Automated detection and classification of breast cancer metastases in lymph nodes using deep learning

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Overview

Background

- At present breast cancer detection and classification in lymph nodes are performed through a microscope by a pathologist. Medical doctor specialised in microscope detect and characterise disease on a cellular level. Small metastases are quite difficult to detect and it perception is missed.

Deep learning approach concerning the task

- High number of patients.
- Second main cause of cancer death in women, after lung cancer.
- Automated method could be very useful to reduce pathological time and the risk

Goal of the project

- The detailed task in this challenge is to determine a pN-stage for every patient in the test dataset. Actually, the pN-stage represents the size and number of cancer metastasis, that is, how severe the disease is for a patient.

Solution strategies

- The model we will use: deeplab models
- The size of the available data set might be quite big. For this we can reduce the size of the datasets by down sampling.
- Implementation of the method on the datasets.
- Accuracy evaluation. For the evaluation of the results we use five class quadratic weighted **kappa** where the classes are the pN-stages. Cohen's kappa coefficient is a statistic that is used to measure inter-rater reliability (and also Intra-rater reliability) for qualitative (categorical) items.

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