ABSTRACT

Tuberculosis (TB) is an infection of the respiratory system caused by the bacteria Mycobacterium Tuberculosis. One way to detect these bacteria is by examining sputum specimens. The bacteria were seen through a microscope to count the number of acid-resistant bacteria. Currently, many studies have been developed to help the calculation of TB bacteria. Most of the studies still classify TB bacteria into two classes and use less efficient feature extraction in storage.

A tuberculosis bacteria classification system from sputum microscopic images is designed in this final project. The microscopic image of sputum will go through a pre-processing stage to access the bacteria from the background. Images that have passed the pre-processing stage will go through the feature extraction and classification stages. This system uses the Compressive Sensing method as feature extraction and a Support Vector Machine as a classification.

This study succeeded in classifying sputum specimens into three classes: positive, negative and scanty. The sputum specimen dataset used contains 90 images which are divided into 63 training data and 27 test data. The Compressive Sensing method in this system uses binary random matrix as measurement matrix. Meanwhile, the Support Vector Machine method uses linear kernel as kernel function and One Against One as SVM multiclass method. This system can identify the class of sputum specimens with an accuracy of 92.593% with a computation time of 11.596 seconds.

Keyword: *Detection of TB bacteria, Compressive Sensing*, *Support Vector Machine*.