Leveraging multimodal interfaces to help the visually impaired

Introduction

Businesses and service providers sometimes fail to cater to the needs of differently abled people, thus limiting their interactions in daily life, like availing medical or food services, booking tickets, and reading.

According to the Times of India, India's population consists of about 15 million blind people out of 37 million people worldwide as of 2007, many of whom encounter obstacles during their daily life interactions. This is a gap that multimodal interfaces can help in addressing. Such interfaces let users interact via multiple input modes to obtain the desired output.

Different modalities such as touch/multi-touch, gaze, speech, gestures, pens, and virtual keyboards can be processed using multimodal interfaces.

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Using multimodal interfaces to help the visually challenged

To enable ease of interaction for the differently abled population, we propose to incorporate multimodal interfaces into devices that are used by the target users round the clock. For example, a device that acts as a navigator can be modified to have the capability to identify objects within a 10-metre radius and communicate the same to the user. Other features that can be added are:

- **SOS trigger**
- **cash check**
- **note reader**
- **notification alert.**

A smartphone can be equipped with the above features via an app having multimodal interfaces which will help the user to easily control various functions.

Benefits and impact

The interface will have various input forms like voice commands and vibrations on touch, which will help visually challenged users to interact more easily. Moreover, it'll be easier for users to bridge gaps in language and communicate more effectively.

Additionally, the societal impact of this solution will be significant and help reduce the problems faced by the country's differently abled population, making it easier for them to navigate daily tasks.

In terms of industrial impact, the healthcare industry might greatly benefit from such innovation. Patients suffering from temporary or permanent health conditions may find it easier to interact with hospital staff and others, making it simpler to communicate in general.

This model can be of immense help in e-commerce platforms as well, and benefit both sellers and customers. Incorporating this model on e-commerce platforms can enable visually impaired sellers or customers to sell or buy things independently.

Furthermore, the adoption of multimodal interfaces can revolutionise the gadget industry if these functionalities are made compatible with everyday devices like smartphones, laptops and tablets.

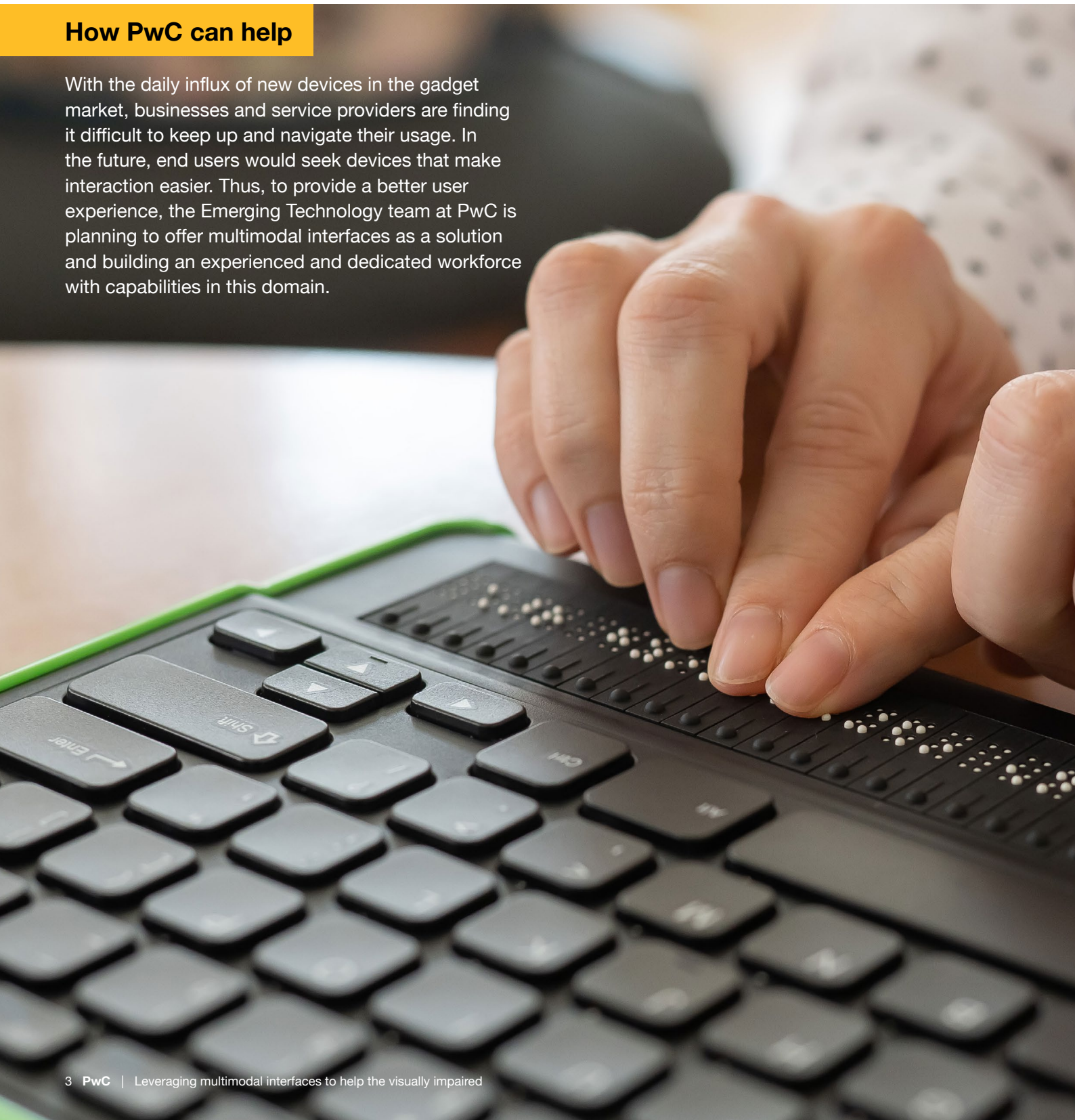
Challenges

Despite the advantages offered by multimodal interfaces, combining all input forms poses a challenge. The interface must be designed in such a way that all input forms can work together, and each input function understands the user's intent. Another challenge is noise pollution, making it difficult to keep devices on at all times when users are out in a public space. Thus, we need to ensure noise filtering is incorporated in the application.

Moreover, different people might opt for different input modes. For example, visually impaired people may find it difficult to interact with the interface and find a speech input option useful. Some people may also have speech-related challenges and may prefer to use touch to interact. Therefore, it is crucial that all these functionalities must work seamlessly to cater to specific, personalised user needs.

How PwC can help

With the daily influx of new devices in the gadget market, businesses and service providers are finding it difficult to keep up and navigate their usage. In the future, end users would seek devices that make interaction easier. Thus, to provide a better user experience, the Emerging Technology team at PwC is planning to offer multimodal interfaces as a solution and building an experienced and dedicated workforce with capabilities in this domain.



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