

Health Department

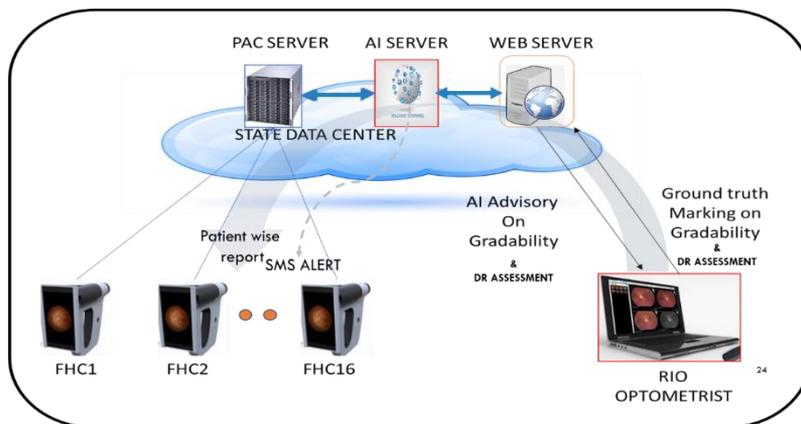
Artificial Intelligence based System for Automated Screening of Diabetic Retinopathy

Business Case

Vision loss due to Diabetic Retinopathy can be significantly reduced when the disease is detected and treated early. Today, Fundus cameras are installed in 16 FHCs in Kerala and patients are being screened for DR. Only 82 percent of the images captured using the fundus camera are analyzable. Remaining 18 percent of the images are not analyzable by the optometrist. Turnaround time to assess the quality of captured images is typically 2 days. By the time the image quality is assessed the patient would have left the premises. Therefore, it is required to have an automated analysis of the quality of images and obtain feedback on whether a retake should be initiated or not, within 10 seconds.

In Phase I of the project, AI based retinal image grading application was developed and tested “offline” successfully. This needs to be taken online.

Even today, with 16 FHCs, it takes approximately 2 days for RIO to analyze the images obtained. With a skewed ophthalmologist to patient ratio coupled with increasing diabetic population, alternative approaches for screening of Diabetic Retinopathy are of utmost importance. There are more than 1200 FHCs all over Kerala where DR screening is to be carried out. When considering the images from all the FHCs, the load for analysis of images increases over RIO. Therefore, technology assistance for automatic diagnosis and screening system to reduce the pressure built over RIO must be attempted.



Artificial Intelligence

Outcome/Benefits

- ▣ Patient wise image gradeability and DR assessment report (both manual/automatic) to FHCs
 - ▣ Collection of ground truths on image gradeability & analysis and daily sensitivity/specificity computation
 - ▣ Retrain/Fine tune AI algorithm to achieve desired sensitivity & Specificity (of Image gradeability & image analysis)
 - ▣ Turn on Automatic SMS alert to FHC if DR is detected in the images.
 - ▣ Collection of ground truths on image analysis for DR detection in each image for fine-tuning the AI model.
 - ▣ Patient wise gradeability (Automatic) /DR assessment report (Automatic with human confirmation) to FHC as emails and SMS.
 - ▣ Update the DR status of patient (Automated report generated by AI tool) as part of patient EHR, so that it can be viewed by the doctor at PHC who ordered the DR investigation for the patient. The doctor can immediately guide the patient, if treatment to be continued.
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