

Exercise 4 - 29th of April 2024

Third Group Task – Signature Verification

Deadline: 20th of May 2024 (end of day)

In this exercise, you will be developing a machine learning approach for signature verification. The goal is to determine whether a signature is *genuine* or *forged*. For this task, on-line signatures are used, which means that they are not given as images, but a sequence of points that were recorded while writing with a pen on a tablet. Given some reference signatures of a writer, which are known to be genuine, it should be established whether another signature is genuine (was written by the same writer), by comparing its writing profile with the reference signatures.

Dataset: MCYT Signatures

You can find the dataset on ILIAS in `exercises/4-Signature`.

For a more detailed description of the dataset, see Section 4 in the paper *MCYT baseline corpus: a bimodal biometric database* (available on ILIAS in `exercises/4-Signature/mcyt.pdf`).

In the dataset, you will find on-line signatures of 30 different writers. On-line handwriting means that the signatures were created by using a pen on a tablet, which recorded information about the pen, such as position or pressure, multiple times a second.

The file structure is as follows:

- `enrollment/`: Contains 5 genuine signatures per writer, which should be used to compute the dissimilarity to signatures that need to be verified.
- `verification/`: 45 signatures for each writer, where 20 are genuine and 25 are forgeries. These are the ones that should be verified for their authenticity.
- `writers.tsv`: List of all writers
- `gt.tsv`: Ground truth for all signatures in `verification/`, marked either as *genuine* or *forgery*.

Data Format

Each signature is given as a TSV file with the following columns:

- **t**: Time (offset) when the data point was recorded.
- **x**: x-coordinate of the current pen position.
- **y**: y-coordinate of the current pen position.
- **pressure**: Pressure that was applied at the current pen position.
- **penup**: Whether the pen-up / pen-down state changed, i.e. if the pen was down (currently writing), a value of 1 means that the pen was lifted (from pen-down to pen-up) and vice versa.
- **azimuth**: Horizontal angle of the pen.
- **inclination**: Vertical angle of the pen.

Each row represents a point that was recorded from the pen at time **t**.

Expected Submission

- Access to your Git(Hub) repository so that we can inspect your code.
- Short report in your Git repository (Markdown or PDF) with your results.