Ref-10

**Intro**

Lung Tumor being one of the most malignant tumors and its detection proven to be a daunting task even by very experienced doctors. The survival rate of patients could increase dramatically from 14% to 49% if the tumors are detected at an early stage. This paper aims at presenting a technique which combines rule-based and SVM, for feature extraction and classification of candidate ROIs.

**Methods**

As the classification of ROIs is the research emphasis in this paper, thirteen features are extracted, their mathematical formulas listed in the paper. Blood vessels being a large part of ROIs are extracted using rule-based techniques because otherwise with that many features to be extracted it would decrease the efficiency of SVM. The remaining ROIs are used as training and test data. Those thirteen features are taken as input to SVM, which is proposed by optimal hyperplane which is mostly a unique solution to a quadratic function optimization problem. For classifying nodules three techniques are used which include firstly rule-based, secondly k-CV at k=3 and SVM for classifying total 254 candidates, third is k-CV and SVM to classify the remaining candidates.

**Results**

The results of the classifier indicate that using only rule-based approach the misclassification is very high. The approach combining rule-based and SVM is faster than SVM approach but the omission rate with the former approach is more than the latter one and that is only because of the complexity of the blood-vessels which are mostly tangled making them harder to distinguish with rule-based approach ,after which we are left with a relatively concentrated sample of candidates.

**Future Improvement**

For future improvement, the paper highlights that they need to work on gathering more cases and balancing the dataset, either by under-sampling or modifying the classifiers. In addition to this paying more attention on the research of ROI symptoms and features.