

Automatically Recording Keystrokes in Public Clusters with RUI: Issues and Sample Answers

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Researchers often need to measure and collect timing characteristics of task performance (e.g., response latency and task completion time). These timing records provide a description of user behavior. This can be done using commercial behavior software, or it can be done with RUI (Recording User Input), a tool to timestamp user behavior (mouse movements, mouse clicks, and keystrokes) in an unobtrusive way (Kukreja, Stevenson, & Ritter, 2006). Here, we present a potential problem when using RUI and similar tools and a sample answer to efficiently use software to investigate human behavior when working in public clusters.

A Problem when Using RUI in Public Clusters

Using RUI in a study in a naturalistic setting raises new issues. The first issue is that recording can cause a problem when it is used in a public cluster (e.g., a computer classroom). A university policy should and Penn State's policy does prohibit installing any tool for experimentation that obtains a user's identifying information (e.g., a login id or password).

The Mac RUI version does not encode material typed into secure text fields, but the Windows RUI captures all keystrokes. This concern prohibits RUI from being installed in public computers in a public directory. Installation is restricted to a temporary directory while running each study session. This causes a repetitive and time-consuming burden on an experimenter when running a study in public clusters.

Here is an example case. We have been using computers at a classroom to measure users' learning and forgetting on a spreadsheet task. Thus, we had to install RUI every session for each subject. For the study, we had to do the following repetitive procedures:

- (1) Insert a CD containing study environments (e.g., RUI and spreadsheet files)
- (2) Copy those folders and files onto the local drive of each computer
- (3) Open Emacs
- (4) Create and configure the .emacs file:
e.g., (load "/Users/guest/dismal/dismal-mode-defaults.el")
- (5) Close Emacs and restart Emacs
- (6) Open up the Macintosh application *Terminal*
- (7) Type `cd rui`

(8) Type `./rui -s "jongkim" -r
~/Desktop/jongkim-ruioutput.txt`

These procedures nearly double the time of running a user study. For our situation, it takes around 25 minutes for an experimenter to setup six computers to run a 30-min. session with six subjects. We had run four consecutive days of experiments to measure users' learning and spent around 1 hour 40 minutes on the repetitive setting in a week.

A Way to Use RUI on Public Cluster Machines

Using RUI on a jump drive and a shell script programming cuts this time to 30s/machine and provides a way to efficiently use RUI on public cluster machines. A simple shell script can help to easily setup our experimental environment by reducing setup time. Table 1 shows a sample shell script.

Table 1. An example of shell scripting.

```
#!/bin/sh
(/Volumes/Exp/.../Emacs -l /Volumes/EXP/.emacs ;) &
echo -n "Enter your initials (e.g., jwk):"
read INITIAL
/Volumes/Exp/rui/rui -s $INITIAL \
-r /Volumes/Exp/$INITIAL.txt
```

The shell script reads the subject's information, automatically sets up the RUI environment, and runs the Dismal spreadsheet (Ritter & Wood, 2005). This approach helps reduce repetitive and useless steps. This technique of using a jump drive to hold software and a shell script to run it easily can be incorporated to an undergraduate course to help students run experiments.

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References

- Kukreja, U., Stevenson, W. E., & Ritter, F. E. (2006). RUI: Recording user input from interfaces under Window and Mac OS X. *Behavior Research Methods*, 38(4), 656-659.
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