

TEXTILE IMAGE CLASSIFICATION USING NAIVE BAYES AND
MULTI-LAYER PERCEPTRON

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Abstract

In this study, we have designed and implemented textile image classification systems using the methods as Multi-layer Perceptron and Naive Bayes. After the models of the systems are constructed for the classes as "Flowery", "Spotted", "Horizontal Striped", "Vertical Striped", "Plaided", "45 Degree Striped" and "135 Degrees Striped" in training phase, we have computed the success of systems in testing phase. The systems consist of four stages as preprocessing, feature extraction, training and testing [1]. In the preprocessing, first, all textile images are converted to the black-and-white images. Second, the thinning process of the images is performed by skeletonization operation. Third, the Sobel filter is applied to detect the edge of images [2]. In the feature extraction stage, the frequencies of 2x2, 3x3 and 4x4 kernel matrices in the images are calculated for each image. Information gain is also used for the dimension reduction of the images' attribute vectors. In the training stage, the models representing each class are composed by training all attribute vectors. In the testing stage, the systems are evaluated by accuracy and f-measure. As a result, Naive Bayes (The best accuracy and F-measure: 0.944) outperformed Multi-layer Perceptron (The best accuracy: 0.938, The best F-measure: 0.937) in classification accuracy and f-measure.

Keywords: Image classification, Naive Bayes, Multi-layer Perceptron

References

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