

An Accurate Computer-Aided Diagnosis: CAD System for Diagnosis of Aortic Enlargement by Using Convolutional Neural Networks

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Abstract : Aortic enlargement, also known as an aortic aneurysm, can occur when the walls of the aorta become weak. This disease can become deadly if overlooked and undiagnosed. In this paper, a computer-aided diagnosis (CAD) system was introduced to accurately diagnose aortic enlargement from chest x-ray images. An enhanced convolutional neural network (CNN) was employed and then trained by transfer learning by using three different main areas from the original images. The areas included the left lung, heart, and right lung. The accuracy of the system was then evaluated on 1001 samples by using 4-fold cross-validation. A promising accuracy of 90% was achieved in terms of the F-measure indicator. The results showed using different areas from the original image in the training phase of CNN could increase the accuracy of predictions. This encouraged the author to evaluate this method on a larger dataset and even on different CAD systems for further enhancement of this methodology.

Keywords : computer-aided diagnosis systems, aortic enlargement, chest X-ray, image processing, convolutional neural networks

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