Research Interests, May 2017

Asst. Prof. Dr. Boran Şekeroğlu

My recent research focus has been on Document Image Analysis and Evaluation Criteria. In scanned documents, where noise, contrast, and illumination vary, classifying pixels as foreground or background pixels is still a difficult and challenging problem. Several evaluation studies on binarization methods for document images were previously performed, however, performing an objective evaluation to determine an optimal binarization method is not trivial because of the application-dependency of the different methods and the varieties in document databases. In this research, quantitative analysis and evaluation of classical and recently proposed proposed binarization methods will be performed and three novel metrices, APAR,APD and CPR will be proposed in order to determine optimum binarization method for document images.

In my second project, we used SVM to design a computer aided diagnosis systems for lung cancer detection. Computer aided diagnosis is starting to be implemented broadly in the diagnosis and detection of many varieties of abnormities acquired during various imaging procedures. The main aim of the CAD systems is to increase the accuracy and decrease the time of diagnoses, while the general achievement for CAD systems are to find the place of nodules and to determine the characteristic features of the nodule. As lung cancer is one of the fatal and leading cancer types, there has been plenty of studies for the usage of the CAD systems to detect lung cancer. Yet, the CAD systems need to be developed a lot in order to identify the different shapes of nodules, lung segmentation and to have higher level of sensitivity, specifity and accuracy. In the research, LIDC database is used which comprises of an image set of lung cancer thoracic documented CT scans. Proposed CAD system consists of image pre-processing, segmentation, feature extraction and classification steps. Then, filtration and enhancement techniques is used as an image processing. Otsu's algorithm, edge detection and morphological operations are applied for the segmentation, following the feature extractions step. Finally, support vector machine with Gaussian RBF is utilized for the classification step which is widely used as a supervised classifier.

My third project is about the Reconstruction of Faces using Skull X-ray Images. Reconstruction of faces using x-ray images of skulls is a challenging application which consists of several parameters such as aging, demographic information etc. Limited researches had been performed to reconstruct the skull images, however, these reasearches generally use two sided images of skull x-ray images. In this research, the aim is the automatic reconstruction of the faces using front-view skull images.

My final project is about the recognition of snake species using artificial neural networks and image processing techniques. There are hundreds of snake species and human beings are not able to recognize all of them except well known species. In this work, the aim is to provide preliminary study in order to recognize the species. First, the region of interest which is snake, will be segmented

manually, then, average pixel per node approach will be applied to reduce the input data in order to provide efficient data to the neural network. Finally the neural network system will be trained and tested.