

Public Abstract

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Title:COMPUTATIONAL ANALYSIS OF TONGUE IMAGE
FOR HEALTH DIAGNOSIS

Tongue, the primary taste organ in the mouth, can reflect the whole body's health conditions based on the Traditional Chinese Medical (TCM) theories. Watching the tongue is one of the most common, essential and reliable methods for the TCM doctor to make diagnoses.

In this thesis, a new health system is introduced based on tongue image analysis. The technologies adopted in this system ranged from tongue image processing algorithms to machine learning applications. The tongue image algorithms used in this work include image segmentation, tongue recognition and tongue image classification. Image segmentation was used to get rid of other unrelated parts, such as lip, face and neck, while keeping the tongue only. Then two recognition methods were applied to check whether the segmented result is a tongue or not. For different tongue patterns, the Support Vector Machine is applied to train a machine learning model and make predictions to classify the tongue into different labeled groups. An app named 'iTongue' is designed to monitor the body status by taking and processing tongue images in smart phones. The app provides a user-friendly, fast and powerful health tool based on TCM theories. The whole system is implemented in a web-based environment. An advanced portal was developed to connect the users and the TCM doctors. The users will not only obtain the analysis label of tongue images, but also get some life style recommendations based on the tongue image analysis. This portal helps the user understand more about his body status and guide him to adopt a more suitable diet and improve exercise.