The proposed CAD lung cancer detection system consists of SVM based node detector and ResNet architecture based node classifier. The results of both detection and classification could be further improved by implementing novel object detection algorithms, such as YOLO v3, and new CNN architectures, such as Efficient Net. Some studies have already shown that YOLO outperforms SVM in detection [1], and in general, EfficientNet models achieve higher accuracy and efficiency than existing CNNs [2].

To evaluate the proposed deep learning model, a conventional ROC analysis was performed, which, as mentioned before, ignores information about the location of the nodules. A better alternative is to use the free response ROC (FROC) curves. These curves are similar to the ROC curves except that their horizontal axis indicates the number of false positives per image [3]. The FROC paradigm can account for nodule detection and location on images containing any number of nodules, which increases statistical power [4]. If an indicated location is within a clinically relevant acceptance region of the actual nodule centroid, the event is scored as true-positive. Otherwise, it is scored as false positive [5]. This is more clinically relevant, as it is important not only to detect the presence of nodules, but also to provide further clues to their location.

Finally, there is still room for improvement. For instance, the second stage of the framework uses a 2D convolutional neural network. However, the scans from CT are 3D images, which means that the performance of the model could be surpassed with a 3D approach. Using 3D kernels is more computationally expensive, but would allow the network to learn volumetric features, which in turn could help with nodule detection and classification.

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