

# LightCast: A Tangible User Interface Creativity Support Tool for Visual Design

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## ABSTRACT

Exploration and experimentation are important aspects of the visual design process. In this paper, we leverage the familiarity and physical mobility of using traditional tools (e.g., paper, marker) to create a novel and engaging creativity supporting system that enables the rapid creation of different visual designs. LightCast is a tangible user interface that utilizes a projector, interactive table, and camera to preserve the nuances of physical action and the strengths of the digital medium.

## Author Keywords

Tangible user interface, design, creativity support, TUI.

## ACM Classification Keywords

H5.2. Information interfaces and presentation (e.g., HCI): User Interfaces – Interaction Style.

## INTRODUCTION

One effect of the proliferation of the desktop computer, with its emphasis of digital, virtual representation over the real, is “the extent to which the physical performance of work has been homogenized” [1]. Writing a story, designing an album cover, and making music on the computer use the same interface for interaction when clearly they are different creative processes with different methodologies. Likewise, designing using the keyboard/mouse interface does not differentiate between the early, conceptual creative phase and the detailed, production phase of the design process. The creative conceptual phase emphasizes speed and ability to explore many different variations; the production phase focuses on precision and detail.

Designers continue to favor pen and paper for quickly sketching ideas because it allows the users to “draw what you want, where you want it, and how you want it to look”

[2]. Experiments have shown that this sense of cognitive freedom derives from the increased sense of physical mobility when interacting with real paper [1]. Building upon this, LightCast is a tangible user interface (TUI) that preserves user interaction with traditional craft tools (e.g., paper, marker, scissor) while adding digital functionality like capture to enables users to rapidly explore and create compelling graphic layouts and designs.

## RELATED WORK

The DigitalDesk showed that there is an innovative interaction space in projecting digital images onto paper; by detecting and responding to user inputs, the system augmented paper with certain digital capabilities. In addition to tangibility, users also responded favorably to the larger workspace of a physical desk [3]. A later work, the Designers’ Outpost, a TUI system that augmented paper and white board interaction, discovered that “working physically supports collocated collaborative work processes” [4].

We believe that the novel interaction of physically working with projected image and paper to generate graphical effects will enable and engage the user to rapidly explore many design variations. Unlike a traditional PC, the large workspace of a table facilitates synchronous, collocated collaborative design practices.

## IMPLEMENTATION

LightCast is a tool for individuals and small groups to brainstorm and communicate graphic design layouts such as book covers and advertisements. LightCast uses a projector to project a digital image onto papers placed on the Mitsubishi DiamondTouch [5]. The DiamondTouch can detect touch positions via capacitive coupling between the table surface and receiver. The lower right sections of the table are marked as button interfaces to the computer. By touching the buttons, the users can display the next pre-selected image, move the image, draw black rectangles, invert the color, and reset the image to its original state. A digital camera, controlled from the table, can capture the entire workspace thereby transitioning a digital+physical object design into a purely digital one for storage and distribution; this photo is transmitted to the computer and is projected back onto the table as feedback and to allow the user to add more elements to the design.

