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Early detection of age related macular degeneration using color fundus imaging: A telemedicine platform

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Abstract

Age-related macular degeneration (AMD) is the leading cause of vision loss for persons over the age of 50 years in the developed and developing world. The number is expected to increase by 12 to 20 fold over ten years due to increase in our ageing population. Recent researches have shown that specific vitamin supplement can prevent AMD and for this identification of people with early stage of AMD is important to design and implement preventative strategies for late AMD. Therefore, a mass screening facility with teleophthalmology or telemedicine for large rural-based communities is essential which can identify more individuals at early stage for AMD prevention. Our proposed work aims to develop such a novel system using color retinal imaging and telemedicine platform for AMD prevention through mass screening of large population from both rural and urban areas.

Our proposed method detects the presence of drusen and quantifies drusen with determining their shape and area from standard color retinal images. The images are sent from the client machines of our telemedicine platform. For automated drusen quantification we use color retinal images and combine color and texture information to classify and detect potential drusen areas. We achieved 100% accuracy for drusen detection as absent or present drusen in the image. For AMD severity we considered 54 images among them 12 images had medium or late stage of AMD and they are classified correctly. The results indicate that our method is ready to quantify the drusen to map the macula area for identification of individuals who are potentially at risk of developing late AMD.

Biography

Alauddin Bhuiyan received his PhD in Biomedical Engineering from the University of Melbourne, Australia. He is currently working as a research fellow at ICT Centre, Commonwealth Scientific and Industrial Research Organization (CSIRO), Perth, Australia. Before joining at CSIRO he worked as a research fellow at Centre for Eye Research Australia and Department of Computer Science and Software Engineering at the University of Melbourne. His research interests include Medical Imaging, Computer Vision, Pattern Recognition and Artificial Intelligence. He is a member of IEEE and IAPR.