

# PATIENT-LEVEL CLASSIFICATION FOR BREAST CANCER METASTASES

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## ABSTRACT

Patient-level classification is an essential task for breast cancer patient’s diagnosis and treatment. In this paper, we propose a method to automatically predict pN-stage for whole slide images by leveraging multi-scale features and path aggregation. We first train a slide-level classifier with hard case mining to generate heatmaps of each WSI. Next, features extracted from those heatmaps are used to train a random forest classifier by rule-based criteria. pN-stages of patients are finally determined by our prediction results.

**Index Terms**— Camelyon17, Deep learning, pN-stage Classification, Breast Cancer, multi-scale features

## 1. METHODS DIFFENCES

There are some changes in the new version:

- (1) We extract only 4 features from each heatmap instead of 10 features to avoid overfitting when training the random forest classifier.
- (2) We use another five threshold values to threshold heatmaps.
- (3) We rearrange the training set for our slide-level classifier.

## 2. RESULTS

We test our model on 100 slides (20 patients) each time. The average slide-level accuracy of our model is 0.93, and average kappa score is 0.93.