Abstract

Spinous layer being a sub compartment of surface epithelium of oral mucosa, plays also major role in investigating oral submucous fibrosis (OSF) at its early stage in addition to basal layer. This paper aims to provide a technique that can be used to assist the oral pathologists in grading OSF based on textural information of the spinous layer. The proposed scheme intends to evaluate the textural changes from normal to various grades of OSF. In practice, it comprises the following modules – (a) surface epithelium segmentation, (b) selection of windows on the spinous layer in reference to the basal layer, (c) textural feature extraction and analysis and finally (d) grading. Here the epithelium is segmented using anisotropic diffusion and Otsu's thresholding. Wavelet based multi-resolution technique is applied to extract 12 textural features from spinous layer. From the statistical analysis, it is observed that 6 features are significant in discriminating normal, OSF with and without dysplasia. Finally, support vector machine (SVM) and Bayesian classifiers are trained with 46 normal, 24 OSF without dysplasia and 20 OSF with dysplasia samples for OSF grading. The result shows that the classification accuracies for both the classifiers (Bayesian = 93.3%, SVM = 96.6%) are comparable, there by emphasizing the significance of texture in oral cancer diagnostics.
Textural Analysis of Spinous Layer for Grading Oral Submucous Fibrosis

References

- Perona, P., and Malik, J. 1990. Scale-space and edge detection using anisotropic

Index Terms

Computer Science  Image Processing

Keywords

Oral Submucous Fibrosis (osf)  Spinous Layer  Anisotropic Diffusion  Wavelet

Statistical Test

Bayesian Classifier

Support Vector Machine.