glitcher by adjusting or moving the zipper (It resamples it’s loop when the value is changed). The zipper movement/position capture was technically achieved by using a light sensor just inside the zip (3), which although does not yield overly accurate results, is fit for this purpose. There is also a light sensor in the hood (2) which is used to measure if the hood is closed or open. This is another means of direct gesture

acquisition, and applies a different sound treatment when the user interacts with it that is also reflective of the physical gesture. When the hood is pulled over the wearers’ head, a low pass filter is applied to the current track, which gives the impression of a muffled noise, an effect that naturally occurs when you put your hood up.

Software

The software that the hardware interfaces with is a custom built patch in Max/MSP, which currently consists of 3 buffers which samples can be loaded/recorded into (1). The glitcher patch (2) is controlled by the zipper sensor and loops a sample of the current track at a selected speed, generating the glitch effect. The patch interfaces with the various control inputs through a hacked USB game controller, which is accessed via the HI object. As the project is just a prototype the software lacks some features that a professional sampler / mixer might have, such as the ability to add multiple new buffers, and cross fade between tracks. This is a consideration for future development.



CRITICAL OVERVIEW

The intended use of the jacket follows a few different models of interaction. Having control over when and how you trigger samples to layer up a track very much follows a compositional model (Winkler 1998). However the more ways that you choose to interact with the jacket, the more it follows a performance model of interaction (Rowe

1993). If you decide to interact with the jacket disregarding its additional mixing controls e.g. putting the hood up when it is raining, then the sound gestures are no longer an intentional effect and the music is reactive of a performance.

The expressive sound manipulation features follow an exploratory model of interaction, and are not obvious until the wearer experiments with the interface (Wanderley 2002).

FINDINGS & CONCLUSIONS

The purpose of this project was to demonstrate that a portable and intuitive interface that carefully considers physical metaphor can breed creativity through remixing music "on the go". To this extent, I think that the project is a success.

It is important to note that it is not finished, and there is much to build upon. For example, to be a truly mobile interface, there needs to be a portable computer integrated into the jacket in order to run the software, and either a headphone jack or speakers inbuilt into the jacket hood. This was considered, however the goal was not to have a finished interface, but a proof of concept.

There are other desirable features and changes that have been uncovered while testing the jacket, such as tighter control over the tracks, the ability to add new tracks (and layer up recorded samples) and a universal time signature that assists the wearer to keep samples in rhythm with each other.

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