

R. Fukuda. Usability analysis of home electronic appliances based on eye tracking and physiological data. *Gerontechnology* 2008; 7(2):110. Modern home electronic appliances have various functions. For instance, a microwave range is often combined with an electric oven and with help of computers various pre-defined cooking menus are available. A modern rice cooker can also make yoghurt and bake bread. However, such multifunctional home appliances are sometimes so complicated that only a part of the functions can actually be utilized. It brings especially serious problems for elderly users. This study aims at clarifying the difficulties elderly users have in using such multifunctional home appliances.

Methods Seven subjects (four males and three females, age: 59–71 yrs) took part in this experiment. User interfaces of five real rice cookers were simulated by using a touch panel display and the subjects were asked to select certain cooking menu and set the timer. During task accomplishment, the behaviour of subjects was observed with video recording and eye movements of subjects were recorded by the eye tracking system EMR-8B (Nac Image Technology, Inc.). Pulse, respiration, and galvanic skin response (GSR) were also recorded by PowerLab data acquisition system (ADInstruments) and used as an index for stress. After each trial, the subjects were interviewed about their difficulties in task accomplishment. **Results and discussion** In most of the trials, subjects operated in a different way than the system designers'intended. Especially when there were two or more similar menu buttons, these buttons were looked at repeatedly one after another, so that it took longer time to select one menu button to accomplish the task. After choosing one menu button, the subjects switched the menu by pressing the button in order to select the aimed menu. But the aimed menu was sometimes passed, because subjects paid not much attention to the display. In such cases selection process should be repeated again. As for timer settings, difficulties with the labelling of the buttons were observed. Most of the employed user interfaces provided two buttons for timer setting; each of them was labelled by a triangle which indicated the direction of time transition produced by pressing the button. But the labelling was not always consistent among the user interfaces, so that it confused the subjects. Only one user interface had two buttons labelled 'hour' and 'minute'. In the case of this user interface, no subject made an extra button press. GSR data revealed that subjects stressed if a button press gave no feedback or different feedback than they expected. Increase of GSR was also observed when they considered which button should be pressed, but it was less frequently observed and its range was smaller. These results implicate that user interface for elderly users should provide only a few buttons that are easy to distinguish and to imagine how they work.

References

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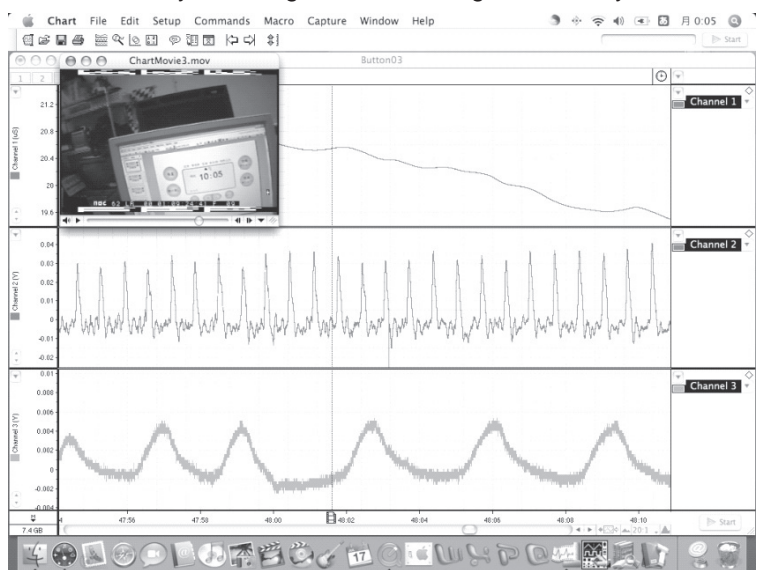


Figure1 Example of the recorded physiological data