Exploring the Affordances of Transparent Tablet Displays

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# ABSTRACT

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## General Terms

Design, Human Factors

# INTRODUCTION

Transparent displays allow users to see both digital content and the real world through the same viewport. Their recent introduction on in mobile platforms has sparked a flurry of novel interactive concepts unviable on traditional mobile displays [1,2]. To large extent, mobile-see-through concepts from designers conjure up mobile augmented reality applications. Researchers have explored possibilities with mobile transparent displays but primarily to focus on a fixed (limited?) set of interaction metaphors, such as to use the ‘back of device’ to resolve the finger occlusion problem on touch input [3, 5].

In this paper we propose interaction techniques that exploit the inherent or ‘true’ affordance of transparent mobile devices. Such affordances as *transparency*, *pixel-correspondence* and *dual-sidedness* enable novel scenarios and demonstrate the value of transparent see-through displays. Transparency, the capacity to see objects through the display, allows for example ^give an example¸. Pixel -correspondence is the capacity to determine the physical dimensions of objects right below the display based on the digital content. This allows [example]. Finally, dual-sidedness, the capacity to see and interact with the display from either side, enables [example]. We also show that based on augmentations to these fundamental affordances, such as the ability to capture in real-time an image through the transparent display, or *surface capture*, can engender a wide range of applications, including what we refer to as contact AR.

Our primary goal was to pose the question as to ‘why have transparent mobile devices’. We address this by identifying interaction techniques that are unique to transparent display mobile devices based on their ‘true’ affordances. We also investigate potential augmentations to such devise, and show that this can open new forms of mobile-based interaction. We demonstrate these possibilities through a prototype device, tPad. tPad, is a 7 inch transparent display tablet with capacity sensors that facilitate touch and pen interaction on both sides. Embedded sensors facilitate the detection of the primary interaction side. A camera optionally attached to the tPad simulates the surface capture functionality.

Novel interaction techniques support the usage of the transparent display for *rich* *note taking* and *active reading.* For note-taking, users can trace objects on a physical object, query printed graphs, capture elements behind the display, access alternative views on the flip-side and share content by staking multiple devices. For active reading, users can explore the virtual version of a printed document by simply putting the tPad on top of it – users can annotate, search, invoke rich content (pictures and video). Finally, applications running on opposite sides of the display can access a shared context.

# RELATED WORK

# RESEARCH Approach

# Conclusions

# REFERENCES

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