Abstract

Diabetic macular edema (DME) is the main cause of visual impairments in patients with diabetic retinopathy and leads to vision loss if left untreated. In this paper, an automatic approach for severity grading of DME is introduced. The approach involves preprocessing, combination of Particle Swarm Optimization (PSO) algorithm and Fuzzy C-Means Clustering for exudates segmentation, optic disc elimination, fovea and macular region localization, and classification. The Bayes classifier separates the lesions to exudates and non-exudates. The severity of the disease is graded into categories such as normal, grade 1 and grade 2 based on the location of exudates. Region of macula is marked by Early Treatment Diabetic Retinopathy Studies (ETDRS) grading scale. The proposed method is evaluated using 200 images of publically available MESSIDOR database and performance figures of 91% for sensitivity, 98% for specificity and 94.5% for accuracy are obtained.

References

Severity Grading of DME from Retina Images: A Combination of PSO and FCM with Bayes Classifier


- Ahmed Wasif Reza & C. Eswaran & Kaharudin Dimyati, "Diagnosis of Diabetic Retinopathy: Automatic Extraction of optic disk and exudates from retinal images using marker
controlled watershed transformation,


- Azarbad and Milad, "Brain tissue segmentation using an unsupervised clustering technique based on PSO algorithm," In Iranian Conference of Biomedical Engineering (ICBME), 2010.


Index Terms

Computer Science

Applied Sciences

Keywords

Exudates  FCM Clustering  fovea  macula  PSO segmentation  severity of DME