













**Table 4:** Segmentation result 2 (STARE database)

<i>Method</i>	<i>Accuracy</i>
Jiang et al.	0.9009
Staal et al.	0.9516
Soares et al.	0.9480
Akram M. U. et al.	0.9502
Proposed Method	0.9883

## References

- [1] Jiang X, Mojon D (2003) Adaptive local thresholding by verification-based multithreshold probing with application to vessel detection in retinal images. *IEEE Trans Pattern Anal Mach Intell* 25:131–137.
- [2] Staal J, Abramoff MD, Niemeijer M, Viergever MA, van Ginneken B (2004) Ridge-based vessel segmentation in color images of the retina. *IEEE Trans Med Imag* 23:501–509
- [3] Soares JVB, Leandro JJG, Cesar RM, Jelinek HF, Cree MJ (2006) Retinal vessel segmentation using the 2-D Gabor wavelet and supervised classification. *IEEE Trans on Med Imag* 25:1214–1222.
- [4] João V. B. Soares, Jorge J. G. Leandro, Roberto M. Cesar Jr., Herbert F. Jelinek, and Michael J. Cree, “Retinal Vessel Segmentation Using the 2D Gabor Wavelet and Supervised Classification”, *IEEE*, vol.25, 2006, pp.1214-1222.
- [5] Sameh A. Salem, Nancy M. Salem, and Asoke K. Nandi Nilanjan, “Segmentation of Retinal Blood Vessels using A Novel Clustering Algorithm”, 14th European Signal Processing Conference (EUSIPCO 2006).
- [6] Fraz MM, Basit A, Javed MY (2008) Evaluation of retinal vessel segmentation methodologies based on combination of vessel centerlines and morphological processing. In: *IEEE ICET08*, pp 232–236
- [7] A.Osareh and B.Shadgar, “Automatic Blood Vessel Segmentation in Color Images of Retina”, *IJST*, 2008, vol.33, pp 191-206.
- [8] Akara Sopharak, Bunyarit Uyyananara, “Automatic Detection of Diabetic Retinopathy Exudates from Non-dilated Retinal Images using Mathematical Morphological Methods”, *ELSEVIER*, 2008, pp.720-727.
- [9] P.C.Siddalingaswamy, K. Gopalakrishna Prabhu, “Automatic detection of multiple oriented blood vessels in retinal images”, *JBISE*, vol.3, 2010, pp.101-107.
- [10] Keerthi Ram, Gopal Datt Joshi and Jayanthi Sivaswamy, “A Successive Clutter Rejection Based Approach for Early Detection of Diabetic Retinopathy”, *IEEE*, vol.58, 2011, pp. 664-673.
- [11] Jaspreet Kaur, Dr. H.P.Sinha, “Automated Detection of Retinal Blood Vessels in Diabetic Retinopathy Using Gabor Filter”, *IJCSNS*, vol.12, 2012, pp.109-116.
- [12] M. Usman Akram, S.A.Khan, “Multilayered thresholding based blood vessel segmentation for screening of diabetic retinopathy”, Springer, 2012.
- [13] Nilanjan Dey, Anamitra Bardhan Roy, Moumita Pal, Achintya Das, “FCM Based Blood Vessel Based Segmentation Method for Retinal Images”, *IJCSNS*, vol.12, issue 3, 2012, pp.109-116.
- [14] S. Muthu Lakshmi, “Supervised Blood Vessel Segmentation in Retinal Images Using Feature Based Classification”, *IJAIR*, vol.1, issue 1, 2012.
- [15] Jaspreet kaur, Dr. H.P. Sinha, “Automated detection of vascular abnormalities in diabetic retinopathy using morphological thresholding”, *IJESAT*, vol. 2, issue 4, pp.924– 931.
- [16] G.S. Annie Grace Vimala S. Kaja Mohideen, “Automatic Detection of Optic Disk and Exudate from Retinal Images Using Clustering Algorithm”, *IEEE*, pp.280-284.
- [17] Sharath Kumar P N, Rajesh Kumar R, Dr. Anuja Sathar, Dr. Sahasranamam V, “Automatic Detection of Exudates in Retinal Images Using Histogram Analysis”, *IEEE*, pp.277-281.
- [18] Mahendran Gandhi and Dr. R. Dhanasekaran, “Diagnosis of Diabetic Retinopathy Using Morphological Process and SVM Classifier”, *IEEE*, 2013, pp.873-877.
- [19] Syna Sreng, Jun-ichi Takada, Noppadol Maneerat, Don Isarakorn, “Feature Extraction from Retinal Fundus Image for Early Detection of Diabetic Retinopathy”, *IEEE*, pp.63-66.
- [20] E. Annie Edel Quinn, K. Gokula Krishnan, “Retinal Blood Vessel Segmentation using Curvelet Transform and Morphological Reconstruction”, *IEEE*, pp.570-575.
- [21] R.F.Mansour, E. Md. Abdelrahim, Amna S. Al-Johani, “Identification of Diabetic Retinal Exudates in Digital Color Images Using Support Vector Machine”, *JILSA*, 2013, pp. 135– 142.
- [22] María García, María I. López, Jesús Poza, and Roberto Hornero, “Comparison of Logistic Regression and Neural Network Classifiers in the Detection of Hard Exudates in Retinal Images”, [IEEE] 35th Annual International Conference of the IEEE EMBS Osaka, Japan, 2013, pp.5891-5894.
- [23] Renoh C Johnson, Veena Paul, Naveen N, Padmagireesan S J, “Curvelet Transform based Retinal Image Analysis”, *IJECE*, vol.3, 2013, pp.366- 371.
- [24] R.Radha and Bijee Lakshman, “Retinal Image Analysis Using Morphological Process and Clustering Technique”, *SIPIJ*, vol.4, 2013, pp.55-69.
- [25] Nafeela Jahan.N, “Detecting and Segmenting Digital Retinal Blood Vessels using Neural Network”, *IJCSNS*, vol.3, 2013, pp.109- 116.
- [26] <http://www.isi.uu.nl/Research/Databases/DRIVE/download.php>
- [27] <http://www.ces.clemson.edu/~ahoover/stare/>