

Accepted Manuscript

Biometric touchstroke authentication by fuzzy proximity of touch locations

Orcan Alpar

PII: S0167-739X(17)32605-5
DOI: <https://doi.org/10.1016/j.future.2018.03.030>
Reference: FUTURE 4042

To appear in: *Future Generation Computer Systems*

Received date : 12 November 2017
Revised date : 1 February 2018
Accepted date : 14 March 2018

Please cite this article as: O. Alpar, Biometric touchstroke authentication by fuzzy proximity of touch locations, *Future Generation Computer Systems* (2018), <https://doi.org/10.1016/j.future.2018.03.030>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Biometric touchstroke authentication by fuzzy proximity of touch locations

Orcan ALPAR

Center for Basic and Applied Research, Faculty of Informatics and Management, University of Hradec Kralove,
Rokitanskeho 62, Hradec Kralove 50003, Czech Republic, orcanalpar@hotmail.com +420 732 764683

Abstract— Advancing touchscreen technologies lead to deployment of biometric passwords that could provide an additional security layer, therefore the presence of a secondary and hidden ghost password could restrain incoming fraud attacks even if the main password is stolen. Apart from the traditional keystroke methods dealing with the inter-key times, on-screen keyboards potentially have new features to extract. Provided that the touchscreen devices capture the touch locations, the users could intentionally create and save a ghost password by touching the predefined regions of the keys in enrollment session. However, while logging in, it is not easy to touch exactly the same points compared to the coordinates saved in enrollment; touching closer coordinates in each attempt is still possible though. From this viewpoint, we introduce a fuzzy classifier with the mathematical foundations of fuzzy proximity and inference for a novel location-based authentication system running on an emulated on-screen keyboard. We mainly focused on extracting the global coordinates that the user is touching in the two-step enrollment, which is so common in conventional registration interfaces. As the main classifier, a fuzzy inference system is implemented with proximity control of the touches for registration and login sessions. The results of the classification procedure are greatly encouraging that only one of sixty four fraud attacks was inadvertently granted; while the false reject rate is 0% and the false accept rate is 1.56% with the equal error rate is 1.61% which indeed represents one of the lowest among the classifiers introduced before.

Keywords—Biometrics, Touchstroke Authentication, Fuzzy proximity, Mathematical Fuzzy Sets, Security

1. Introduction

As a science discipline, biometrics term mainly represents inherited physical and biological characteristics of individuals, like DNA and fingerprints; and habitual or behavioral traits in handwriting, signing styles and keystrokes. If the characteristic traits of the individuals could be extracted as unique features, it is very promising and trustworthy to use in biometrics authentication systems as inputs. Biometric authentication here stands for the access granted by a device to enable an individual to enter a system or a building without any other tool. Considering the nature of biometric devices, not every trait is feasible for authentication indeed; however useful for recognition and identification. For instance, despite the indisputable uniqueness of face, gait, teeth and even top/side/back views of individuals' heads, these traits generally couldn't be controlled by a device for authentication. Therefore the biometric traits and features could be separated into two major groups: identification and authentication; where authentication has two sub sections: physiological and behavioral as shown in figure 1.

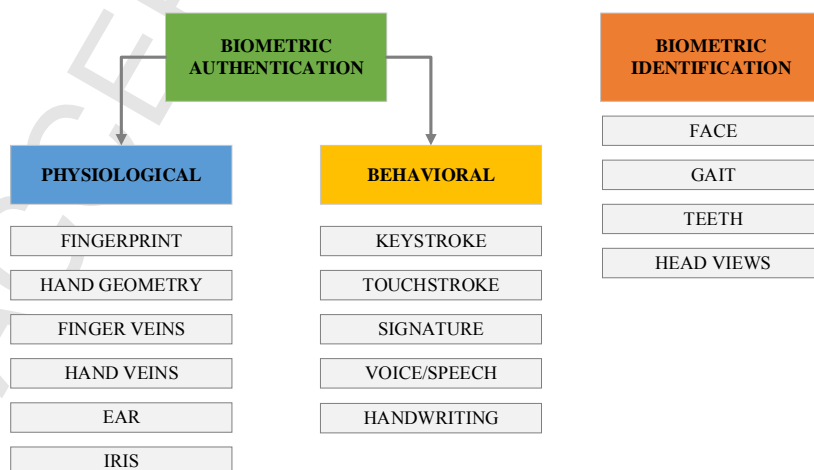


Fig.1. Generalized Classification of Biometrics

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات