Progress Report, Week 19

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Task division

We roughly divided the segmentation, feature extraction and classification among Jelle, Lennart and Leon respectively. But we keep each other updated so that everything will eventually work together in one final system. This week was mainly used for orientation and deciding the main system implementations. We also started loading and observing the data. We noticed that most Chinese signs overlapped, which is a crucial for the implementation of the segmentation phase. Next we observed that the photos in general are rotated arbitrarily.

Segmentation

The segmentation part is done by Jelle in Matlab. He started with correcting the rotation of the lines. This is roughly done by comparing multiple angle rotations with respect to the number of vertical pixels. Last-mentioned seems to work now.

Feature extraction

Lennart focused on finding possible features. What exactly distinguishes one Chinese sign from another. He read several papers on feature extraction in other papers. When engineering the features one should account for the fact that different fonts should still roughly have the same values for these features. Finally for bold fonts we could use some thinning so that we have the base sign back.

Classification

For the classification we have oriented this week on what type of classifier we would like to use. We decided to focus on the difference between a HMM and a LSTM approach. Therefore Leon oriented on earlier research of handwriting recognition using a HMM and LSTM. We finally decided to implement a LSTM because it already performed very well in different handwriting recognition tasks

and we feel like it is more realistic. A LSTM uses activation of previous layers in previous signs in order to classify the next. This sounds logical as some aspects of previous words characterize or limit the usage of upcoming words. Matlab does not provide a really good basis for LSTM's, so we will use Python for this task.

Total articles read

Revisit Long Short-Term memory: An Optimization Perspective. By Qi Lyu and Jun Zhu
Efficient character segmentation approach for machine typed documents. By Vladan Vuckovic
A new watershed model based system for character segmentation in degraded text lines.
Edge boxes: Locating Object proposals from Edges. By C. Lawrence Zitnik
A survey of methods and strategies in character segmentation. By Richard Gasey
LeRec: A NN/HMM hybrid for on-line handwriting recognition. By Y. Bengio.