

Gharib, Amirhossein*Assessment of Blood Vessel Tortuosity and Width in Retinopathy of Prematurity Using ROPAssist*

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- **Purpose:** Computer Aided Diagnosis (CAD) has widely attracted scholars in many fields; however, little work is done related to CAD for retinopathy of prematurity (ROP). This paper introduces ROPAssist which is developed to enable automatic diagnosis of PLUS cases for ROP. A set of parameters are computed from the retinal image so that the software can be also used for research purposes. In order to provide ease of use, images are presented both as batch and individual forms. The software is also designed to be easy to learn and user friendly.
- **Methods:** ROPAssist is capable of computing tortuosity and vessel diameter in whole picture. An image bank, gathered by Farabi hospital in Tehran, is used to assess ROPAssist. The compendium consists of 48 images that are labeled as plus or non-plus independently by three experts. Certain image processing techniques are adopted to extract vessel tortuosity and diameter features; the classification data is subsequently used to train our decision system and a threshold is there for defined to identify plus/non-plus. Another outcome of the ROPAssist is the generated vessel map which can be used for other applications as well.
- **Results:** According to experts' consensus and classification results, ROPAssist's Kappa is 0.5940, sensitivity is 0.7714 and specificity is 0.9231. The algorithm is liable to yield more significant results with increase in ROP image database size.
- **Conclusion:** ROPAssist can contribute in diagnosis of retinopathy of prematurity by reduction of subjectivity since it exhibits high correlation with experts' consensus decisions. It also enhances the overall treatment time. As a result it can be used widely in clinical procedures.