

Hyperparameters Optimization of Boosted CNN Model for Image Classification

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Abstract. The most common cancer in women is breast cancer. It is the second leading cause of death among women. Automatic tissue classification from medical images is an important step in pathology detection and diagnosis. The improvement of system accuracy is a key issue in the detection and classification of tumors in digital mammographic images. In the last years, Convolutional Neural Networks (CNNs) have become a popular machine learning architecture in medical image analysis. In this work, we propose to optimize the hyperparameters for medical image classification using Particle Swarm Optimization (PSO). The classification process used works in two stages: usage of a trained CNN to automatically extract the features of the images, then application of the XGBoost algorithm to classify the extracted features. The tuned hyperparameters are mainly important hyperparameters from the XGBoost algorithm. This work is still in progress, and the proposed approach has been tested on many subsets from the digital database for screening mammography (DDSM). The results demonstrated an overall system accuracy of 99.43%. It indicates an improved performance over traditional approaches in breast cancer image classification.

Keywords: Optimization, Particle Swarm Optimization (PSO), CNN, XGBoost, Image Classification.

References

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