A Psychological Identification for Computer Security

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Abstract

The authentication is one of the most important prerequisite of any computer system if the system contains confidential information for distinguished set of users in a community. The effort becomes more complicated when the system has to serve for different levels of authorization for these users.

The literature suggests methods based on two different concepts to achieve this requirement, something the user knows or user has, and something the user is. The basic authentication mechanisms are based on the former concept, where an authentication system assumes something the user knows, such as, user name and password or a PIN code, or something the user has, such as, a security token like a smart card. However, these approaches have lot of drawbacks, such as, forgetting of passwords, theft, loss or disclosure of identity data, and replicating of security tokens.

In contrast, more advanced authentication mechanisms in today uses the concept of something user is and the approach is to use biometric measurements of users, such as, fingerprint, hand geometry, retina scan, voice analysis, and face recognition. Even though these techniques serve a powerful solution, there are threats with respect to advancements in technology, or uncommon issues. These includes, replicating or cloning of biometric measurements to compromising one's identity under forced conditions.

As a solution, we are proposing a security token based on one's psychological identity. There is no other unique feature other than psychological identity of a person and it is totally dependent on cognitive factors, such as, memory, inferencing capabilities, personality, knowledge and experience. Further there is no technology capable of replicating one's psychology.

In the recent years, computer science influenced study of psychology has reported an immense progress. As a result, researchers have been able to identify the factors influencing one's psychology and its relationship to biological system. According to cognitive science, one's cognitive processing can be either conscious or sub-conscious. Most of the conventional authentication mechanisms are based on something consciously controlled by users, such as remembering passwords. Meanwhile, emotions are explained as an intense mental state that arises subjectively rather than through conscious effort in humans. These emotional changes trigger reactive changes in the body, such as, changes in the mood of the face as well as internal changes like the flow of hormones. The modern bio-medical instruments are capable of capturing these biological changes in the form of skin resistance, blood pressure etc. Further, researchers have been able to reverse engineer biological reactions to recognize emotions.

Our proposed method is based on this phenomenon and it is an indirect way of identifying one's psychology by the psychological reactions. The subject is presented an emotionally charged multimedia content, and while the user is observing this content his/her mental states are approximated by measuring and analyzing biological reactions. Our preliminary studies and literature have suggested that these state changes are identical to individuals. Therefore, a recognized personal profile has the potential of identifying a particular person over a group of persons over different instances of time.

Another important advantage of this solution is that it has the potential to give a confidentiality level of the user at a particular time. This would be an important parameter to grant different authorization levels and to capture forced conditions.