

REVIEW
of the Bachelor's Thesis

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«Finger-based Multimodal Biometric Recognition »

The bachelor thesis presents a method for personal recognition which utilizes two biometric traits in order to reach better performance than any of the unimodal systems (based on the use of only one of the considered modalities). The topic is very up-to-date, combining the data from finger vein biometrics and traditional fingerprint biometrics therefore seems to be a good idea.

The student has searched and studied the relevant articles related to the subject and has analyzed the use of several modalities for identification and issues in designing multibiometric systems. The scope of the literature used corresponds to the given topic and to the method of solving it. Some references does not contain the year of publishing. With the acquired information a proposition for a new approach of biometric authentication (which uses two traits and two algorithms) was made. The studied theoretical background was clearly summarized. Experiments have been conducted on biometric data from a public-domain database. Matlab code is utilized for the biometric system simulation. The work excluded the acquisition and quality assessment phases and included the feature extraction, template matching and decision phases. The system's performance was tested by combining several normalization and fusion techniques. The result indicates that the best accuracy is reached when a multimodal system employs the fusion with the Sum Rule and Min-Max normalization technique.

Alisa Shaykhetdinova proved an ability to use her knowledge, understanding and practically apply fusion and normalization methods using Matlab.

The presentation of the thesis is fluent and written in a good level of the English language. Formally, I have no serious objections to the work submitted, a few misspellings and grammatical transgressions are not so numerous that, given the overall scope of work, this can be considered as a serious deficiency. The thesis under consideration is logical, the text is comprehensible and understandable to the reader, the report does not contain any serious mistakes or inaccuracies.

The results of the bachelor's thesis are fully usable in practice. In about 20 pages, the thesis provides a sufficient level of details.

Issues that should be discussed within the scope of the defense of the thesis:

- The rationale for the claim, that the best accuracy was reached while employing Min-Max normalization and Sum Rule for Fusion is valid for FAR=0,1%. Why the author has used exactly this value of FAR? The similar, but different results for FAR 0,01% could be obtained, where the difference between unimodal and bimodal biometrics is more significant (Figure 8.2.).
- The precise definition of “accuracy” mentioned several times in the work is missing. In some systems the security is preferred (low FAR), in some cases the user comfort is preferred (low FRR). So the concept “accuracy” is recommended to define more precisely.

Overall I recommended the submitted work for the defense and I suggest evaluating the thesis as **A – excellent**.

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