Postgraduate student: **Lagga Peggy**

Thesis Title:

Computer-aided detection system for lung nodules of CT images

Abstract:

This thesis aims to implement a computerized system for the detection of lung nodules, in order to provide an accurate diagnosis support model for lung cancer screening. This method is based on processing and analyzing images of computed tomography (CT) of the lungs, so as to classify these images.

Specifically, there were used CT images of lungs from 12 patients, which were assessed by an experienced radiologist. These images were digitized and were segmented in order to distinguish lungs from background tissue. Then, in order to classify the areas of the lung, we followed various steps, such as selection of regions of interest (ROIs), extraction of textural features, reduction and selection of features, classification. After the extraction of 20 textural features from the regions of interest, we reduced them, so as to save time and computational cost, and we divided the whole data (healthy and nodules) in two groups, training and test. The training data were used to design the classifier, with whom we did the characterization of the test data.

With regard to the classification of the data as cancer or healthy, we created a pattern recognition system where 7 different classifiers were tested (MDC, KNN, KNN weighted, PNN Gaussian, PNN exponential, PNN reciprocal, SVM). We then applied the exhaustive search method in each classifier and, also, by using the leave one out method, we resulted to the best feature combination, which gives the highest percentage of accuracy. Moreover, it was calculated the percentage of accuracy equal to 90%, for the classification which was occurred by the combination of the 7 classifiers, using the majority rule.

Finally, having compared the results of accuracy for the classifiers, we ended up with a group of 5 classifiers (MDC, KNN, KNN weighted, PNN exponential, SVM), a combination that enhanced system's performance. So, we designed our classifiers once again, with the whole number of our data this time and using only the best feature combinations, and we classified every pixel of the CT of lungs, using the majority rule for the best 5 classifiers.

Examining Committee

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