

Enhanced visualization of oral cavity for early inflamed tissue detection

王祥辰, Yung-Tsan Chen, Jui-Teng Lin, Chun-Ping Chiang, 鄭芳炫

Computer Science & Information Engineering

Computer Science and Informatics

fhcheng@chu.edu.tw

Abstract

We describe a color image reconstruction method that enables both direct visualization and direct digital image acquisition from one oral tissue by using various light sources and color compensating filters. In this method, the image of the oral tissue with white light emitting diodes (LEDs) with blue color compensating filter has a larger color difference between the normal and inflamed tissues. The enhanced visualization comes from the white light color mixing between the red normal tissue and bluish white light from the LEDs. With our method, we evaluate the perceived tissue reflectance in each pixel of the image and color reproduction with different illuminated spectra. Our approach to enhancement of visually perceived color difference between normal and inflamed oral tissue involves optimization of illumination and observation conditions by allowing a significant optical contrast of illuminated spectrum to reach the observer's eyes. In comparison with a conventional daylight LED flashlight, a LED with blue filter as the illuminant for oral cavity detection enhances the color difference between normal and inflamed tissues by 32%.

Keyword : Illumination design, Image reconstruction techniques, Spectroscopy, fluorescence and luminescence