Fakultät
Angewandte Informatik

TECHNISCHE HOCHSCHULE DEGGENDORF

A Secondary Review

for the master thesis
„Enhancing TableNet's Validation: Evaluating the Accuracy of the Existing Architecture with Novel Training Data"

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Reviewer: Zineddine Bettouche

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This thesis focuses on improving data extraction processes from table images in documents. It also investigates the effects of a new dataset, rich in various table designs and detailed coordinates, on the performance and accuracy of table detection models. The study integrates a deep learning system for both table detection and understanding the tables layout.

The work relies on two metrics: IoU, which measures the accuracy of predicted tables versus actual tables, and Bitwise XOR, which examines differences at the pixel level. The Marmot dataset was prepared, but there were concerns about the real-world accuracy of the added data. A notable process converted PDFs into table images and pinpointed table boundaries automatically. However, issues were observed regarding unwanted noise. During testing, the TableNet system was examined at two resolutions: 256x256 and 1024x1024 pixels. The use of a blurring technique showed improvement, and the higher resolution was more effective. Yet, noise removal remained a challenge.

One of the primary challenges in computer vision and machine learning is the scarcity of quality datasets, especially for specialized tasks such as table image detection. This thesis has sought to address this challenge by introducing a comprehensive dataset that mirrors real-world scientific papers. This not only provides a rich variety of table designs but also enhances the training material available for machine learning models. Within this context, the TableNet system was tested to determine its efficacy in detecting tables from document images. Preliminary results are promising, showing the system's potential to be a tool in this domain. Future works can emphasize the refinement of column detection methods and the improvement of the extraction process, ensuring that data pulled from tables is both accurate and comprehensive.

The structure of the thesis document can be improved by addressing a few points. Chapter 5 *(Implementation)* can be integrated into the methodology chapter, as the latter describes currently only the used data plus the table-coordinates generation. This change would make the methodology chapter describe the methods used throughout the work of the student. *5.5 TableNet* can be renamed to state that it describes the Tensorflow implementation of the architecture, which is already presented in *3.6 TableNet*. The descriptions of IoU and Bitwise XOR

in *6.1* and *6.2* can be cut and reintegrated into subsections *5.8.1* and *5.8.2*, which describe their implementations. If this change is done, chapter 6 can be renamed to *Results Evaluation*, which in return would include only *6.3 Results*. This section *6.3* was already too long for it to be just a section; therefore, editing *6. Evaluation* into *6. Results Evaluation* would solve this issue too.

Finally, The student's practical methodology and innovative techniques are commendable. The research has potential, but enhancing the noise removal process and the further validation of the dataset's real-world relevance are necessary. The future plans align well with the study's objectives, and the work is a notable contribution taking in consideration the areas highlighted for improvement.

Deggendorf, 24. August 2023

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Zineddine Bettouche