Proposal for CSE591 Final Project

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Index Terms—Stroke recognition

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1 PROPOSAL

In Virtual Reality (VR) headsets, wearable computers, and other pervasive computing applications, user authentication is necessary for login onto the local device or a remote virtual sites to access resources or personalized services. In such an environment presenting a keyboard or touchscreen is usually impractical, while gesture based authentication would be efficient and favorable because the primary user interface of these devices is based on gesture. For example, popular VR systems such as Oculus Rift, HTC Vive, and Sony PSVR all utilize handheld remote controllers to play games. Future gesture interface will use hand-wear devices [2] or wearable cameras [3] to capture users hand motions. However, existing hand motion based authentication solutions suffer from limited capture resolution, inconvenience for performing specified gestures, and unstable user behavior. Hence, their discrimination power is limited and their usability is questionable.

We would like to proposed a finger motion based passcode method, which can authenticate the user by writing a passcode with the index finger in the air. The finger motion can be captured by the device used for the gesture user interface. The content of the passcode can be meaningful phrases, a piece of scribbling like a signature, or a doodle as long as it can be reproduced by the users finger motion. In this way, the model enables a much larger passcode space than the alphanumeric password. For example, it can contain a drawing of a five-point star, which can not be typed on the keyboard. The captured motion signal is compared with a previously registered movement pattern using our novel algorithm to authenticate the user. The user is able to perform it repeatedly and easily, while others would have significant difficulty to mimic it. Thus, our model can overcome shoulder surfing attack[4], relieve the difficulty of remembering strong passcodes, and avoid inherent shortcomings of using irrevocable biometrics based authentication solutions.

2 REFERENCE

Chaos computer club breaks apple touchid. http://www.ccc.de/en/updates/2013/ccc-breaks-apple-touchid. Accessed: 2016-10-8.

CyberGrasp. http://www.cyberglovesystems.com/cybergrasp/. Accessed: 2017-2-1.

Microsoft HoloLens. https://www.microsoft.com/microsofthololens/en-us. Accessed: 2017-2-1.

LASHKARI, A. H., FARMAND, S., ZAKARIA, D., BIN, O., SALEH, D., ET AL. Shoulder surfing attack in graphical password authentication. arXiv preprint arXiv:0912.0951 (2009).

AMMA, C., GEORGI, M., AND SCHULTZ, T. Airwriting: a wearable handwriting recognition system. Personal and ubiquitous computing 18, 1 (2014), 191203.

ASLAN, I., UHL, A., MESCHTSCHERJAKOV, A., AND TSCHELIGI, M. Mid-air authentication gestures: an exploration of authentication based on palm and finger motions. In Proceedings of the 16th International Conference on Multimodal Interaction (2014), ACM, pp. 311318.