

Applying Bayesian modelling for inclusive design under health and situational induced impairments

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ABSTRACT

Predictive pointing enables realising smart interfaces, which are capable of inferring the user intent, early in the pointing task, and accordingly assisting the on-display target acquisition (pointing and selection). It adopts a Bayesian framework to effectively model the user pointing behaviour and incorporate the present perturbations induced by situational impairments as well as inaccuracies in the utilised sensing technology. The objective of the predictive pointing system is to minimise the cognitive, visual and physical effort associated with acquiring an interface component when the user input is perturbed due to a situational impairment, for example, to aid drivers select icons on a display in a moving car via free hand pointing gestures. In this paper, we discuss the ability of the predictive pointing or display solution to simplify and expedite human computer interaction when the user input is perturbed due to health induced impairments and disability, rather than a situational impairment. Examples include users with tremors, spasms, or other motor impairments. Given the flexibilities acceded by the Bayesian formulation, the applicability of the predictive pointing to inclusive design in general is addressed. Its intent prediction functionality can be adapted to the user's physical capabilities and pointing characteristics or style, thereby, catering for wide ranges of health induced impairments, such as those arising from ageing. It is concluded that predictive displays can significantly facilitate and reduce the effort required to accomplish selection tasks on an interactive display when the user input is perturbed due to health or physical impairments, especially when pointing in 3D with free hand pointing gestures.

Full papers will be published in the Conference Proceedings and will be freely available to delegates at the conference and online on September 20, 2016.