Facade-Auto-generating Tactile Interfaces to Appliances

【Main Content】:

Common appliances have shifted toward flat interface panels, making them inaccessible to blind people. Although blind people can label appliances with Braille stickers, doing so generally requires sighted assistance to identify the original functions and apply the labels. We introduce Facade—a crowdsourced fabrication pipeline to help blind people independently make physical interfaces accessible by adding a 3D printed augmentation of tactile buttons overlaying the original panel.

【Contributes】:

• In a user study, we identify existing challenges and design requirements for augmenting physical interfaces with tactile markers.

• We introduce Facade, a crowdsourcing and fabrication pipeline to augment inaccessible physical interfaces with overlaid 3D printed tactile buttons.

• Our validation shows that Facade enables blind people to independently augment appliance interfaces, and that fabri-cated overlays provide rich and usable tactile feedback for accessing otherwise inaccessible appliances.

【Facade】: Labels are used to generate a 3D model for a tactile and press-able button layer, matching the original controls. After label-ing by crowd workers, the blind user can use VoiceOver to customize the preferences for the tactile layer to be fabricated using the iOS app (Figure 2D). Blind users specify customiza-tions using a virtual version of the interface displayed on their iPhone.

Using step：

    Capture and Perspective Transformation

    Crowd sourced Segmenting and Labeling

    Fabricating Accessible Augmented Layer

【Design Considerations】:

    Custom Settings

    Memorization Strategy

    Robustness

【DESIGN ITERATIONS】

Iteration #1: Design Probe 》Iteration #2: Material Exploration 》Iteration #3: Improved Legibility

【USER EVALUATION】

【Conclusion】:

Compared to traditional embossed label machines, Facade does not require the help of witnesses. Using different reading media and button shapes provides richer tactile feedback and reduces storage load by providing legend and in-app support: embossed labels These features are not available. Our research looks forward to the faster and more popular 3D printers in people's homes. Facades can benefit blind users by generating a tactile overlay for home appliances in minutes, complementing or replacing embossed labels for home use.