**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%.

**Topic 2:** “Image based computer aided diagnosis system for cancer detection”.

**Abstract:-**

Cancer is one of the major causes of non-accidental death in human. Early diagnosis of the disease allows clinician to administer suitable treatment, and can improve the patient’s survival rate. Traditional diagnosis involves trained clinicians to visually examine the respective medical images for any signs of nodule development in the body. However due to the large scale of the medical image data, this manual diagnosis is often laborious and can be highly subjective due to inter-observer variability. Inspired by the advanced computing technology which is capable of performing complex image processing and machine learning, researches had been carried out in the past few decades to develop computer aided diagnosis (CAD) systems to assist clinicians detecting different forms of cancer. This paper reviews computer vision techniques adopted in medical image analysis, in particular, for cancer detection. The review focused on the detection of the most common form of cancer types, namely breast cancer, prostate cancer, lung cancer and skin cancer. A recent proposed cloud computing frame work has inspired the researchers to utilize the existing works on image based cancer research and develop a more versatile CAD system for detection.

**Topic 3: “markov random fields in image segmentation.”**

Abstract:

We propose a Markov random field (MRF) image segmentation model, which aims at combining color and texture features. The theoretical framework relies on Bayesian estimation via combinatorial optimization (simulated annealing). The segmentation is obtained by classifying the pixels into different pixel classes. These classes are represented by multi-variate Gaussian distributions. Thus, the only hypothesis about the nature of the features is that an additive Gaussian noise model is suitable to describe the feature distribution belonging to a given class. Here, we use the perceptually uniform CIE-L\*u\*v\* color values as color features and a set of Gabor filters as texture features. Gaussian parameters are either computed using a training data set or estimated from the input image. We also propose a parameter estimation method using the EM algorithm. Experimental results are provided to illustrate the performance of our method on both synthetic and natural color images.