Public Abstract

First Name:Ratchadaporn

Middle Name:

Last Name:Kanawong

Adviser's First Name:Ye

Adviser's Last Name:Duan

Co-Adviser's First Name:

Co-Adviser's Last Name:

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Title:COMPUTER-AIDED TONGUE IMAGE DIAGNOSIS AND ANALYSIS

Computer-aided diagnosis is a medical procedure that assist physicians in interpretation of medical images. This work focuses on computer-aided tongue image analysis, specifically, as it relates to Traditional Chinese Medicine (TCM). Tongue diagnosis is an important component of TCM. Computerized tongue diagnosis aid medical practitioners capture quantitative features to improve reliability and consistence of diagnosis. Recently, researchers have started to develop computer-aided tongue analysis algorithms based on new advancement in digital photogrammetry, image analysis and pattern recognition technologies. A total computer-aided tongue analysis framework consists of tongue detection, tongue segmentation, tongue feature extraction, tongue classification and analysis, which are all included in our work.

We propose a new hybrid image segmentation algorithm that integrates the region-based Mean Shift method with the boundary-based Canny Edge detection method. We apply this segmentation algorithm in designing an automatic tongue detection and segmentation framework. We also develop a novel color space based feature set for tongue feature extraction to implement an automated ZHENG (TCM syndrome) classification system using state of the art machine learning techniques. To further enhance the performance of our classification system, we propose preprocessing the tongue images using the Modified Specular-free technique prior to feature extraction. We also explore the extraction of geometry features from the Petechia dot on tongue images for improved classification. Lastly, we propose a new feature set for automated tongue shape classification. Experimental results obtained demonstrate the advantage of our proposed methods to current state of the art techniques.