

## **Clinical Efficacy of Indigenous Software for Automatic Detection of Stages of Retinopathy of Prematurity (ROP)**

**Authors :** Joshi Manisha, Shivaram, Anand Vinekar, Tanya Susan Mathews, Yeshaswini Nagaraj

**Abstract :** Retinopathy of prematurity (ROP) is abnormal blood vessel development in the retina of the eye in a premature infant. The principal object of the invention is to provide a technique for detecting demarcation line and ridge detection for a given ROP image that facilitates early detection of ROP in stage 1 and stage 2. The demarcation line is an indicator of Stage 1 of the ROP and the ridge is the hallmark of typically Stage 2 ROP. Thirty Retcam images of Asian Indian infants obtained during routine ROP screening have been used for the analysis. A graphical user interface has been developed to detect demarcation line/ridge and to extract ground truth. This novel algorithm uses multilevel vessel enhancement to enhance tubular structures in the digital ROP images. It has been observed that the orientation of the demarcation line/ridge is normal to the direction of the blood vessels, which is used for the identification of the ridge/ demarcation line. Quantitative analysis has been presented based on gold standard images marked by expert ophthalmologist. Image based analysis has been based on the length and the position of the detected ridge. In image based evaluation, average sensitivity and positive predictive value was found to be 92.30% and 85.71% respectively. In pixel based evaluation, average sensitivity, specificity, positive predictive value and negative predictive value achieved were 60.38%, 99.66%, 52.77% and 99.75% respectively.

**Keywords :** ROP, ridge, multilevel vessel enhancement, biomedical

**Conference Title :** ICBST 2014 : International Conference on Biomedical Science and Technology

**Conference Location :** London, United Kingdom

**Conference Dates :** August 21-22, 2014