

## BRAIN IMAGE PREPROCESSING AND APPLICATION

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*ABSTRACT.* Image preprocessing is a key process in content-based image retrieval and preprocessing of different images maybe requires distinct methods. In this article, based on brain medical images, we presents an effective method, which includes cutting out background region, fitting ellipse to correct lean imaging angle, and gray level normalization. The methodology is applied in content-based CT brain image retrieval and experimental results show its effect and robustness. In addition, preprocessed results of human face indicate potential application of our proposed method.

**Keywords:** Image preprocessing, Brain image, Content-based image retrieval, Face image

**1. Introduction.** CBIR has become one of the most active research areas in the past few years. Many visual feature representations have been explored and many systems have been built. While these research efforts establish the basis of CBIR, the usefulness of the proposed approaches is limited, especially, in brain image retrieval, including brain medical image and face image. There are many sources of variation in images. Differences in acquisition strategies and patient positioning can cause the variances in intensity, orientation, and scale. The performance of preprocessing would impact the retrieval performance in CBIR systems [1, 2, 3]. Effective preprocessing for standardizing image presentation is important for increasing retrieval accuracy.

Many preprocessing methods are illustrated in different medical image applications. A high amount of priori knowledge about the structure of the images is used for these preprocessing steps for CT images of the head [4]. Sinha [5] investigates the use of the eigenimage methodology with focus on the image preprocessing steps which are required to increase the accuracy of diagnosis. An improved minutia preserving smoothing algorithm for preprocessing of MRI is given in [6] based on solving a nonlinear diffusion equation. Moreover, Xu [7] considered deeply the normalization and then proposed combining mutual information for registration.

Besides, preprocessing is also necessary in other fields of digital image processing. In [8], a preprocessing method is proposed for print image processing. Kumar [9] proposes a fuzzy-genetic algorithm for the remote terminal unit. Based on lateral inhibition, [10] improves the image preprocessing algorithm for the infrared image processing. Bilcu [11] proposes a practical preprocessed approach for bar code detection in mobile devices. However, until now, we haven't found a special processing method focusing on brain medical images.