Testing the temporal accuracy of keystroke logging using the sound card

Frid, Johan; Wengelin, Åsa; Johansson, Victoria; Johansson, Roger; Johansson, Mikael

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Writing research has seen an increased use of keystroke logging. Keystroke logging programs log the writing process in a continuous and non-obtrusive way. They enable researchers to collect fine-grained data because they log every keystroke in relation to a timestamp (in milliseconds), which indicates the time that a specific key was used. For the researcher interested in, for example, word-internal processing, it’s important to know the degree of precision and accuracy that can be achieved by the program.

**METHOD**

We propose a method of measuring the accuracy of keystroke timestamps using a recording of the sounds made by key presses.

- Sound cards fit the purpose well since they typically have much better temporal resolution than computer keyboards and they are readily available in most computers.
- Key presses produce noise patterns that are easily temporally located in an acoustic waveform.
- The timestamps of the noise patterns can then be compared with the corresponding timestamps reported by the keystroke logging program.
- Specifically, the differences between the two timestamps of each keystroke, provides an estimate of the accuracy of the program.

<table>
<thead>
<tr>
<th>point-by-point</th>
<th>interval</th>
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<tbody>
<tr>
<td>sd</td>
<td>range</td>
</tr>
<tr>
<td>ScriptLog</td>
<td>0.005</td>
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<tr>
<td>Java prototype (Firefox)</td>
<td>0.003</td>
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<tr>
<td>Java prototype</td>
<td>0.003</td>
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<td>C++ prototype</td>
<td>0.003</td>
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<tr>
<td>SoundCard</td>
<td>5.29E-05</td>
</tr>
</tbody>
</table>

We find significant differences between the variances of the prototypes and ScriptLog (example: for Java: F=0.287, p<0.001).

- This implies that a reimplemented version will provide improved timing accuracy.
- This method can be implemented as part of any keystroke logging program in order for the user to test the accuracy in his/her own computer environment.

Johan Fridl¹, Åsa Wengelin², Victoria Johansson¹, Roger Johansson¹, & Mikael Johansson¹

¹Lund University, Sweden
²University of Gothenburg, Sweden