Video Performance Art using Tangible Control Blocks

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Abstract

Few interactive tabletop systems have gained widespread acceptance beyond the laboratory. We believe this is in part due to the interaction environments exploited by these systems. Touch sensitive surfaces, for example, lack the physical presence from which much of the rich expressiveness of the table and its associated artifacts are derived. We present Control Blocks, tangible interface tools designed to rekindle the physicality of the traditional tabletop without losing the ability to support complex tasks required in the computational groupware environment. We also discuss the concepts underpinning our first prototype, which is a system to provide collaborative and expressive interaction with a typically single user suite for the video performance art of VJing.

Keywords

Tangible user interfaces, input/interaction, interface/experience design, tabletop hardware, entertainment.

1. Introduction

Despite the popularity of tabletop interfaces as a topic of collaborative computer systems research, few solutions have proved successful outside of the laboratory. Our contention is that a crucial design element is missing from the majority of prototypes proposed, which prevents the recreation of the fluid interactions that users experience with everyday tables. When a table is considered as the basis for an interaction environment one of its key features, which is often ignored, is its ability to support the use of physical artifacts. By virtue of their physical characteristics, these artifacts can be manipulated by group members both collaboratively and in parallel, with conflicts governed by both social protocol and the laws of physics. Many existing tabletop interfaces rely on purely virtual interfaces which are governed by physical metaphors created by the interaction designer. The inconsistency of such metaphors often hinders the fluid use of the interface.

We believe that if a groupware interface is to be created which truly models the tabletop, then efforts must be made to rekindle the physicality of the interaction setting. Past research on tangible user interfaces has worked towards this goal, with some success. However, approaches to tangible interaction have often relied on simple and relatively abstract interaction schemes. For example, Caretta [7] allows for the manipulation of a town planning model based upon the positioning of blocks which represent buildings, Tangible Geospace [5] allows the manipulation of a virtual map by positioning objects which represent buildings found upon it. In practice, the range of tasks which tangible tabletop interaction might support requires a deeper connection between the properties of the artifacts and the interaction scheme.

2. Control Blocks

Control Blocks [4] are tangible interface tools augmented with large analogue controls. The tools are similar to Fitzmaurice's Bricks [2] (see Figure 1), physical objects which can be manipulated to mediate interactions with a set of associated virtual content. The blocks, however, aim to support more complex and general purpose groupware tasks by extending the user's interaction options beyond orientations and translations of physical blocks. For example, in a tabletop video editing application, a jog wheel on a block can be used to scrub through an associated video clip. Control Blocks operationalize four key elements of tangible interaction in the context of tabletop interfaces: affordances [3]; expressive parallel interaction; directly mapped interaction [1]; and physical presence. Control Blocks are tailored to exploit these elements to provide users with a feeling of

physical interaction in relation to the purely virtual content displayed upon a tabletop interface.

Figure 1. A user interacts with Bricks.

3. VJing: Expressive Interaction

On her recent world tour, the popular musician Bjork utilised the reacTable [6], a synthesiser based around the manipulation of tangible objects upon a tabletop. This suggests both a readiness on the part of performance artists to accept tabletop interfaces, and potential for the development of tabletop and tangible system in less conventional and artistic domains.

Design of our initial Control Blocks is based on our choice of an activity that requires significant expression on the part of the user (performer). VJing is the live performance art of mixing video, in a way analogous to how a DJ mixes audio. This is currently undertaken using enhanced video editing software, occasionally augmented by the use of MIDI-based physical controllers such as keyboards.

Figure 2. A VJ performs with a live band.

VJing is an expressive process where the artist produces a constantly changing visual performance commonly in reaction to live music or a crowd. Such an activity is well suited to the observation of the inter-relation between the expressive goals of the artist and the functionality of the interface.

3.1. Directly Mapped Interaction

VJs commonly interact with their video mixing software through secondary devices such as midi keyboards in order to gain direct control of their performance. Use of such tools stands in stark contrast to the temporally multiplexed interaction found in many of today's mouse based interfaces. Hence VJing provides us with the opportunity to evaluate Control Blocks and the directly mapped interaction they provide.

3.2. Collaboration

Editing and the application of visual effects to video is an inherently complex activity, especially when undertaken in the course of a live performance. A consequence of the inadequacy of existing interfaces (i.e. their reliance on the metaphors and devices of conventional video editing software) is that much of the visual content shown by VJs is prepared prior to their performance. This places a significant constraint on the degree to which VJs can deviate from their pre-performance plan, significantly restricting their expressive freedom. This problem indicates great potential for the division of the VJing task across a group of performers, creating an interesting collaborative tabletop activity to motivate the design of Control Blocks.

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