CHAPTER 7

CONCLUSION AND FUTURE WORKS

Watermarking in medical images has immense potential in the field of medical diagnostics and in telemedicine health care. Data embedded in MR images make them much more secure. Moreover, the data embedding algorithm has been thoroughly reviewed and clearly discussed in this thesis. Since it is reversible, the original data and the embedded data are restored and extracted clearly. This lifting scheme keeps the distortion low and gives better PSNR. Hence, an efficient and simple reversible data embedding method for digital images has been achieved and illustrated. The capacity and the quality of embedded images are found to be the best when compared with the images available from the literature. Furthermore, this work helps in the distance based diagnosis for medical applications. The embedded data achieved a higher degree of quality with respect to wavelet transforms and SVM. The performance result in terms of PSNR for different medical images reveals interesting observation made better than the existing methods. These images with high capacity can be trained and retrieved using MDCT based SVM classification for different classes of retrieving medical images. The detailed analysis and experimental results substantiate the embedding approach, along with the histogram technique do not deteriorate under any aspect and also shows the effectiveness of the method. Moreover, it has been tested using MATLAB. The comparison of these two methods of implementing wavelet transforms has proved that a higher degree of quality can be obtained. Hence,
this work is successfully designed for the performance analysis of images with high capacity and are trained, retrieved using MDCT based SVM classification of real time applications. This SVM provides a good out-of-sample generalization, which is much more suitable for assigning different classes for medical images and it can be robust, even during the training phase. In this work that has been proposed, an SVM delivers a unique solution, since the optimality problem is turned off and it can perform solutions for different samples. The samples are compared with the performance of different classes of images in medical data sets. In this research work, it is investigated that a multiclassification technique based on SVM classification is suitable for medical images and were validated by Modified discrete cosine transform. The innovative medical image was retrieved and extracted from this method, and the accuracy was calculated which provided much better results for medical images of the retina (99%) and iris (98%), demonstrating that an SVM performed best when it came to reporting accuracy. The texture features extracted using MDCT, resulted in a better approach with respect to the separation of all classes. Simulation results demonstrate the eventual retrieval of different classes of images for the samples that were selected. Therefore, this method chiefly improves the accuracy, and influences the performance analysis and classification of the medical image. The SVM is one among a group of powerful classifiers, but not necessarily the best, as the classification process always depends on various other factors, like the quality of features, the data set of training etc. Hence, it is believed that based on this model, future researchers will study and develop some modern strategy for a larger number of medical databases to enhance the training and evaluation of the method that we have proposed in our research.
Future works

In the near future, researchers may be directed to investigate more wavelet types for further improvement on data hiding capacity and PSNR, using the histogram shifting technique and the SVM technique. One of the possible data hiding techniques for future research is with respect to hiding data on the network using histogram shifting in case of a breach, and peer-to-peer private communications and posting secret communications on the web to avoid transmission. Hence, the accuracy of the image can be increased for any number of images using SVM with a multi-query system model. This can be achieved by using SVM classifiers followed by KNN for CBIRs using texture and shape features. The supervised classifier concentrates on extracted features for retrieval. A Gray level co-occurrence matrix algorithm can be implemented to extract the texture features from images. A feature optimization can be performed on the extracted features to select from among the best features in order to train the classifier. The classification may be done on the dataset and it can be classified into three categories namely, normal, benign and malignant. Hence, the multi-query image would be classified by the classifier into a particular class and as a result, relevant images could be retrieved from the database.