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Advance Assessment of Neural Network for Identification of Diabetic Nephropathy Using Renal Biopsies Images

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Abstract

The current era of medical science computer plays an important role in disease identification. The accuracy and robustness of the medical test is improved with the help

of computer. The significant cause of chronic kidney diseases is the diabetic nephropathy. The diabetic nephropathy has the end stage of renal failure. The research has been done to identification of causes of diabetic nephropathy. The computational technology enhances its usability towards the diabetic nephropathy research. The research has been executed on dataset of 226 images. The classifier has been applied over the geometric features like area, perimeter, eccentricity, perimeter, mean, standard deviation and correlation etc. The neural network used for classification of the dataset. The classification has been done for 10, 15 and 20 hidden layer variation. The performance is calculated using True positive and true negative statistical measure. The classifier is extracted 0.1133% error rate and 88.66% accuracy over the two class classification as normal and diabetic nephropathy dataset. From the above experimental results authors recommended that the neural network is the strong and dynamic classifier for the diabetic nephropathy identification.

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References

1. Alsaad, K.O., Herzenberg, A.M.: Distinguishing diabetic nephropathy from other causes of glomerulosclerosis: an update. *J. Clin. Pathol.* **60**(1), 18–26 (2007)
[Article](#) [Google Scholar](#)
2. Gupta, S., Nijhawan, S.: Comparative analysis of text detection using SVM, KNN and NN. *International Journal of Science and Research (IJSR) ISSN (Online), 2319-7064* (2015)
[Google Scholar](#)
3. Tervaert, T.W.C., Mooyaart, A., Amann, K., Cohen, A., Cook, H.T., Drachenberg, C., Ferrario, F., Fogo, A., Haas, M., De Heer, E., Joh, K., Laure, H.N., Radhakrishnan, J., Seshan, S., Ingeborg, M.B., Bruijn, J.: Pathologic classification of diabetic nephropathy. *J. Am. Soc. Nephrol. JASN* **21**, 556–563 (2010). <https://doi.org/10.1681/asn>
4. Kotyk, T., et al.: Measurement of glomerulus diameter and Bowman's space width of renal albino rats. *Comput. Methods Prog. Biomed.* **126**, 143–153 (2016).
<https://doi.org/10.1016/j.cmpb>
5. Barros, G.O., et al.: PathoSpotter-K: a computational tool for the automatic identification of glomerular lesions in histological images of kidneys. *Sci. Rep.* **7**,

46769 (2017)

[Article](#) [Google Scholar](#)

6. Rangayyan, R.M., Kamenetsky, I., Benediktsson, H.: Segmentation and analysis of the glomerular basement membrane in renal biopsy samples using active contours: a pilot study. *J. Digit. Imaging* 23(3), 323–331 (2009). <https://doi.org/10.1007/s10278-009-9188-6>

[Article](#) [Google Scholar](#)

7. Ravi, M., Hegadi, R.S.: Detection of glomerulosclerosis in diabetic nephropathy using contour-based segmentation. In: *International Conference on Advanced Computing Technologies and Applications (ICACTA-2015)*, pp. 244–249 (2015)

[Article](#) [Google Scholar](#)

8. Image database. <http://medpics.ucsd.edu>
9. Image database. <http://peir.path.uab.edu>
10. Image database. <https://library.med.utah.edu>
11. Image database. www.ajkd.org
12. Image database. www.ncbi.nlm.nih.gov
13. Image database. www.kidney pathology.com
14. Patil, Y.B., Kawathekar, S.S.: Automated analysis of diabetics nephropathy using image segmentation techniques for renal biopsy images. *Int. Multidiscip. J. Pune Res.*

3(4) (2017). Impact Factor: 2.46, ISSN 2455-314X

[Google Scholar](#)

15. Vapnik, V.N.: The Nature of Statistical Learning Theory. Springer, New York (1995)

[Book](#) [Google Scholar](#)

16. Huang, C., Davis, L.S., Townshed, J.R.G.: An assessment of support vector machines for land cover classification. *Int. J. Remote Sens.* **23**, 725–749 (2002)

[Article](#) [Google Scholar](#)

17. Foody, M.G., Mathur, A.: Toward intelligent training of supervised image classifications: directing training data acquisition for SVM classification. *Remote Sens. Environ.* **93**, 107–117 (2004)

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Ethics declarations

✓ All authors declare that there is no conflict of interest

✓ No humans/animals involved in this research work.

✓ We have used our own data.

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