SkinUI: Using Skin Interface as Quick Access to the Specific Functionality on AR Glasses

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Abstract

AR glasses have a great potential to be the next generation computing platform due to the prevalence of AR technology in many domains. However, using head gaze and mid-air gestures to perform some tasks on AR glasses is still cumbersome. E.g., checking the battery level in a game application. Hence, we present SkinUI, an on-skin interface that offers quick access to a system and app-specific functionality according to the current context. In addition, we present two scenarios of using SkinUI on AR glasses and the challenges in creating such skin interfaces which are seamless and dynamic.

Introduction

AR applications have been ubiquitous on mobile devices since Louis Rosenberg developed the first immersive AR system Virtual Fixture in 1992. Recently, AR glasses become increasingly significant in global AR market due to its immersive experience and hands-free interaction.

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Ease of access and **affordance** are two main advantages of on-skin interaction, which inspires us to consider using the skin to augment the interactions on AR glasses. We list the design goals of *SkinUI* as follows,

•*SkinUI* is **natural**: Its appearance fits the skin surface and it tracks the position of skin surface in real-time.
•*SkinUI* is **context-aware**: it shows UI for the relevant functionalities according to the context of use.
•*SkinUI* is **intuitive**: it does not require the extra efforts to understand and learn.

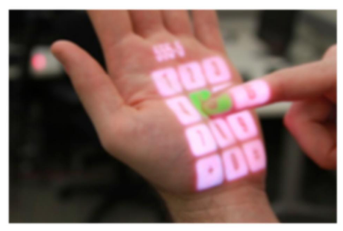
The contributions of our work have two fold: (1) an approach using the skin to provide quick access to the context-specific content on AR glasses. (2) an insight into the use of the skin interfaces on AR glasses.

Related work

PalmGesture leverages an infrared camera to recognize the gesture drawn on the palm.

Skinput appropriates the arm as input surface by using acoustic sensors to recognize the finger tap on the arm and display the UIs on the arm by an equipped pico-projector.

OmniTouch is a wearable system that uses a depth sensing camera and a projector to allow the multi-touch interaction on the skin.



SkinWatch enhances the input interaction of smart watches by sensing the deformation of the skin under the watch.

Skin Buttons uses a projector to render touch sensitive icons on the skin, which also expends the touch region of smart watches.

Scenarios

Scenario 1: Quick look of system status and notifications in a game.

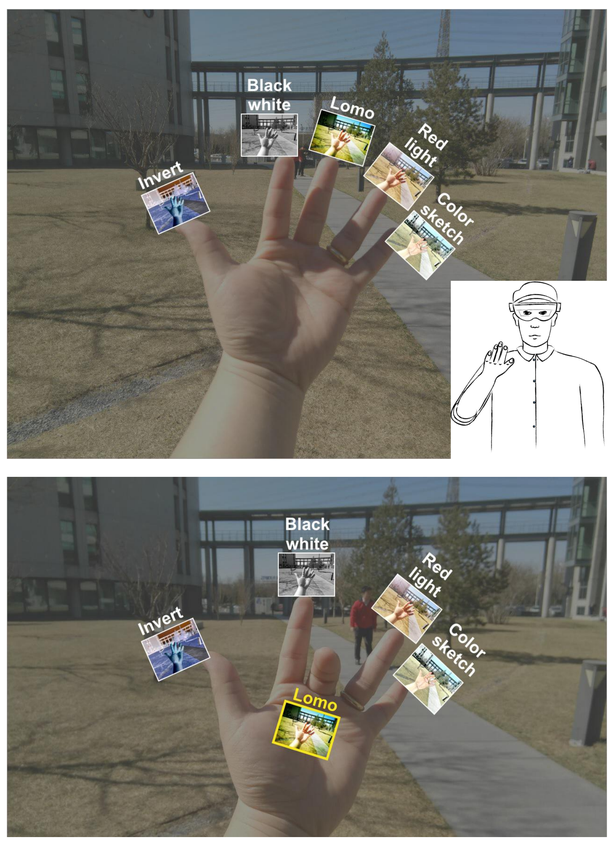
Assume a user is playing an AR game – English bird. Later, he intends to look the time and the battery level.

Usually, he has to pause the game and return to the system launcher, which is tedious. However, *SkinUI* simplifies the process and does not interrupt the running game.

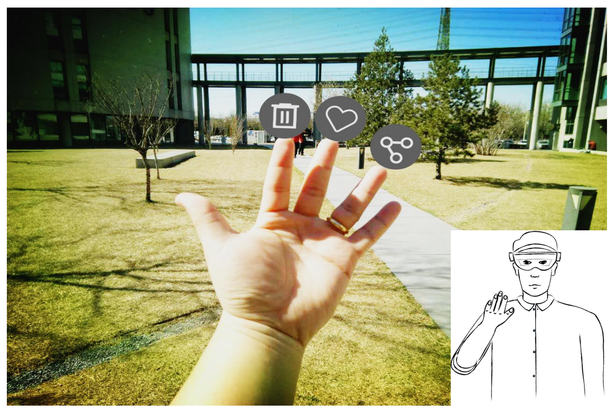
Scenario 2: Quick settings for the camera.

It is common to use the camera on AR glasses. Usually, the camera setting involves several steps. Using the gaze and mid-air gesture to complete these steps takes more time than using finger touch and mouse.

In shooting mode



In view mode



System Design

•A module that tracks the real-time position of the targeted skin and indicates where and how the UIs should be rendered.

•A module that is aware of the temporal context of use. Then the system knows what content should be rendered on the glasses.

•A module that renders the selected content at the indicated position.

Conclusion

We design *SkinUI* that enables the user to access to the context-specific more easily without heavy implementation and additional hardware. We hope this work will stimulate future explorations of using skin surface on wearable AR devices especially for glasses.