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Isa Sadeeq Akanni, B. Mlynko Ph.D., Assoc.Prof.

Тернопільський національний технічний університет імені Івана Пулюя, Україна

OPTICAL CHARACTER RECOGNITION USING FOURIER DESCRIPTORS

Іса Садік Аканні, Isa Sadeeq Akanni

ОПТИЧЕСКИЙ ХАРАКТЕР ВИЗНАННЯ ВИКОРИСТАННЯ ФУР'Е ДЕСКРИПТОРИ

Optical Character Recognition (OCR) is an important application of pattern classification. There are many documents of historical, technical, and economic importance which exist only in printed form. OCR can help to reduce the cost of digitizing these documents. There exist many successful OCR techniques which have been applied to areas such as handwriting recognition, recognition of mechanically printed text, and recognition of musical notes. Such applications have been carried out in the context of bi-tonal as well as gray-scale images.

These systems employ a large number of different image features and many of them make use of multiple features in order to obtain good performance. Descriptions of features commonly used for OCR can be found in when evaluating the usefulness of a feature set it is important to look not only at the accuracy of a classifier based on it, but also at the correlation between errors made by the classifier and those made by a classifier which uses an independent set of features. If two classifiers are found which have a low error correlation, then it may be possible to combine them in order to attain classification accuracy greater than either classifier alone can provide.

This paper develops a new set of image features and investigates their use for performing OCR on bi-tonal images. Fuzzy-knn and neural-network based classifiers are constructed and their performance is compared to that of an independent neural network-based classifier which makes use of a completely different feature set. In addition, the error correlation between each pair of classifier is measured.

The goals of my paper are to develop a set of image features for performing OCR on bi-tonal images and to develop image-processing software for handling the Features, including neural-network and fuzzy-knn based classifier. The features need to perform well and should diver from those typically used for OCR, with the intention that the errors made by classifier based on them will not be highly correlated with those made by existing classifiers. In addition, the software is integrated with the camera framework and made available as an open-source project.

The paper has achieved these goals and represents a significant contribution in the following areas of OCR:

- Theoretical Contribution: New image features were developed which are based on Fourier Descriptors The features are novel and different from typical features used for OCR.
- Material Contribution: an open-source software library for extracting the features from images was created and made publicly available. Open-source software was created which implements fuzzy-knn and neural network based classifier, both of which use the new image features to perform OCR.