

Early Recognition and Grading of Cataract Using a Combined Log Gabor/Discrete Wavelet Transform with ANN and SVM

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Abstract : Eyes are considered to be the most sensitive and important organ for human being. Thus, any eye disorder will affect the patient in all aspects of life. Cataract is one of those eye disorders that lead to blindness if not treated correctly and quickly. This paper demonstrates a model for automatic detection, classification, and grading of cataracts based on image processing techniques and artificial intelligence. The proposed system is developed to ease the cataract diagnosis process for both ophthalmologists and patients. The wavelet transform combined with 2D Log Gabor Wavelet transform was used as feature extraction techniques for a dataset of 120 eye images followed by a classification process that classified the image set into three classes; normal, early, and advanced stage. A comparison between the two used classifiers, the support vector machine SVM and the artificial neural network ANN were done for the same dataset of 120 eye images. It was concluded that SVM gave better results than ANN. SVM success rate result was 96.8% accuracy where ANN success rate result was 92.3% accuracy.

Keywords : cataract, classification, detection, feature extraction, grading, log-gabor, neural networks, support vector machines, wavelet

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