

PassFrame: Generating Image-based Passwords from Egocentric Videos

ABSTRACT:

In this paper, we analyse first-person-view videos to develop a personalized user authentication mechanism. Our proposed algorithm generates provisional image-based passwords which benefit a variety of purposes such as unlocking a mobile device or fallback authentication. First, representative frames are extracted from the egocentric videos. Then, they are split into distinguishable segments before a clustering procedure is applied to discard repetitive scenes. The whole process aims to retain memorable images to form the authentication challenges. We integrate eye tracking data to select informative sequences of video frames and suggest another alternative method if an eye-facing camera is not available. To evaluate our system, we perform experiments in different settings including object- interaction activities and traveling contexts. Even though our mechanism produces variable graphical passwords, the log-in effort for the user is comparable with approaches based on static challenges. We verified the authentication scheme in the presence of an informed attacker and observed that the effort is significantly higher than that of the legitimate user.

INTRODUCTION:

Personal digital devices (e.g. laptops, tablets, smartphones, and desktop computers) are involved in various aspects of our daily life such as working, entertainment, financial management, navigation, and healthcare. As a protection mechanism, they are usually accessible with secret information known only by the permissible users. Graphical passwords, such as the 9-dot log-in screen on the Android platform, have been gaining more popularity than classical text-based approach due to their convenience on the touch-based interface. Nevertheless, the user is required to remember a static password which is vulnerable to shoulder surfing attacks or smudge analysis. Recently, the proliferation of wearable cameras allows users to continuously capture videos or images of the environment from the first-person perspective. These devices can be mounted to a frame of eye glasses, clipped on a shirt, or even attached to a wristband. The

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motion information captured in egocentric videos can be exploited to identify the wearers while they are walking. These characteristics of egocentric videos make them a potential candidate for designing authentication schemes on personal devices.

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