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A Deep Learning Approach for the Analysis of Masses in Mammograms with Minimal User Intervention

Neeraj Dhungel, Gustavo Carneiro, Andrew P. Bradley

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**Highlights**

- We introduce a novel automated CAD system with minimal user intervention that can detect, segment and classify breast masses from mammograms. We explore deep learning and structured output models for the design and development of the proposed CAD system. More specifically for the detection, we propose a cascade of deep learning methods to select hypotheses that are refined based on Bayesian optimization. For the segmentation, we propose the use of deep structured output learning that is subsequently refined by a level set method. Finally, for the classification, we propose a deep learning classifier that is pre-trained with a regression to hand-crafted feature values and fine-tuned based on the annotations of the breast mass classification dataset. Our proposed CAD system produces the current state-of-the-art detection, segmentation and classification results for the INbreast dataset.

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