

ADAPTIVE FILTERS IN COLOR IMAGE PROCESSING AND CLASSIFYING IMAGE PIXELS IN MEDICAL APPLICATIONS USING FUZZY LOGIC

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Abstract

Noise reduction is the very important stage of image processing and pattern reorganization. Many researches find new tools and filters for noise reduction. This paper proposed a fuzzy based adaptive filter. The proposed filter is composed with the existing filter like VDF, VMF and VRF with Gaussian noise, impulse noise and mixed Gaussian Noise. The proposed method is proved to be a best suitable one with a P value of 0.23. In this paper is concerned with classifying image pixels into three sets of pixels: contour, regular, and texture. When properly processed, classified images can represent foundations for diagnostic purposes. A neuro-fuzzy approach was used to take advantage of neural network's ability to learn, and membership degrees and functions of fuzzy logic, respectively. The method is based on the spatial properties of the image features and makes use of multi-scaled representations of the image. A training set was used to create and train the classifier system. The classes were represented as fuzzy sets with degrees of memberships. Each pixel was assigned a degree of membership for each of the three fuzzy subsets. Classified pixels were finally shown as three separate images each representing a set. The method showed high quality classification for images of simple components. This approach would be highly attractive in the biomedical field due to the vast availability of images.

Keywords: Image processing, biomedical images, pixel classification, pixel classes, neuro-fuzzy approach, Rectangular Window, Rational Functions, Fuzzy Logic, Color Space, Trapezoid Fuzzy Subsets, Fuzzy Membership Function, Distances Function Sub Filters, Power Parameter.