Five fundamentals for self-service fingerprintreading

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Exposé
Requirements for a successful interaction between a fingerprint reader and the user.

There is no doubt that a sufficient quality of a fingerprint is required in order to verify a traveler when crossing a border or issuing a visa. However, in order to achieve a high quality fingerprint, it must be ensured that fingerprints at all can be captured in any case. What seems to be an obvious step is not given today per se.

Comprehensive studies on identifying issues for a self-service border control process using fingerprints as an identifier, performed by the Science and Technology Directorate of the US Department of Homeland Security, have shown that the major issue is the acquisition of fingerprints for non-trained users[1]. A typical traveler using today's fingerprint scanners does not know and is not guided

WHICH FINGER IS TO BE PLACED?

WHERE AND HOW TO PLACE THE FINGER?

HOW LONG TO HOLD THE FINGER ON THE DEVICE?

These issues lead to either an extension of the capture times or in worst case, the need of an operator to manually guide the user through the fingerprint capture process.

It is therefore absolutely apparent that the equipment used for a self-service fingerprint capture process for border controls needs to be designed in a completely different way than most of today's fingerprint scanners. Systems in self-service operation need to work independent from the pre-knowledge of the capture process, the language and cultural background of the passenger.

In order to have an automated fingerprint capture process it is required that there is a real-time, dynamic and most easy to understand interaction between the user and the machine. The interaction between user and scanner should not be a one-way-route but rather a conversation between partners. Or in other words: Fingerprint scanners need to talk to the user.

1 Usability and user perceptions of self-service biometric technologies Y. Sirotin, International Biometric Performance Conference, Gaithersburg, 2016

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WHAT IS REQUIRED FOR A SUCCESSFUL INTERACTION BETWEEN A FINGERPRINT SCANNER AND THE USER?

1. LIMIT DISTRACTION

In a typical today's setup, the fingerprint scanner is placed in one position and the instructions and feedback elements, in most cases displays, are placed somewhere else. The user is therefore forced to focus his attention before and during the fingerprint capture process, both to the scanner and the display. Depending on the setup this could be a difficult task as two actions, placing/correcting/holding fingers and watching the display, need to be done in parallel.

To overcome this difficult task, the capture and feedback area have to be combined into one single element. This way users only have to concentrate their attention onto one place thus simplifying and accelerating the capturing process.

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2. GUIDE AND HELP

For an automation of the fingerprint capture process, it is essential to have guidance to the user before, during and at the end of the acquisition process. The typical LEDs or fixed pictograms used in most of today's fingerprint scanners might help for experienced users; in many cases a colored or blinking LED says nothing to the user. Those feedback elements require an understanding of their meaning, which is of course not existing, as most travelers will use these machines very rarely and even worse, every manufacturer or operator does have his own philosophy about the meaning of such signals.

It is therefore required that elements are displayed that guide the user on the number of fingers requested, the location where these fingers must be placed and in particular clearly signalize for how long to hold them on the fingerprint area. Equally important is to offer help in case the fingers are placed in a wrong way, such as fingertips only, wrong hand or spread fingers.

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3. BE INCLUSIVE

Elements that are displayed to the user need to work independently from the origin, the language and knowledge of the user. Therefore, text messages do not help in a multi-language environment, nor do live images of fingerprints help the user to assess the quality or completeness of a fingerprint image.

Symbols, animations and icons used need to work cross-culturally and as best as possible be understandable by young, old, well- or less-educated, as well as experienced and novice users.

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4. TIMING MATTERS

Basis for a good conversation is a mutual dialogue between both partners signaling the awareness of each other. Nothing is worse than having an interaction with a machine, if the machine does not or only with delay react on the user's action. In those cases, users get frustrated and very often the entire process is corrupted.

Fingerprint scanners used in a self-service application consequently need to react immediately, or in technical words: in real-time, after each user action. Otherwise any delay causes confusion for the user. Thus, a very sophisticated "teamwork" between the hardware and software controlling the device is required to achieve this real-time conversation.

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5. BE IN LINE

The guidance during the fingerprint process needs to be “in line” with the user. Animations or symbols that are displayed on the device need to consider the degree, the level and speed of attention of the user.

Particularly on border control, when travelers using fingerprint scanners after long flights without sleep, the attention can be much different compared to a day in an office. Thus, the appearance of the symbols and the speed of the animation need to be well balanced not to overburden users, but also not to keep them waiting for the next step.

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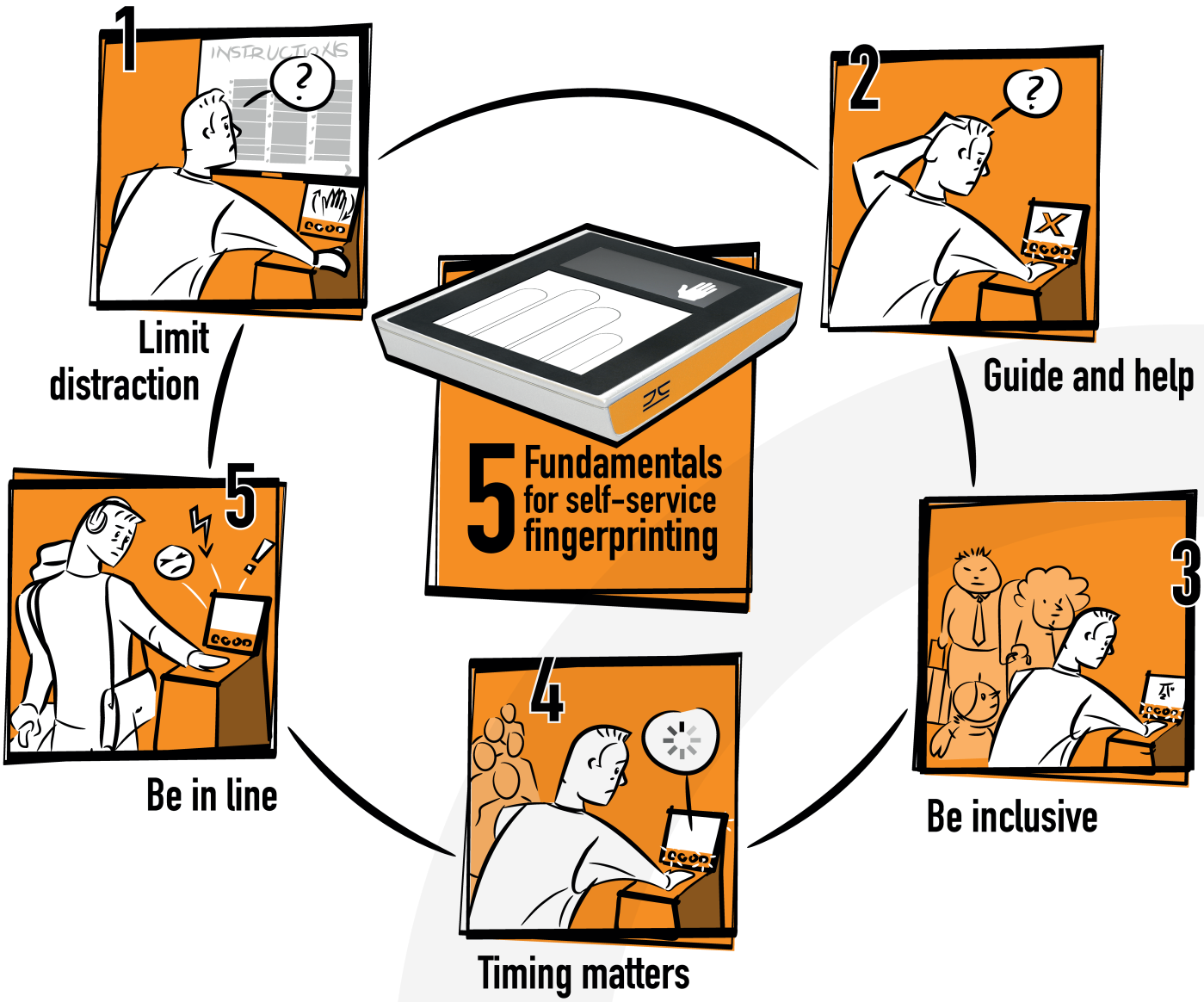
SUMMARY

In order to achieve a smart, fluent and user accepted self-service fingerprint capture process, fingerprint scanners need to have the ability to communicate with the user. The most important is to take every user into account and treat him respectfully through the process. This is particularly true for when sensitive information such as fingerprints are taken. Giving the user the positive feeling that he is in the driver's seat, will significantly contribute to the acceptance of the automated fingerprint capture.



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