

Representations for Fingerprints

Deep Learning for Fingerprint Recognition



Motivation

- Fingerprints are one of the most widespread traits in biometric recognition and in use for long time – but still not perfect
- Hand-crafted (engineered) fingerprint recognition might assume models that do not hold in reality
- Data-driven approaches have shown their superiority over engineered ones in image processing and pattern recognition

Objectives

- Learn from Data**
Data-driven approaches shall replace engineered approaches
- Evaluation and Comparison**
Engineered and learned approaches need to be compared scientifically in terms of performance

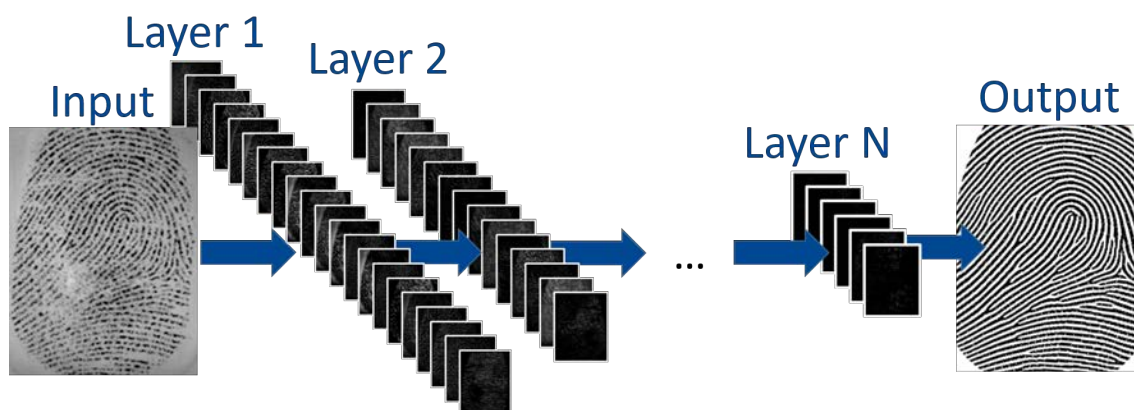


Figure: In a Convolutional Neural Network fingerprint images are processed through several layers of trainable convolutions. Each layer transforms its input to a new representation and abstraction. The final output can be any arbitrary target function of the input, e.g. a binarization like in illustrated here.

Approaches

- Deep Learning**
Apply and modify techniques from Representation Learning to the Domain of Fingerprint Recognition (e.g. ConvNets, Siamese Networks, AutoEncoders ...).
- Data-Driven Development**
Whenever applicable data-driven approaches shall be preferred over engineering approaches.



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