

Demonstration of the Unphotogenic Light: Protection from Secret Photography by Small Cameras

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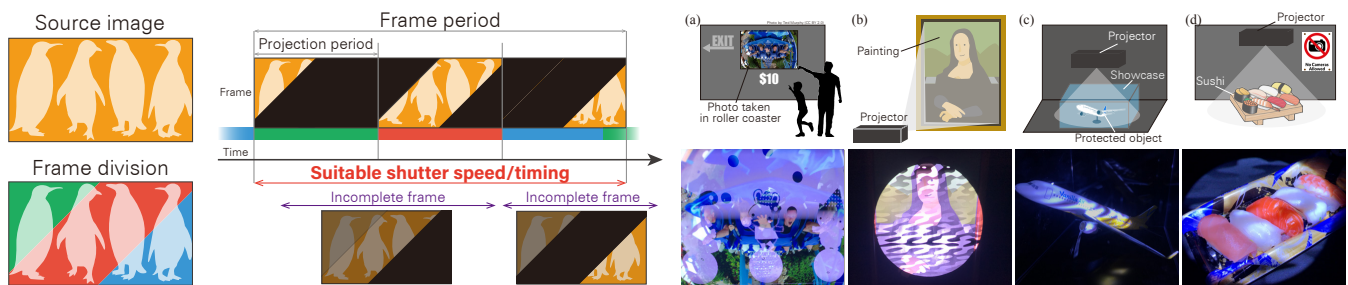


Figure 1: Left: theory and effect of the proposed method. The image is divided into multiple parts and projected in turns. We must synchronize camera shutter speed with frame period to capture the entire image correctly. Right: application examples; top: schematic diagrams, bottom: applications taken by the smartphone.

CCS CONCEPTS

• **Human-centered computing** → Displays and imagers; • **Hardware** → Displays and imagers;

KEYWORDS

Protection, sneak photography, security, privacy, copyright.

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1 INTRODUCTION

We demonstrate a new method to protect projected content from secret photography using high-speed projection [Suzuki and Ochiai 2017]. We aim to realize a protectable projection method that allows people to observe content with their eyes but not record content with camera devices.

To achieve this goal, we exploit the difference between the human vision system and the camera vision system. Notably, humans cannot recognize the high-speed changes of light. There are several studies that aim to present imperceptible on-screen markers using high-speed projection between the afterimage effect of human eyes and shutter speeds of digital cameras [Luiz et al. 2015]. From another point of view, these techniques show specific content only to

the human eye while showing different content to a camera. Thus, we can project images that can be seen by human eyes whereas cameras only capture an incomplete frame as illustrated in Figure 1 left. Therefore, this means the projected light is unphotogenic.

2 APPLICATIONS

The main purpose of this method is to discover protection techniques to prevent secret photography. For example, it can be applied to secret pages in a presentation. As another example, our system can be used in theme parks as shown in Figure 1 (a). There is a system that takes pictures of passengers in the middle of an attraction. Pictures are previewed on the screen near the exit, and you can purchase it. However, you can also take photos of the screen with a smartphone. By using the proposed method, these photos are prevented.

The proposed system can be used not only as an image projector but also as a lighting system. For example, our system can install in an art gallery as a spotlight as shown in Figure 1 (b) and (c). As another example, we can use the proposed system in restaurants. If a restaurant chef dislikes the photography of food by smartphones, the proposed system can be used as lighting. Because the customers cannot take photos with their smartphones as shown in Figure 1 (d), they can instead concentrate on eating the food.

REFERENCES

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