

Breast Cancer Cellularity Prediction from H&E Images Challenge

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Abstract—Breast cancer affects about 1 in 8 women in the United States alone [1]. Being able to identify breast cancer in its early stages is of the utmost importance. Deep learning can be used to detect breast cancer from whole slide images of breast cancer hematoxylin and eosin stained pathological slides with high accuracies. This can save human labor and help detect breast cancer in its early stages, preventing it from spreading to neighboring cells. This research paper focuses on applying multiple convolutional neural network (CNNs) models to whole slide images of breast cancer to increase prediction accuracy of cancer cell detection.

Index Terms—Convolutional Neural Network (CNN), Deep Learning, ResNet

I. INTRODUCTION

THE

II. LITERATURE SURVEY

III. MATERIALS AND METHODS

IV. EXPERIMENTS

V. CONCLUSION

REFERENCES

- [1] U.S. Breast Cancer Statistics. [Online]. Available: https://www.breastcancer.org/symptoms/understand_bc/statistics
- [2] Diagnosing breast cancer. [Online]. Available: https://www.breastcancer.org/symptoms/understand_bc/statistics
- [3] W. He, G. Yan, and L. D. Xu, "Developing Vehicular Data Cloud Services in the IoT Environment," *IEEE Transactions on Industrial Informatics*, vol. 10, no. 2, pp. 1587–1595, May 2014.
- [4] M. Gerla, "Vehicular Cloud Computing," in *Ad Hoc Networking Workshop (Med-Hoc-Net), 2012 The 11th Annual Mediterranean*, Ayia Napa, Cyprus, 2012, pp. 152–155.
- [5] S. Wang, C. Fan, C.-H. Hsu, Q. Sun, and F. Yang, "A Vertical Handoff Method via Self-Selection Decision Tree for Internet of Vehicles," *IEEE Systems Journal*, vol. 10, no. 3, pp. 1183–1192, Sept. 2016.
- [6] K. C. Lee, S. hoon Lee, R. Cheung, U. Lee, and M. Gerla, "First Experience with Cartorrent in a Real Vehicular Ad Hoc Network Testbed," in *2007 Mobile Networking for Vehicular Environments*, Anchorage, AK, USA, May 2007, pp. 109–114.
- [7] G. Marfia, A. Amoroso, and M. Rocchetti, "On the Design and Run of VANET Road Experiments," in *Ad Hoc Networking Workshop (Med-Hoc-Net), 2012 The 11th Annual Mediterranean*, Ayia Napa, Cyprus, 2012, pp. 141–145.
- [8] J. Wang, C. Li, H. Li, and Y. Wang, "Key Technologies and Development Status of Internet of Vehicles," in *Measuring Technology and Mechatronics Automation (ICMTMA), 2017 9th International Conference on*, Changsha, China, 2017, pp. 29–32.
- [9] A. Bohm and M. Jonsson, "Supporting Real-time Data Traffic in Safety-critical Vehicle-to-Infrastructure Communication," in *Local Computer Networks, 2008. LCN 2008. 33rd IEEE Conference on*, Montreal, Que, Canada, 2008, pp. 614–621.
- [10] C. Yan, J. Wang, and S. Li, "Research on Traffic Information Transmission Algorithm in Internet of Vehicles," in *Intelligent Transportation Engineering (ICITE), IEEE International Conference on*, Singapore, Singapore, 2016, pp. 147–150.
- [11] N. Sharma, N. Chauhan, and N. Chand, "Smart Logistics Vehicle Management System based on Internet of Vehicles," in *Intelligent Transportation Engineering (ICITE), IEEE International Conference on*, Wanknaghat, India, 2016, pp. 495–499.
- [12] C. Parera, A. Zaslavsky, P. Christen, and D. Georgakopoulos, "Context Aware Computing for The Internet of Things: A Survey," *IEEE Communications Surveys & Tutorials*, vol. 16, no. 1, pp. 414–454, May 2013.
- [13] K. M. Alam, M. Saini, and A. E. Saddik, "Toward Social Internet of Vehicles: Concept, Architecture, and

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Applications,” *IEEE Access*, vol. 3, pp. 343–357, March 2015.