

Document Graphics Analysis: 2D Line plots and Flow Charts (Master Thesis)

ACCESS@KIT - Zentrum für digitale Barrierefreiheit und Assistive Technologien

Generate an intermediate representation for line plots and line charts to Assist Visually Impaired People (VIP) in accessing mathematical content.

VIP users can read documents (e.g. PDFs) via screen readers (text-to-speech) and access documents' graphical content via a tactile printout or display. However, the vast majority of this content is highly visual and rarely made in an accessible format. VIP depend on text-based descriptions accompanying the content, and often the text does not tell the whole story as they are not designed to do so.

So far, existing work [1]–[4] has focused on either the detection/segmentation of graphical content from documents or the creation process of accessible plots and charts and how to optimize the content for the tactile display. In addition, most of the time this software relies on professional users to prepare and input the content. However, we are still missing an automated end-to-end conversion pipeline (especially for image-based plots which lack the metadata).

The main goal of this MA/automated pipeline is to **extract the metadata from the line plots and charts**. Ranges, graph and axis titles, legend, text, data entries and other elements if present. Thanks to deep learning, which mitigates manual selection of features and extensive image processing steps as it can extract features automatically during the training of the model. Because of this, deep learning has gained tremendous popularity and use recently. In this thesis, it is also required to use AI modern architectures such as transformers for computer vision and NLP to process the input data.

Applying student is required to be familiar with image processing topics (such as OpenCV) and deep learning frameworks (Tensorflow/PyTorch).

Contact us if you are interested in the thesis topic. Please contact Dr Thorsten Schwarz (thorsten.schwarz@kit.edu) or Omar Moured (omar.moured@kit.edu) with a short motivation statement, your CV, and a current transcript of records. Feel free to reach out beforehand if you have any questions.

REFERENCES

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