

Automating Detection of Cancer Tissue

Abstract

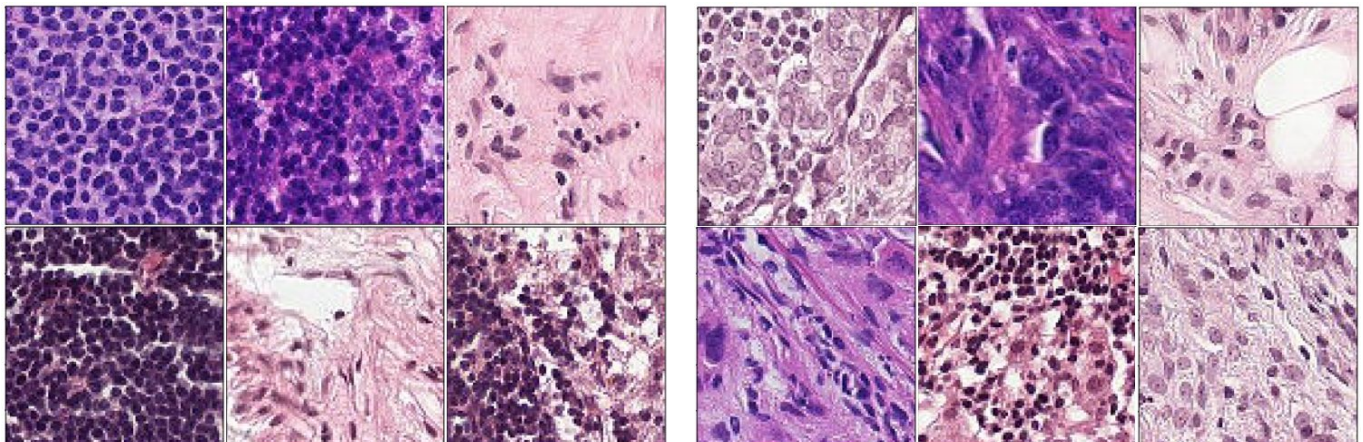
A neural network has been built to predict the presence of metastatic tissue in lymph nodes. The images were collected from Patch Camelyon challenge [1]. Various models were built until an accuracy of 83% was reached.

Background

From genetic therapy to detection of various diseases, AI has revolutionized medical research. Recently, health researchers have innovatively applied AI to one of the most pressing health concerns of the century: cancer. Breast cancer is the second most common cancer in women. This project trains an AI model to detect cancer tissue in microscopic images. Early detection of metastatic tissue could potentially support health providers in developing swift diagnosis for patients, possibly saving their lives.

Goal

Build a model that has >80% accuracy. When dealing with cancer images, there is no particular discerning shape of cancer that can be easily pointed out, such as the shape of a house, or a dog. With the current technological achievements it is not possible to have a model with 100% accuracy.



Healthy Cells

Tumor cells

Results

The results of the simulated model revealed a model accuracy of approximately 83%, successfully satisfying the initial hypothesis of the project. The next steps would be to create a webpage where scientists and doctors can have easy access to to analyze their pictures. By automating cancer detection from images, AI can lead to innovative and life-saving health interventions for cancer treatment.

References:

- [1] Patch Camelyon Challenge - <https://patchcamelyon.grand-challenge.org/Introduction/>
B. S. Veeling, J. Linmans, J. Winkens, T. Cohen, M. Welling. "Rotation Equivariant CNNs for Digital Pathology". [arXiv:1806.03962](https://arxiv.org/abs/1806.03962)
Ehteshami Bejnordi et al. Diagnostic Assessment of Deep Learning Algorithms for Detection of Lymph Node Metastases in Women With Breast Cancer. JAMA: The Journal of the American Medical Association, 318(22), 2199–2210. [doi:jama.2017.14585](https://doi.org/10.1001/jama.2017.14585)