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DSP-D-18-00426: Interim Decision

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Ms. No.: DSP-D-18-00426
Title: Finger Texture Biometric Characteristic: A Survey
Corresponding Author: Dr. Raid Omar
Authors: Tingting Han, Dr.; Taolue Chen, Dr.; Satnam Dlay, Prof.; Jonathon Chambers, Prof.

Dear Dr. Omar,

Thank you for submitting your manuscript to Digital Signal Processing. Below you will find the reviewers' comments on your above-mentioned manuscript. The reviewers have made suggestions which the Editor feels would improve your manuscript. The Editor encourages you to consider these comments and make an appropriate revision of your manuscript.

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Thank you and we look forward to receiving your revised manuscript.

With kind regards,

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Reviewers' comments:

First Handling Editor's opinion:
The paper presents a survey about FT. The leading author, Prof. Chambers has published similar topics before in [36,37]. [37] is cited many times in this paper, however, the topic is the same, and it has published last year in DSP J. I do not think that this new paper could give much more on the State-of-the-Art in [37]. This paper can be interpreted as a detailed Intro about SoA of the previous [37] publication in DSP by the same group. Moreover, the scope of this survey paper is too broad and does not provide sufficient insight and focus into finger texture biometric. For this reason I recommend to publish this paper in a different, biometrics oriented journal.
++++++++++++++++++++++
Second Handling editor's opinion:
The article presents a thorough review analysis of finger-based biometric systems. However this review has few if any insights in Digital signal processing techniques, reason why I believe a more target oriented journal is a better much for this submission.

Reviewer #1: This paper presents a survey of finger texture biometric.

Some grammatical errors were spotted in the paper such as:
Page 9 Line 2-3: "fusion or combination with other biometric characteristics does not important to be considered."
Page 9 Line 22: "what is about amputating a certain finger?."
Page 12 last line: "In contrast with the FT, the FT is more user-friendly."
Page 25 Line 22: "which is was found to..."

The paper should be thoroughly proofread first.

In Table 1, a comparison is made to determine the acceptability, reliability, collectibility, applicability and security level of various finger physiological characteristics. However, the comparison result of high, moderate or low level is purely based on the authors' opinion and is not supported by any data or survey.

In Section 7, several databases were presented. Some sample images of each database should be presented too.

In general, the scope of this survey paper is too broad and does not provide sufficient insight and focus into finger texture biometric. For example, CASIA palmprint image database (Section 7.3) is meant for palmprint instead of finger texture, and is of insignificant relevance to the topic of the paper.

Reviewer #2: The paper presents a comprehensive study for the Finger Texture (FT). The authors also present the main drawbacks and obstacles of employing the FT as a biometric characteristic. As a whole, the paper is well written and structured. Data analysis also shows that the work carried out is sound and promising, but some minor adjustment are required to make the manuscript worthy to be published. Some of issues that need to be addressed are given below:

1.The paper is well organized, but authors need to add more up-to-date articles published in 2018 and 2019.

2.Although the authors provide a comprehensive overview of the various methods of FT, the authors did not give the URL of open source methods. These methods' codes are very useful for researchers.

3.The authors present a fairly valuable study in Section 7 Employed Databases in FT Studies. However, the authors should present several representative images for each database to better distinguish them more intuitively.

Reviewer #3: The amount of work behind the present article is impressive and it definitely worth considering. However, I do have some observations, as follows.

In the introduction on line 5, authors refer to "high security level systems". Are there low security level systems as

well? Please provide references and be specific to exactly what kind of systems (with high security level) you refer to. Also, when considering "products and buildings", do authors refer strictly to access systems for buildings? Is there any reason to consider only these systems?

The Figure 1 could be organized as a table, as most part of the figure contains no information, just one cloud and several arrows.

The image in Fig. 2 looks as it was processed. Please indicate the algorithms that were applied (and why). If the image is from [5], do authors have the permission to use the image?

Regarding Fig. 3, please indicate how the rectangles were determined, especially if they were determined automatically. The rectangles showing the regions themselves are enough to make the point. I suggest removing the arrows and the rectangle reading "main locations of FTs" which says basically the same as the caption of the figure.

All the enumerations on pages 5 an d6 could be inline, in one single paragraph, for aesthetic reasons.

Text font size in Fig. 4 and 5 should be smaller. The Fig. and 5 could be merged into a single figure, as they both provide examples of the same concepts emphasized for two different fingers.

First paragraph at the beginning of Section 2 (page 7, line 95) is to telegraphic, it should be properly rephrased.

Page 7, line 100: what authors mean by "beneficial" when referring to features? Further on, on line 105, what do authors mean by "its traits can be collected without requiring a certain finger to be presented"?

No references are provided to support the statement in paragraph 115 on page 8 - "in contrast to the FT, the visible lines and skin wrinkles of the FT are more reliable and permanent". Moreover, why for FT the acquisition devices can have lower resolution, compared with the ones used for fingerprints?

Page 8, line 120: is the binarization the only approach for hand region segmentation / identification?

Page 8. Line 130: the statement "in contrary to the FT, the security level that provided by the FT is very high" makes no sense to me. Also please provide some references for that statement. In the same paragraph, please define ROI in the introduction - which is mentioned here for the first time. What could be/is considered as ROI for FT?

Page 9, paragraph 135: please rephrase and provide references to support the statement.

As far as I know the veins are not inside the skin. Which layer of the derma? Pease be specific and use the appropriate medical terms.

Page 9, line 141: the NIR environment refers to the acquisition system?

Page 9, line 145: what do authors mean by "invisible patterns" and why they should be considered if invisible? Not clear to me.

Page 9 line 155; please rephrase "what is about amputating a certain finger".

Line 157, please reconsider the statement "Comparing with the FT, there is no restrictions for using special acquisition device or environment". Some minimal requirements (e.g. image resolution) must be considered.

Regarding "FOKs are unique and reliable patterns" - all of them (FG, FV…) are unique and reliable. This statement is misleading and not appropriate.

Page 10 line167: the FOK pattern is believed to be distinctive and varies between the fingers rather than the individuals - one can read that FOK could be the same (identical) for different individuals?

"FOK offers different texture views according to various bending degrees" applies to other characteristics as well, e.g. FV. Please reconsider.

Page 10 line 180: "there are several difficulties associated with this data base" - please rephrase.

Page 11, line 195: constancy in terms of what?

Page 11 line 200: reliability if not considered in the introduction as characteristic of the biometric systems. Or at least, a clear separation between the characteristics of the systems and of the traits should be made.

Page 11 line 207: please be more specific about "a large box". What kind of box? Again, be more specific about "suitable lighting" and, later on, "user-friendly capturing" on line 214.

Page 11 line 221: please define the "main fingers" in the introduction.

Page 12 line 231: what exactly the authors mean by "richer patterns"? In terms of what, from the point of view of texture characteristics (allowing for a quantitative evaluation)? Density, orientation etc?

Page 13, line 257: the security level of features is not mentioned before. Authors should be consistent first of all with the characteristics (both of systems and considered features as pointed out before) and secondly when comparison of each trait / feature is performed against FT - the comparison should be performed from the point of view of the same characteristics for all features.

Page 14, line 293 - "fancy patterns" - please be more specific.

Regarding Table 1: please check the consistency between the characteristics in table 1 and the ones considered/ described in the introduction.

Some references should be provided for the three stages considered in Section 3.

Regarding the conclusions of the paper, the statement "many efficient commercial biometric applications and systems based on FT(s) can be produced" should be rephrased, as it sounds more like a speculation. Regarding the usage of multi-spectral sensors: hyperspectral imaging could also be considered, but please provide some reasons for increasing the spectral resolution for the acquisition devices. This was not clear to me by the end of reading the paper.

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