HOW CAN HAPTICS REVIVE THE TOUCH SCREEN INDUSTRY IN POST COVID 19 WORLD?

Why are touchscreens in danger?

The new norm of touch free social interaction post Covid 19 raises questions around survival of public touch screen kiosks. Whilst touch screens in their current form provide the much-needed barrier that eliminates the need for face to face interaction, we still must contend with physically touching a surface that was previously imprinted on by several others. This leads to several hygiene concerns, making them a liability for retailers and public transport agencies.

Why Mid-Air Haptics?

The key aspect of touch screens is the certainty of choice it provided users when they use their own fingertips to make the selection. To replicate a similar certainty, touchless screens will need a feedback loop that can be truly felt by the user. This is where mid-air haptics will come into play with tactile feedback. It goes a step further and provides the reassurance of a button like interface in the real world.

Use Case: Airport Customer Feedback Kiosk

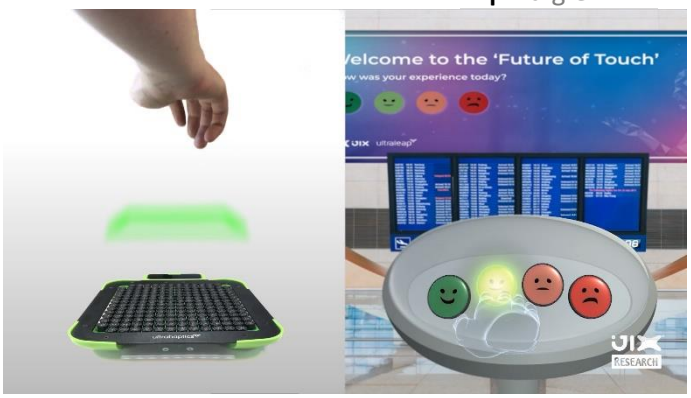
In recent times, hygiene has become a major concern for travellers passing through airports. To reduce the risk of a traveller contacting the virus from the public kiosks owing to it being touched previously by another traveller who may have had the infection, we have designed a haptic-interface plugin that can be integrated with these kiosks. For the prototype, we have picked the customer feedback kiosk that allows travellers to rate their airport experience. The choice of answers is displayed as emoticons for the travellers to choose from. The application allows travellers to select an emoticon through a button tap gesture which has a click-like tactile feedback loop.

Prototype Set-up & Development

Interface: The virtual world of the Customer Feedback Kiosk is set up in Unity based on a NZ airport. For the prototype, 3D modelling of 4 colored buttons representing the emoticons (happy, ok, bad, terrible) were designed and an interactive sequence was created for the click of an emoticon.

Hardware: The application is deployed as a WEB AR interface on a system integrated with Ultraleap's Stratos Explore development kit hardware platform. The tactile sensor in the kit is made up of an array of 256 transducers. The kit includes a Leap Motion Controller that handles the hand tracking aspect of the interface.

Interaction Design and Development: The interaction between the user and the interface is controlled by gesture recognition and haptic feedback. The interface design uses a transparent round button to mark out the hand tracking area. A digital hand is designed to mimic the user's hand movements on the screen. The transducer array is split into four parts to align with the interactable space and will be activated only when the leap motion controller recognizes the tap of the button. A point vibrating vertically was found to be ideal to simulate a hovering button, and we used a group of points, rotating as they separate, to simulate a click as the user presses down.



Prototype Feedback

The prototype of the interface was demonstrated to a focus group of 10 people belonging to different age groups at the JIX Research Lab. All the participants were able to virtually choose a rating emoticon accurately after being taken through a walk-through by our team. Despite the mid-air touch feel, the participants felt like they were physically tapping the button owing to the augmentation of their own hand on screen and tactile feedback on their hand when the button was released. All participants considered the entire experience to be a safer way to interact with public kiosks.

Wider Applications

- Retail Point of Sale Kiosk – Self-checkout counters at supermarkets
- Information Kiosk – Navigation Maps in trade and exhibition events
- Interactive Kiosk – Museums, Galleries and Archives