ABSTRACT

Contributing 3.0% of the total world ceramic production, Indonesia is considered as the seventh largest ceramic manufacturers. This position has given a significant value as it had contributed to the development of Indonesia infrastructure. Thus, maintaining and improving the competitive advantage of this sector is an important issue which needs a considerable attention. One of the underlying factor which determine the competitive advantage of an organization is quality. In the case of ceramic tile industry, the surface quality of ceramic may affect the perceived quality of the customer. However, it was found that the quality inspection process conducted in *Balai Besar Keramik* (BBK) was done manually and repeatedly by operators which in a long run, may cause fatigue. This study attempt to automate the process of ceramic quality inspection through image classification techniques. Specifically, a dimensionality reduction technique called Principal Component Analysis and classification technique Artificial Neural Network was incorporated in the study to classify four defects: Crack, Chip off, Scratch and Dry spots. The selected model resulted in 90.1% of accuracy and F1-score of 0.78. The inspection time of 0.508 seconds/snapshot was also obtained during the real time inspection. This study therefore offers a relatively fast alternative to detect ceramic tile surface defects with a considerable amount of accuracy.

Keywords: Artificial Neural Network, Principal Component Analysis, Unconstrained Optimization, Supervised Learning, Unsupervised Learning.