A Matching Test of Task-Gesture on Tablet for Mid-older and Young Adults

Taipei, Taiwan

Abstract

Due to the intuitive controllability and easy to learn the tablet is very popular nowadays. Many touch gestures are introduced to enhance the convenience usage on the tablet. However, how these gestures match with the tasks? Are they understood by the "technological alienation" of the elderly users? Is there difference existing between the elderly and younger people? This study aims to answer these questions. Seven basic gestures and their correspondent tasks were selected from top 3 operation systems. Thirty mid-older subjects including 15 expert users and 15 novice tablet users and thirty young subjects were recruited to do matching test. As a result, we found that the correct rate of the mid-older is significantly lower than the young. Experience in using might affect the correct rate. Certain intuitive gestures including Tap, Swipe, Pinch and Rotation had higher correct rate were considered to be acceptable for both mid-older and young subjects according to the ISO standard. However, only the Pinch gesture for novice mid-older is acceptable. The research suggests that more coaching might be needed for novice mid-older adults on the use of gestures.
Keywords: mid-older, matching test, tablet, gesture

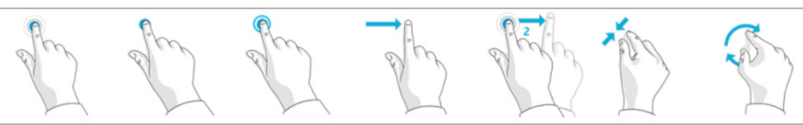
Literature Review

Caprani et al. (2012) found that seniors using their fingers and eyes in an intuitive way when they using tablet. They do not need any IT products' experiences. The hand-eye coordination is much better. The intuitive operation can reduced seniors' mental load. It can meet their needs for internet and leisure entertainment. Morris (1992) pointed out that "Technological Alienation" of seniors in the application of information science and technology, namely, operation of an existing computer, peripheral hardware and software interface used, compared with other age groups, seniors are often more difficult to control, causing psychological and physical disorders.

The maturing of the touch gesture control technology in recent years, touch gesture control is applied broadly in GPS navigation, smart phones, tablets, laptops, touch panels and other consumer electronics products. Compared with the previous mouse control device, touch gesture has become a mainstream control method, a new generation of human-computer interface interaction. According many literature, the touch-control is more intuitive, convenient and easy to learn for the elderly. However, what problems will happen when the elderly converts from traditional input interface to a touch-control operation? Will it be easier to use and give a proper feedback to the elderly. It remains a subject worth to explore.

Seven gestures were selected from the three most popular tablet operation systems, i.e. Android, Apple iOS and Windows. Seven gestures include Tap, Tap and hold, Double tap, Swipe, Pan, Pinch and Rotation. They are considered to be basic and used most often. They are illustrated as Table 1.

Table 1 Selected gestures and their corresponding meaning

Gestures	Tap	Tap-and hold	Double-tap	Swipe	Pan	Pinch	Rotation
Illustrations							
Correspond meanings	Select	Delete	Quick zoom	Turn pages	Move	Zoom in/ out	Spin

Research Methods

Matching test is adopted to see how the tasks match the gestures on a tablet.

Subjects

Two groups of respondents, 30 mid-older adults (aged 40-70) and 30 young adults (aged 20-30), are recruited for the test. The gender are as evenly distributed as possible. The mid-older group including 15 expert users (who use tablets or similar devices everyday) and 15 novice users (who use tablets or similar devices less than once a week).

Tools

A laptop computer is used to play back the video clips which shows intended tasks and a questionnaire sheet were used to collect the answer.

Experiment procedure

1. Collect the subjects' basic data including: age, gender, education and experiences in using tablet.
2. Seven questions in video clips are played back to the subject one by one randomly. Subjects are asked to reply respectively until finish all the questions.
3. To prevent the subjects from choosing an answer by try-and-error, tablet was not provided during the test. The subjects were asked to choose an answer intuitively.
4. The answers and reactions from the subjects were recorded by the researcher for analysis.

Data process

The Confusion Matrix (Zwaga and Boersema, 1983), a method to evaluate graphic symbols recognition rate, was used to analyze the data.

Results and Discussion

Thirty young subjects aged between 20-28 years old (18 males, 12 females, 23.0 average, 2.27 S.D.) and thirty mid-older subjects aged between 47-70 years old (12 males, 18 females, 60.6 average, 7.03 S.D.) were recruited to do the task-gesture matching test.

Mid-older subjects vs. young subjects

Overall, it is not surprisingly that the average correct rate on all tasks for mid-older subjects (52.4%) is significantly less than young subjects (78.6%). Except for "Delete", all the correct rate of every task for the young subjects are higher than the their counterpart (see Figure 1). Interestingly, amon young subjects, two tasks' correct rates are below 66.7% (the ISO standard for icon acceptable recognition rate) i.e., "Delete" and "Quick zoom".

Novice vs. Expert Mid-older

The average correct rate of the expert older (60.9) is higher than novice older (42.9). In Figure 2, there is only one task's correct rate, namely Zoom in/ out, for novice older subject is equal to 66.7%. Six ou

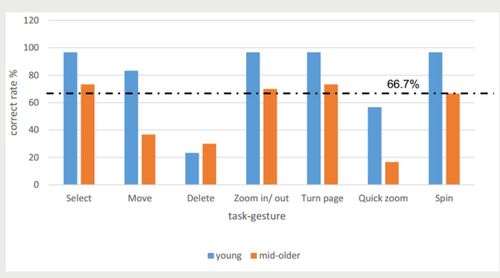


Figure 1 Comparison between young group and mid-older group on gesture matching rates

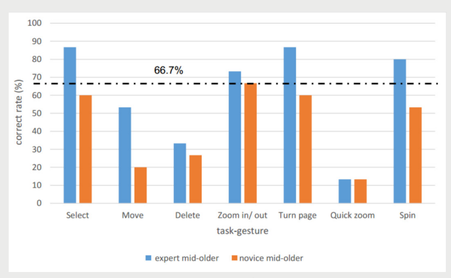


Figure 2 Comparison between expert older group and novice older group on gesture matching rates

Conclusion

Seven basic gestures, namely Tap, Tap and hold, Double tap, Swipe, Pan, Pinch and Rotation, and their correspondent tasks were selected from top three operation systems to examine the recognition difference between mid-older and young tablet users. Thirty mid-older subjects including 15 expert users and 15 novice tablet users and thirty young subjects were recruited to do matching test. As a result, we found that the correct rate of the mid-older is significantly lower than the young. Experience in using might affect the correct rate. Certain intuitive gestures including Tap, Swipe, Pinch and Rotation had higher correct rate were considered to be acceptable for both mid-older and young subjects according to the ISO standard. However, only the Pinch gesture for novice mid-older is acceptable. The research suggests that more coaching might be needed for novice mid-older adults on the use of gestures.

Acknowledgement

This study was sponsored by the Ministry of Science and Technology, Taiwan (MOST-105-2221-E-027 -067).

References

Caprani, N., O'Connor, N. E., & Gurrin, C. (2012). Touch screens for the older user (pp. 95-118). InTech.

Morris, J. M. (1992). The effects of an introductory computer course on the attitudes of older adults towards computers. In ACM SIGCSE Bulletin (Vol. 24, No. 1, pp. 72-75). ACM.

Zwaga, H. J. & Boersema, T. (1983.) "Evaluation of A Set of Graphic Symbols," Applied Ergonomics, 14(1), 43-54.

Author(s)

Chiwu Huang

Organization

National Taipei University of Technology

iasdr2017

University of CINCINNATI

D | A | A | P