

AbstractID: 11820 Title: Hybrid computer-aided diagnosis system for lung nodules in CT-chest exams

**Purpose:** A computer-aided diagnosis system for the selection of lung nodules in computer tomography (CT) chest studies was improved. The previous CAD scheme is based on a region-based detection and analysis scheme. The results of this system were promising with a sensitivity of about 40 % for nodules larger 4 mm diameter and an average false positive rate of 6, tested in 88 CT studies.

**Material and methods:** To improve sensitivity, an additional detection scheme was implemented. This method is based on a multi-scale detection method. The image data were smoothed with a 3D Gaussian filter and computed the Hessian matrix and eigenvectors and eigenvalues for all pixels detected by the first algorithm. By analyzing the eigenvalues spherical structure can be located. For further segmentation a region growing method was implemented and further analysis of the detected structures was performed. The results of both method were combined.

**Results:** To test the detection algorithms we used 19 CT studies. Our CAD system detected 58% of the nodules with a false-positive rate of 16 per study. Mean computation time was 4.5 minutes on a standard PC.

**Conclusion:** Combination of two CAD schemes improved the performance of the system significantly. More effort should be made in combining different computer-aided diagnosis schemes for lung nodule detection in CT of the chest.