Sonification of Software's Behavior and Its Application to Information Security

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The author proposes sonification of software's behavior to improve information security. Nowadays many people use computers without knowing what are going on inside. Computers are usually connected to Internet, and therefore it is at least necessary for computer users to be aware of information security, especially malware (malicious software.) For a computer user to easily notice anomalies of software, the author proposes a revolutionary system using sound, which does not disrupt his/her work and is extremely easy to use. This is a distinctive advantage of sonification over visualization. This system plays various MIDI (Musical Instrument Digital Interface) audio sounds, depending on software's behavior such as communications, File IO, etc. Each process is allocated to a different instrument, and the process behaviors are expressed by PitchBends or Modurations. Even if plural sounds are played, users can follow a particular sound by the cocktail party effect. The proposed system is practical, because it can run together with other softwares (e.g. browser) and notifies the user of their behaviors in real time. When the user feels abnormities from the sounds, he/she can stop the process or the computer itself, or report to the administrator. This system was implemented and executed on Windows7. It uses ETW(Event Tracing for Windows), so its load is not heavy. We found that the particular attack such as some malwares which try to infect other computers are very clearly identified. This method may be used for deeper analysis of malwares. Implementaion on smart phones may also be possible.

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