

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

**APPLICATION FOR ALLOTMENT OF THE TOPIC FOR CS 451 SEMINAR**

Date:

1. Group No. : 10
2. Names & Roll No. : Anju Vincent V
3. Topics according to the order of preference (At least three topics should be given)
4. Computer aided diagnosis system for cancer detection
5. Markov random fields in image segmentation.
6. Medical image analysis for cancer management in natural computing framework.
7. Abstract of each topic along with corresponding Base paper : (To be attached in separate sheets)
8. Dated signature of the student :

**ALLOTMENT MADE** [To be filled by the department]

1. Topic allotted :
2. Date of allotment :
3. Name of the guide :
4. Signature of the staff member in charge:

(Guide)

**Seminar Coordinator H.O.D**

**SEMINAR TOPICS SELECTED**

**Topic 1: “**Computer aided diagnosis system for cancer detection”.

**Abstract:-**

Cytological screening plays a vital role in the diagnosis of cancer from the microscope slides of pleural effusion specimens. However, this manual screening method is subjective and time-intensive and it suffers from inter- and intra-observer variations. In this study, we propose a novel Computer Aided Diagnosis (CAD) system for the detection of cancer cells in cytological pleural effusion (CPE) images. Firstly, intensity adjustment and median filtering methods were applied to improve image quality. Cell nuclei were extracted through a hybrid segmentation method based on the fusion of Simple Linear Iterative Clustering (SLIC) super pixels and K-Means clustering. A series of morphological operations were utilized to correct segmented nuclei boundaries and eliminate any false findings. A combination of shape analysis and contour concavity analysis was carried out to detect and split any overlapped nuclei into individual ones. After the cell nuclei were accurately delineated, we extracted 14 morphometric features, 6 colorimetric features, and 181 texture features from each nucleus. The texture features were derived from a combination of color components based first order statistics, gray level co-occurrence matrix and gray level run-length matrix. A novel hybrid feature selection method based on simulated annealing combined with an artificial neural network (SA-ANN) was developed to select the most discriminant and biologically interpretable features. An ensemble classifier of bagged decision trees was utilized as the classification model for differentiating cells into either benign or malignant using the selected features. The experiment was carried out on 125 CPE images containing more than 10500 cells. The proposed method achieved sensitivity of 87.97%, specificity of 99.40%, accuracy of 98.70%, and F-score of 87.79%.