An Exploration of Geographic Authentication Schemes

Objective:

The objective of this system is to design and explore the usability and Security of two Geographic Authentication Schemes.

Abstract:

We design and explore the usability and security of two geographic authentication schemes: GeoPass and GeoPass-Notes. GeoPass requires users to choose a place on a digital map to authenticate with (a location password). GeoPassNotes—an extension of GeoPass—requires users to annotate their location password with a sequence of words that they can associate with the location (an annotated location password). In GeoPassNotes, users are authenticated by correctly entering both a location and an annotation. We conducted user studies to test the usability and assess the security of location passwords and annotated location passwords. The results indicate that both the variants are highly memorable, and that annotated location passwords may be more advantageous than location passwords alone due to their increased security and the minimal usability impact introduced by the annotation.

Introduction:

Passwords have well-know problems relating to their memorability and vulnerability to being easily guessed by an adversary. The security problems with passwords appear to be even worse than previously believed. To ensure security requirements are met, unusable password policies are implemented that cause an increasing burden on users. When passwords are forgotten, many systems rely on secondary authentication such as challenge (or "personal knowledge") questions

for resetting his or her password. Unfortunately, such methods also appear to offer questionable security. These issues motivate new user authentication strategies that have improved memorability and security. We hypothesize that location passwords should be highly memorable under an appropri-ate system design; after all, map locations are visual, and represent places (which may be more "concrete", and easier to remember). We design and explore the usability and security of two geographic authentication schemes. GeoPass—first proposed and analyzed in the preliminary version of this work—and GeoPassNotes. In the GeoPass system, a location password is a point on a digital map that is selected by a user as his/her password. GeoPassNotes is an extension of the GeoPass system. In GeoPassNotes, users are authenticated by correctly entering both a location and an annotation. Therefore, we aim to enhance the security of location pass-words by asking users to choose a note they can associate with their chosen location; we call this combination of the location password and its note anannotated location password.