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Presentation Abstract

Program#/Poster#:	6568
Abstract Title:	**Automated Grading of Age-Related Macular Degeneration by an Image Mining Approach**
Presentation Start/End Time:	Thursday, May 05, 2011, 1:15 PM - 1:30 PM
Session Number:	557
Session Title:	Multidisciplinary Ophthalmic Imaging / CME
Location:	Palm A
Reviewing Code:	242 image post processing and analysis methodologies - MOI

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Keywords: 549 imaging/image analysis: clinical; 685 retina; 412 age-related macular degeneration

Abstract Body: **Purpose:** To develop and evaluate an automated "disease / no disease" grading system for age-related macular degeneration (AMD).
Methods: We developed an automated "disease / no disease" grading system for AMD based on image mining techniques. First, image pre-processing was performed to normalize colour and non-uniform illumination of the retinal fundus images. Then, 2-dimensional (2D) Gabor wavelet filters were applied to identify and remove pixels belonging to retinal vessels. To represent images for the mining task, a graph based image representation using quad trees was adopted. Next, a graph mining technique was applied on the generated graphs to extract relevant features (in the form of frequent sub-graphs) from images of both AMD and healthy volunteers. These features (from training dataset) were then fed into a Naive-Bayes classifier for training purpose before we employ the trained classifier to classify any new unseen images (testing dataset).
Results: The algorithm was evaluated on a collection of 161 colour fundus images (101 AMD images and 60 non-AMD images) from the ARIA database (http://www.eyecharity.com/aria_online), acquired using a Zeiss FF450+ fundus camera at a 50 degree field of view. We conducted our experiments using ten-fold cross validation and achieved the best specificity of 95% and a sensitivity of 97% with an overall accuracy of 96%.
Conclusions: AMD is the leading cause of irreversible vision loss in people aged 50 or over in the western world and is an alarming public health problem attributing to our ageing population. The ultimate goal is to further develop this system as an automated grading tool for identifying patients of AMD at an early stage. This will potentially lead to timely introduction of effective treatment strategies resulting in better therapeutic outcomes and better quality of life for the patients and consequently resulting in socio-economical cost effectiveness.

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