Dynamic Authentication by Typing Patterns

Luke Knepper
Computer Systems Lab 2009-2010

Abstract

This project will analyze and test the accuracy of dynamic typing pattern authentication methods. The program will generate a dynamic set of text that the user will be prompted to type, and then it will feed the user's typing characteristics through neural network structures. Experimentation will be done to determine the most accurate neural network structures and data collection conditions. This process will be an improvement on normal typing pattern authentication techniques, which use static passwords rather than dynamic text.

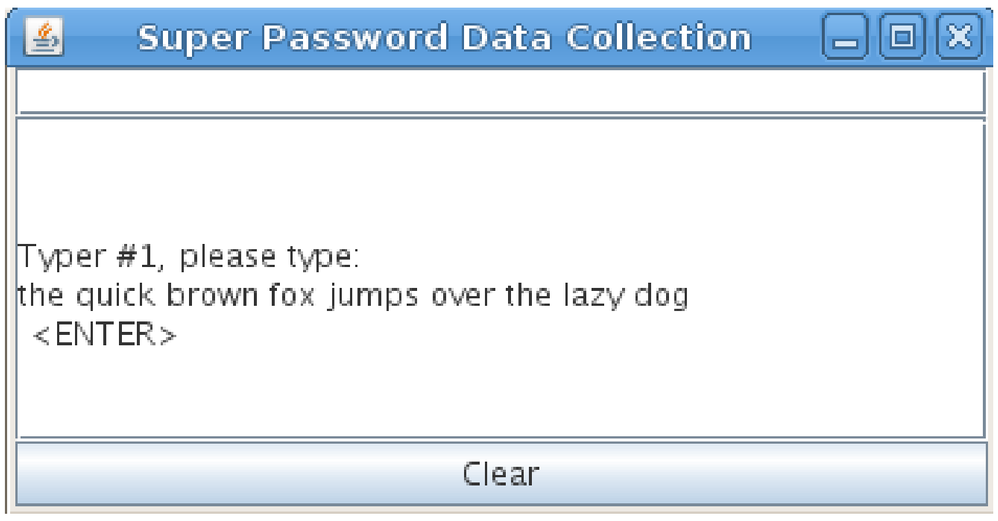

Fig 1: The current GUI

Background and Introduction

Typing patterns differ by person. People naturally hold down specific keys for specific times and take longer between different keystrokes. These typing characteristics can be, and have been, used for authentication purposes. however, current methods are not flexible to implement and only measure typing patterns on a single, static password, making them easy to hack using a simple Keylogger.

No research has yet been done on the accuracy of using dynamic Blocks of text (which the user is prompted to type), which is Considerably more difficult to crack, as no simple keystroke Combination can be recorded and played back by a keylogger. Previous experimentation on static passwords has found that Neural-networks are the optimal approach but only come in at 80-90% accuracy. This suggests that typing authentication Techniques will not be able to replace traditional authentication Techniques (such as usernames and passwords) but can provide Another layer of security on top of these.

Discussion

A proof of concept program has been completed thus far. This program prompts two users to type a sentence, And then prompts them to choose a "mystery user" to Type a third sentence (the identity of the user unknown To the program). It then feeds the users' typing patterns From the first two sentences through a simple neural Network, training this network to their characteristics. Once the network is trained with the two identified sets Of data, the program feeds the third user's typing data Through the network. Whichever user the third set of data Most closely approximates is the user that the program Identifies as the typer.

This will only be a proof of concept program, using the Simplest single-layer network possible.

The program has an accuracy of 18 / 20 = 90%, which goes To show that the concept can be used on a larger scale, If perfected.

Results and Conclusions

Current results have shown that this method can be used Accurately and efficiently for authentication purposes, but is not a secure replacement to traditional authentication techniques, And therefore should be used hand in hand with these Techniques as an added layer of security.