Utilization of Common OCR Tools for Typeset Coptic Texts

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Coptic
- The final stage of the Ancient Egyptian language used in Egypt from ca. the third century
- A new writing system based on the Greek alphabet and several letters from Demotic (a language stage and writing system used in Egypt from ~ 700 BCE)
- A language transmitted in several regional forms (dialects) with a large production of manuscripts in Sahidic Coptic, the dialect at the basis of our OCR work

Coptic alphabet
- Ca. 30 letters.
- Several diacritics such as tressas, circumflexes, supralinear strokes etc.
- Several punctuation marks such as dots, commas, and coions
- Editorial marks in editions

Why is Coptic OCR needed?
- OCR for Coptic is not well-developed.
- Almost all the Coptic texts in past publications were not OCRed.
- OCR for Coptic is needed by many DH projects in Coptic.
- There is a small amount of human power in Coptology compared with the large amount of unOCRed Coptic editions.

Coptic DH projects (selected)
- SFB 1136 (Göttingen)
  ➢ Creates a text corpus of selected monastic works in Coptic
  ➢ Digital Edition of the Coptic Old Testament (Göttingen)
  ➢ Creates a digital edition of the Coptic translation of the Old Testament
  ➢ Coptic SCRIPTORIUM (Georgetown/Pacific)
  ➢ Creates a linguistically annotated Coptic corpus

Existing Coptic OCR
- Tesseract (developed by Ray Smith) for Coptic, trained by Moheb Mekhaiel (http://www.moheb.de/ocr.html)

New method: Ocropy
- Python-based OCR package
- Using recurrent neural networks
- Originally developed by Thomas Breuel
- Available at https://github.com/tmbdev/ocropy
- Trained for Coptic by our group and our collaborator Eliese-Sophia Lincke (Berlin)

Preprocessing: ScanTailor

Processing: Tesseract

Postprocessing: PoCoTo & manual

Coptic diacritics, punctuation, and editorial signs
- Create problems with Tesseract
- Better processed by Ocropy

Comparison between Tesseract and Ocropy
- Our test case: 1956 edition of the works of Besa, a fifth-century abbot in Upper Egypt, written in the Sahidic dialect of Coptic
- Mekhaiel's model: aimed at the Boharic dialect (different type face, but containing all the diacritics and letters of Sahidic)
  1. With diacritics, punctuation, and editorial signs
  2. Without these

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