Module 5
Converting incunabula: Practice

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Practice session: Overview

Steps to do:

- download the data for this session from the data directory
- take the preprocessed pages of "Gart der Gesundheit" and do line segmentation
- build an html file and generate ground truth
- begin model training
- take an existing model, run it on test pages and evaluate the result

Some steps depend on a running OCRopus/Ocrocis installation, but *everybody can do the ground truth generation*.

All Ocropus commands have help text, see e.g. `ocropus-gpageseg -h` for options.

- in reality, a philologist/historian/etc. would do ground truth annotation and give the result to his or her IT support person (except if you are a *digital humanist*)

Line segmentation

- these commands are somewhat compute intensive, so if your laptop is too weak or you haven‘t installed OCRopus, skip to the next step
- your binarized images of *Gart der Gesundheit* are in the directory `/tif`
- apply Ocropus binarization (this is here not necessary, but is an alternative to ScanTailor binarization):

```
ocropus-nlbin -n tif/* -o book
```

- apply Ocropus line segmentation:

```
ocropus-gpageseg -n book/*.bin.png
```

- you could also segment the tif images directly:

```
ocropus-gpageseg -n tif/*.tif
```

- generate an editable html file:

```
ocropus-gtedit html -H 35 book/*/*.bin.png -o gt.html
```

Generating ground truth

- start from the file `gt.html` (generated or provided, see `data` directory):

```
firefox gt.html
```

- some lines have been incorrectly segmented, leave them alone (no text to enter)
- image lines without corresponding ground truth will not bet trained
- use the transcription guidelines: `richtlinien.pdf`
- entering special characters:
  - Linux:
    - CTRL-SHIFT-U, release, then type hexcode
    - or type `gucharmap` into a terminal
  - Windows: type `charmap` into the command line
  - Mac: go to *Edit* > *Special Characters*
- if you are done (one page?), save the file to the same directory where your `book/` is found (`gt-1.html`)

Preparing training and test data

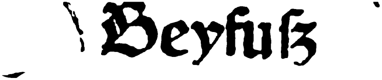
- extract the ground truth:

```
    ocropus-gtedit extract gt-1.html
```

- your `book/` directory now contains a ground truth file for each line you edited:

```
book/
    0001/
        010001.bin.png
        010001.gt.txt
        010002.bin.png
        010002.gt.txt
        ...
    0002/
    ...
```

010001.bin.png:



- copy 90% of your pages (`0001/` etc.) into a `train/` directory, 10% into a `test/` directory
- you may want to crop some line images to remove noise (see above)

Training a model

- normalize your data (here: to NFC; do the same for data under `test`)

```
for f in train/*/*.gt.txt; do
    uconv -f utf8 -t utf8 -x nfc -o ”${f/gt.txt/gtneu.txt}” ”$f”
done
for f in train/*/*.gtneu.txt; do
    mv ”$f” ”${f/gtneu.txt/gt.txt}”
done
```

- start training with explicit character set:
  - use the provided `chars.py` and place it under `ocropy/lib/python/ocrolib`; then:

```
    ocropus-rtrain -o gdgmodel -d 1 train/*/*.bin.png
```

- shortcut: let Ocropus find the set of characters from your annotations

```
ocropus-rtrain -c train/*/*.gt.txt test/*/*.gt.txt \
    -o gdgmodel -d 1 train/*/*.bin.png
```

  - (due to NFKC normalization, you will lose the ſ)

Evaluate a trained model

- copy the model `GdG-00023000.pyrnn.gz` and `test.tar.gz` to your computer
  - ground truth for training this model was kindly provided by the RIDGES corpus at HU Berlin (Anke Lüdeling et alii)
- extract the test data and recognize the text:

```
ocropus-rpred -n -m GdG-00023000.pyrnn.gz test/*/*.bin.png
```

- test for errors:

```
ocropus-errs test/*/*.gt.txt
```

- look at the character confusions:

```
ocropus-econf test/*/*.gt.txt
```

- experiment with the context parameter -C, e.g.

```
ocropus-econf -C2 test/*/*.gt.txt
```

OCR a book

- download book.tar.gz and extract (or use your own data in book/)
- recognize a book

  ```
  ocropus-rpred -n -m GdG-00023000.pyrnn.gz book/*/*.bin.png
  ```

- extract the predicted text

  ```
  ocropus-hocr book/*.bin.png
  ocropus-gtedit text book/*/*.bin.png
  ```

- look at the files book.html, correct.txt, reference.html
- generate a line synopsis for further correction and view Correction.html

  ```
  ocropus-gtedit html -H30 book/*/*.bin.png
  firefox Correction.html
  ```