

Recognising Elders using Behavioural Biometrics

Rasika Preethiraj¹, Kengatharaiyer Sarveswaran (sarves@jfn.ac.lk)²

¹ Department of Mathematics, Eastern University, Sri Lanka.

² Department of Computer Science, University of Jaffna, Sri Lanka.

Abstract

The elderly population continues to grow everywhere and it finds difficulties to access websites due to various reasons including functional impairments like lack in vision, hearing, mobility and movement. Therefore, websites are usually made separately for elders to improve their user experience. However, first it's important to recognise whether a user is an elder or not, and for that usually user profile information such as date of birth or age are used. Users may reluctant to feed information or may even feed a wrong one. This research proposes a method using which elders can automatically be recognised using behavioural biometrics of them. Based on the initial observational study on elders it was noted that elders shake the mouse to identify the mouse pointer location, do scrolling fast without much control, and the elders take a lot of time to click on a link or button after moving over it. These three observation were considered as behavioural biometrics to recognise elders. A data set was compiled in a control environment from 24 people of different ages including 18 elders who are more than age of 65. All the people were asked to follow a same set of tasks in two websites. Thereafter, the collected data were cleaned and a decision tree was built to recognise elders using j48 algorithm and Weka tool. The results showed that elders move the mouse faster than 5.7928 pixel/millisecond, scroll faster than 3.455561/millisecond, and take more than 1, 158.6875 milliseconds to respond over a link or button. Thereafter more behavioural biometrics were collected from random users in open environment in which users were asked to fill a questionnaire with the intention of collecting their age. The collected data then were used to validate the decision tree. It was found that speed of mouse movement recognises the elders with 84.51% accuracy, scrolling speed recognises with 96.08% accuracy, and response time recognises elders with accuracy of 97.68%. The results show that instead of rely on user profiles, elders can be recognised using user behavioural biometrics with significant accuracy. Though the response time shows a high recognition rate, it is planned to explore the combination of different behaviour biometrics together to see whether recognition rate can be improved.

Keywords: *Recognising elders, Behavioural biometrics, Website for elders*