Detection of Dhool Number in Black Tea Manufacturing with Image Processing Techniques

S. Saranka', T. Kartheeswaran', D.D.C. Wanniarachchi[2], W.K.I.L. Wanniarachchi[3]
'Department of Computer Science and Technology, Uva Wellassa University, Badulla , Sri Lanka.
'Department of Science and Technology, Uva Wellassa University, Badulla, Sri Lanka.
'Department of Physics, University of Sri Jayewardenepura, Nugegoda, Sri Lanka.

The possibility to use digital images of tea particles as a tool to monitor fermentation of black tea processing is studied in this project. Copper green colour is the predicted colour used to measure the degree of fermentation; therefore, determining the fermentation level by observing the copper green using naked eye is error prone and affects the complete product outcome. Black tea processing takes several batches per day, and from each batch, there are three types of particles obtain after Roll breaker processes. According to the size of the particles these are named as dhool **1,** dhool 2, and dhool 3. The duration of fermentation is varied by dhool number for a given batch due to varied sizes of tea particles. Therefore, it is important to identify the dhool number for a given digital image. The method used in this project is divided in to three main phases, image pre-processing, identification of the dhool number, and prediction of the fermentation level. image processing techniques are used to extract features of tea leaves and Support Vector Machine (SVM) is used as the classifier to train the system and obtain accuracy in each stage. The results indicate higher accuracy in predicting the dhool **1** which is over 77% accurate while dhools 2 and 3 indicated accuracy levels of 69% and 73% respectively. Therefore, image processing techniques can be successfully used to predict the dhool number of a given batch of tea processing.

Keywords: Fermentation, Image processing, SVM