

Abstract

This technology offers a method that is capable of predicting user intention during pointer-based human-machine interaction and eliminates the need for explicit behaviors to switch interaction modes. The technology is meant to predict types of user intention through the use of the stylus, while the stylus is utilised on tablet PCs or mobile devices.



Problem solved with the technology

This novel device employs a scale-invariant gaze-based mode inference method that uses eye gaze and pen information to recognise user-intended modes such as minimise, maximise, drag and scroll with **approximately 81% accuracy**.

This technology is built around frequently employed pen-based virtual interaction tasks. Typical pen-based interaction consists of symbols, gestures and non-stylised pen input. Among these, symbols and gestures have characteristic visual appearances. Hence, these symbols and gestures can be classified with conventional image-based recognition algorithms.

The invention focuses on non-stylised pen input where the visual appearance alone does not carry sufficient information for classification purposes. In particular, for each task the stylus has an ideal starting point and an ideal ending point. In order to complete each task, the user needs to make a movement that starts near the starting point and ends near the ending point. Conventional image-based recognition algorithms do not lend themselves well to classifying pen input corresponding to those tasks. This is because the pen input do not have characteristic visual appearances.

The proposed method involves three consecutive phases. The phases are defined as:

- * multimodal data collection,
- * feature extraction and
- * intention prediction.



Potential Application

The proposed technology can be applied as add-on applications for tablet PCs and mobile devices. The product can allow for a pen-based virtual interaction setup for tablets and mobile phones.

In the embodiment of the prior art, command interfaces are used. The command interfaces are based on the eye-mind hypothesis in which intentional eye movements are associated with interface actions. In other words, in command interfaces, gaze is employed as an explicit pointing device. This embodiment requires the gaze to be used for manipulation in addition to its natural purpose, visual perception. In addition, this embodiment forces the user to be aware of the role of the eye gaze and therefore causes high cognitive workload.

Current approaches in this area are device-specific and quite different from the direct manipulation style that most users are accustomed to. More importantly, some of these approaches cannot be employed in pen-based interaction because they require multiple contact points (e.g., multi-touch and multi-finger commands for zooming).

The value proposition of this technology is to save users the trouble of switching modes between basic interaction commands and assist them by automatically predicting the intended task being performed during natural pen-based interaction.

Customer Benefits

* The proposed technology is intended to produce a higher accuracy of use than traditional device, since the technology uses eye gaze information instead of prediction methods.

* The technology is meant to be agnostic and not device-specific.

Market Trends

The Global Market of Capacitive Stylus is growing rapidly mainly due to the rising market penetration of smart phones. According to a recent study report published by the Market Research Future, The global market of Capacitive Stylus is booming and expected to gain prominence over the forecast period.

The global Capacitive Stylus Market is anticipated to accrete pervasively by 2023, with a whopping CAGR between 2018 and 2023.

Additional Technical Information

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