



Technology Commercialization Opportunity

Automated Fundus Image Field Detection and Quality Assessment

Inventors

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Background and Technology Description

Fundus images are photographs of the interior surface of the eye; the retina, and include the macula and optic disc. They are an important diagnostic tool for many retinal diseases including age-related macular degeneration, diabetic retinopathy, and glaucoma. Fundus images are routinely acquired using special equipment by trained technicians in a clinical ophthalmological setting as a documentation and diagnostic tool. In telemedical applications, these images are often sent as electronic images to ophthalmologists for evaluation and diagnosis as a replacement for an in-person retinal exam. If images captured in these contexts are incorrectly labeled or of insufficient quality, the patient must be recalled and the images reacquired, which is unlikely in the event of a screening environment.

Our technology is an automated software system for determining the field (left or right eye, and which portion of the eye) and assessing the image quality, all automatically without operator intervention. The system works by first detecting the location of the optic disc to then determine the eye and field. It then performs an automatic vessel segmentation followed by feature extraction using the segmented vascular pattern. Finally, the quality assessment is done using a trained software classifier working first on each field and then providing a comprehensive quality assessment based on all images associated with each patient.

This system could be implemented in commercial fundus cameras to provide a way to minimize patient recall and improve patient throughput by reducing occurrences of mislabeled and poor quality images. It would also improve ophthalmologist efficiency by minimizing their time wasted on evaluating images with insufficient quality. Through integration with a fundus camera, the system could alert the less trained operator when the acquired images are of insufficient quality at the time of image capture, allowing the operator to collect new images while the patient is still present at the clinical facility. The system could also be utilized at reading centers for research studies by screening images coming in from different clinical trials to determine if they are of sufficient quality to be read.

Keywords: Fundus imaging, fundus image field detection, fundus image quality

Technology Readiness

The algorithm has been implemented in prototype software and tested with a database of 76 images.

Idea	Concept	Prototype	Alpha Version	Beta Version	Released
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