ABSTRACT

This study aims to develop an Android-based application system that uses Machine Learning technology to classify the quality of coffee beans. Indonesia as a coffee connoisseur country has a high level of consumption, but the selection of coffee bean quality still relies on time-consuming and subjective physical quality testing. Therefore, the main problem to be solved is the need for an objective, fast and easy-to-use system to classify coffee bean quality.

The solution offered to overcome the subjective and time-consuming problem of selecting the quality of coffee beans is to use Image Processing and Machine Learning technologies. This research will use several different Machine Learning methods, such as Convolutional Neural Network (CNN), Random Forest, and K-Nearest Neighbor, to get relevant results. Furthermore, the method with the highest level of accuracy will be integrated into an Android-based application, making it easier for people to detect the quality of coffee beans using a smartphone camera. Thus, this solution is expected to provide better knowledge to the public regarding the selection and understanding of the types of coffee beans. The results showed that the use of the Convolutional Neural Network (CNN) method for detecting the quality of coffee beans resulted in the highest level of accuracy compared to the Random Forest and K-Nearest Neighbor methods. In testing using a coffee bean image dataset, CNN achieved an accuracy rate of 98%, while Random Forest reached 96% and K-Nearest Neighbor reached 91,33%. This shows that CNN has a better ability to classify the quality of coffee beans based on image.

In brief conclusion, this research succeeded in developing a coffee bean quality detection system based on Image Processing and Machine Learning. The use of the Convolutional Neural Network (CNN) method in this application provides a high level of accuracy in classifying the quality of coffee beans. An Android-based application that has been integrated with this system can be used by the public to easily detect the quality of coffee beans through a cell phone camera. Thus, this research provides an effective solution in facilitating the selection and understanding of quality types of coffee beans.

Keywords : Machine Learning, Mobile Applications, Convolutional Neural Network, K-Nearest Neighbor, Random Forest