

# Longitudinal Finger Rotation - Deformation Detection and Correction

Bernhard Prommegger<sup>1</sup>, Christof Kauba<sup>1</sup>, Michael Linortner<sup>1</sup>, and Andreas Uhl<sup>1</sup>

**Abstract**—Finger vein biometrics is becoming more and more popular. However, longitudinal finger rotation, which can easily occur in practical applications, causes severe problems as the resulting vein structure is deformed in a non-linear way. These problems will become even more important in the future, as finger vein scanners are evolving toward contact-less acquisition. This paper provides a systematic evaluation regarding the influence of longitudinal rotation on the performance of finger vein recognition systems and the degree to which the deformations can be corrected. It presents two novel approaches to correct the longitudinal rotation, one based on the known rotation angle. The second one compensates the rotational deformation by applying a rotation correction in both directions using a pre-defined angle combined with score level fusion and works without any knowledge of the actual rotation angle. During the experiments, the aforementioned approaches and two additional are applied: one correcting the deformations based on an analysis of the geometric shape of the finger and the second one applying an elliptic pattern normalization of the region of interest. The experimental results confirm the negative impact of longitudinal rotation on the recognition performance and prove that its correction noticeably improves the performance again.

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<sup>1</sup>Bernhard Prommegger, Christof Kauba, Michael Linortner, and Andreas Uhl are with the Department of Computer Sciences, University of Salzburg, Jakob-Haringer-Str. 2, 5020 Salzburg, Austria [uhl@cosy.sbg.ac.at](mailto:uhl@cosy.sbg.ac.at)