Short manual of data recording function

1. Outline of the function

The latest Gazetalk equips data recording and indices calculation functions. These functions can be started by activating the key named “start recording” in the top menu. These functions allow us to get “log of eye movement data” described in time-line style and “performance indices” calculated for both of each specific time interval and whole performance. The details of these data are described below.

(1) Log of eye movement data

The log shows the transitions of gazes. Events allocated to each gazed key, times at which the gaze comes into/exits from each key, gaze durations for each key, names of each key which was gazed at, relations to typing task*, conditions in terms of dwell time, and texts shown in text field are recorded in the log.

* “relating to typing”: Events that can be treated as those relevant to typing itself. These events can be defined by an analyser.

(2) Performance indices

The following 11 indices are calculated automatically: Number of Text Field event, Attended Keys Not Selected, WPM, CPM, Effective Time, Net_WPM, Key Strokes Per Character, Average duration of uninterrupted, Number of uninterrupted, and Number of delete key activations. Each index is calculated on the following basis: Every specified time(accumulative and normal), and every sentence(accumulative and normal).

- Number of text field event: This is defined as the number of gazes at text field divided by the number of characters typed. This index was originally used by Majaranta et al (2004)
- Attended keys not selected: This is defined as the number of keys gazed but not activated (i.e., gazes with duration that is less than dwell time for key activation) per character.
- Words per minute: This index is calculated as (the number of typed characters or spaces)/5/total time (minutes). This is mainly used in European languages.
- Characters per minute: This is calculated as (the number of typed characters or

spaces)/total time (minutes).

- Effective Time: This index is referred to as the total time durations a users spent for typing (i.e., Effective time). This index can be obtained by summing up all the time durations in which events relating to typing occurred.
- Net_WPM: This index can be calculated as the number of characters typed/5 / effective time. This directly represents with the “pure” typing speed. In our paper (Aoki et al, 2006), this index was called as “micro WPM”.
- Key Strokes per character (KSPC): This index is defined as the number of key activations divided by the number of characters typed. The KSPC was proposed by MacKenzie(2002)
- Average duration of uninterrupted text input: This index represents the mean time duration of consecutive text input. This can be obtained by identifying the consecutive events relating to typing. The detailed explanation about this index can be found in our paper(Aoki et al, 2006).
- Number of uninterrupted text input: This index represents the number of groups consisting of consecutive events relating to typing. The ideal number would be 1 since the user did not need to stop text input during typing. The detailed explanation about this index is found in our paper(Aoki et al, 2006).
- Number of deleted characters: This index is referred to as the number of deleted characters per character typed. The explanation about this index is found in our paper(Aoki et al, 2006).

2. How to obtain the indexes in Gazetalk experiment

(1) In order to start using the function, you need to add the following one line into the “EW2.ini” file found in Gazetalk folder.

StatisticTime=30

This has to be done before starting Gazetalk. The value shown in the line indicates the time(sec) intervals used to calculate each index. You can change this value according with the purpose of analysis (for example, 10,60, 300, etc.).

(2) You also have to define typing-related events in order to calculate indices such as effective time, net-CPM. This is needed to obtain net time spent for typing itself. The system setting can be done by adding events which you think are not relating to typing

into “NotInputRelated.txt”. In default, the four events (TextField, OutOfGaze, eEXIT, and eMINIMIZE) are defined as those which are not relating to typing.

(3) When starting Gazetalk, you are asked to enter “log-file name”. Please give some appropriate name enabling you to easily identify the data.

(4) The function can be started by activating “start recording” in top menu. This function can only be completed by activating “Exit” key found in Gazetalk interface. If you choose any other method for exiting Gazetalk (for example, clicking “x” by a mouse etc.), you cannot obtain any indices.

(5) The system produces five files whose name are “**1.txt” to “**5.txt” (** indicates the log-file name you gave in (3)). The contents included in each file are as follows:

“**1.txt”: raw log data of eye movement, described in time line style.
“**2.txt”: Indices calculated on every specified time interval basis (accumulative)
“**3.txt”: Indices calculated on every specified time interval basis (normal)
“**4.txt”: Indices calculated on each sentence basis (accumulative)
“**5.txt”: Indices calculated on each sentence basis (normal)

“Normal” means that the indices are calculated for each time interval or sentence by use of data included in each of the time interval or sentence. “Accumulative” indicates that the indices are calculated at each time interval or sentence by use of all the data obtained at the moment of calculation.

References

Aoki, H., Hansen, J. P. and Itoh, K. (2006). Towards remote evaluation of gaze typing systems, Proceedings of the 2nd Conference on Communication by Gaze Interaction – COGAIN 2006: Gazing into the Future, Turin, Italy, pp. 94-101.

MacKenzie, I. S. (2002). KSPC (keystrokes per character) as a characteristic of text entry techniques. Proceedings of the Fourth International Symposium on Human Computer Interaction with Mobile Devices, Heidelberg, Germany, pp. 195-210.

Majaranta, P., Aula, A., and Räihä, K.-J. (2004). Effects of feedback on eye typing with a short dwell time. Proceedings of the 2004 Symposium on Eye Tracking Research and Application, San Antonio, USA, March, pp.139-146.