

Abstract

Older adults (60+) are often facing particular difficulties when interacting with technology. The "digital divide" that exists between younger generations, who adopt technology faster, and older generations, who struggle to use electronic devices, is often grounded in technology which is not tailored to the specific needs and abilities of this user group. The normal aging process is accompanied by changes in perceptual, cognitive and motor resources, entailing implications how to design suitable technology for the elderly.

Gesture-based interaction, and in particular surface gesturing on multitouch screens, has become the de-facto standard of controlling mobile devices. While this technology is often attributed a particularly "natural" and "intuitive" way of usage, its aptness for older users in particular has still to be shown. The purpose of this work is to fathom the potential of gesture interaction to facilitate technology interaction for elderly users, and to determine constraints that need to be respected to render this input paradigm senior friendly. To this end, research has progressed in three stages.

Stage one addressed the question whether the demands on motor control and manual dexterity imposed by finger gesturing match the abilities of older adults. In two studies, the effects of gesture complexity, available screen space, and the operation posture of a mobile device on gesture performance were assessed. Though being slower than younger users, older users did not show systematic or substantial problems in accurately reproducing gesture patterns, even on small screens or thumb-only gesture execution. Age-related slowing was found to be reduced compared with other input devices.

Stage two addressed the semantics of gestures, in search of a set of gesture commands which are intuitive to older adults. In two studies, user-derived gestures were filed into a gesture glossary, and subsequently evaluated to derive a list of best matches for 34 typical tasks on mobile devices. Older users favor single-finger gestures, and are more willing to sacrifice efficiency for familiarity.

In stage three, conventional key input was compared with gesture input for older adults, using a functional mobile phone prototype. Older users were not only more efficient and made fewer errors in the gesture mode, they also rated this input mode as more intuitive and better learnable than the key mode, and 72% indicated gesture control as their preferred interaction mode.

Taken together, the empirical results provide first evidence that interacting with electronic devices by means of touch and gesture does not overtax older adults, but on the contrary, might have benefits over conventional key input. Using this technology could reduce existing interaction problems, and ultimately support elderly better in their daily activities through technology better adapted to their needs and abilities.