Josef Ressel Center for User-friendly Secure Mobile Environments (u'smile)

University of Applied Sciences Upper Austria
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Master's Thesis: Mobile Palmprint Recognition
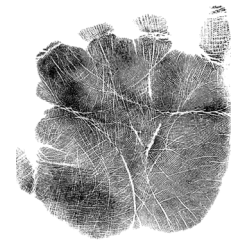
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Motivation

Palmprint recognition [1] is a form of biometric recognition [2] that distinguishes people by their palmprints. There exist different online palmprint recognition approaches (digital source image) with different image acquisition, preprocessing, feature derivation, and feature classification mechanisms [3-5]. As modern mobile devices feature increasingly higher quality cameras, palmprint recognition and authentication becomes more interesting on mobile devices [6-9], e.g. to authorize a mobile banking transaction. We are interested in performing palmprint recognition and authentication from photos taken with embedded cameras of users' mobile devices. Thereby we are interested in the following aspects: a) how strong do changes in illumination (predefined illumination settings) degrade recognition results? b) How strong do recognition results decrease if they are used with different mobile devices? This thesis contains significant data analysis and machine learning parts. It is advised to do a thesis related project in the MC520 Applied Machine Learning in Mobile Environments course in the 1st MCM semester. With good performance this thesis can provide the possibility to write a paper for a scientific conference (in combination with MC601 Scientific Working in the 3rd semester).

Goals

- A literature review should be done, covering existing palmprint recognition approaches in general as well as specifically for the mobile domain (preprocessing, feature derivation, matching, and results).
- A suitable palmprint recognition approach should be selected and prototypically implemented to answer the questions of aspect a) and b) above using a publicly available palmprint database.
- If no public DB suits this purpose a mobile palmprint DB should be recorded. The DB should contain multiple samples of palmprints from different users. Creating a small palmpring recording App is part of this goal.
- The final, fine tuned, and evaluated palmprint recognition approach should be implemented as Android App.

Research questions

- Which palmprint recognition approaches are suitable for mobile devices, what are their requirements/details?
- How strong do different illumination conditions degrade recognition results? Which illuminations are usable?
- How strong are recognition results degraded when performing palmprint recognition/authentication across different mobile devices?

Literature

[1]   Palm print, https://en.wikipedia.org/wiki/Palm_print
[2]   Biometrics, http://en.wikipedia.org/wiki/Biometrics
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[6]   Kim, J. S.; Li, G.; Son, B. & Kim, J. An empirical study of palmprint recognition for mobile phones. IEEE Transactions on Consumer Electronics, 2015, 61, 311-319. Online: https://doi.org/10.1109/ICSP.2016.7878045
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