CHAPTER – IX

CONCLUSIONS AND FUTURE WORKS

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9.1 CONCLUSIONS

Image processing techniques assist the radiologist for clinical diagnosis and improves the manual analysis. Computer aided diagnosis are implemented to achieve the greater accuracy. In this dissertation different modules for detection and diagnosis of oral MRI images are employed and the results are deliberated. The images are pre-processed, enhanced and the features are extracted. The images are detected and diagnosed using the classification and segmentation techniques. Performance analysis is performed using sensitivity, specificity and accuracy and they are summarized below:

The oral cancer images are obtained from the github database and from Devaki scans, Madurai. Pre-processing of the images are implemented using the adaptive median filter and random valued filter. The random valued filter preserves the edges with the increase in PSNR values and decrease in error values. The quality of the images is enhanced using adaptive histogram equailization.

Features extraction are used to extract the unique features in the image. Features are extracted using the combination of GLCM and LBP techniques from the Gabor transformed images. The features are extracted to obtain a greater accuracy for classification. These features are now trained and classified using ANFIS classification approach. The performance evaluation of oral cancer segmentation using ANFIS classification method achieves 91.2% of sensitivity, 91.9% of specificity and 94.5% of oral cancer segmentation accuracy.

Further, NN classification method is used to detect and classify the cancer affected oral MRI images. The performance evaluation of oral cancer segmentation using NN classification method achieves 86.5% of sensitivity, 90.1% of specificity and 91.7% accuracy. This research work also develops a methodology using deep learning algorithm to classify the oral images into either normal or abnormal. The CNN classification approach achieves 98.6% of sensitivity, 99.1% of specificity and

99.7% of accuracy. The classification by CNN has greater performance compared to that of the Neural network and ANFIS classifier.

The morphological approach is applied to segment the cancerous regions using the parmeters like perimeter, area, width and height. The proposed oral cancer detection system using morphological functions achieves 91.2% of sensitivity, 91.95% of specificity and 94.5% of accuracy. The segmentation using morphological approch achieves good performance in terms of accuracy, specificity and sensitivity values than watershed segmentation and region growing methods.

The segmented cancer regions are further diagnosed into ‘Mild’ or ‘Severe’ using deep learning algorithm. The proposed method for the diagnosis of oral cancer using RF classification method obtains 98% for mild case and 99.3% for severe case. The proposed method using CNN classification method obtains 99% of diagnosis rate for mild case and 99.6% for severe case.The CNN algorithm has achieved greater accuracy for both detection and diagnosis of oral cancer. This approach would help the physicians and radiologist to analyze the severity levels of the disease for further treatment.

9.2 FUTURE WORKS

The future scope of this research works is stated as,

- The proposed algorithms can be extended to detect and classify the other oral related abnormalities in future.
- In future segmentation algorithms can be hybridized for medical applications.
- More textural features can be extracted with various other feature extraction techiques.