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## An intelligent mobile based decision support system for retinal disease diagnosis

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Diabetes and cataract are the key causes of retinal blindness for millions of people. Current detection of diabetes and cataract from retinal images using Fundus camera is expensive and inconvenient since such detection is not portable and requires specialists to perform an operation. This talk presents an innovative development of a low cost smartphone based intelligent system integrated with microscopic lens that allows patients in remote and isolated areas for regular eye examinations and disease diagnosis. This mobile diagnosis system uses an artificial neural network algorithm to analyze the retinal images captured by the microscopic lens to identify retinal disease conditions. The algorithm is first of all trained with infected and normal retinal images using a personal computer and then further developed into a mobile-based diagnosis application for android environments. The application is optimized by using the rooted method in order to increase battery lifetime and processing capacity. A duty cycle method is also proposed to greatly improve the energy efficiency of this retinal scan and diagnosis system in smartphone environments. The proposed mobile-based system is tested and verified using two well-known medical ophthalmology databases to demonstrate its merits and capabilities. The evaluation results indicate that the system shows competitive retinal disease detection accuracy rates (>87%). It also offers early detection of retinal diseases and shows great potential to be further developed to identify skin cancer.

### Biography

Li Zhang is a Senior Lecturer in Computer Science in Northumbria University and also serves as an Honorary Research Fellow in University of Birmingham. She holds expertise in artificial intelligence, intelligent robotics, and digital diagnosis. She gained her PhD and Postdoctoral experience from University of Birmingham. Previously, she was a PI for a TSB-funded project in collaboration with National Autistic Society. Currently she works on the EU-funded cLINK project in collaboration with 14 partners and hosts Postdoctoral/PhD researchers as a co-PI. She is also an Editorial Board Member for two international journals and an Associate Editor for Decision Support Systems.

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