

PERCEPTRON VS. LEARNING VECTOR QUANTIZATION FOR COLOUR RECOGNITION

R.A. EKANAYAKE, G.E.M.D.C. BANDARA AND N. ATHUKORALA

Department of Production Engineering, Faculty of Engineering, University of Peradeniya

Artificial Intelligence, the major invent that has made the revolution in modern technology, finds a wide variety of applications in several areas. One of those techniques, Neural Network is a soft computing technique, developed on the basis of the physiology of the human brain. This is used in many applications for pattern / colour recognition.

This paper studies an application of Neural Networks for colour recognition in food processing industry for quality control based on the colour. By visual inspection it was discovered that there are four groups of food particles those can be categorized according to the colour. Among four categories, it is required only one category to be accepted while rejecting the others.

The problem was deviated from the colour recognition applications carried out so far, as there were no specific margins separating the colours of these food particles, leading to a limitation in the use of conventional methods of sorting using colour sensors. The research was initiated towards Neural Networks with the above limitation in this particular classification problem. Previous studies have been carried out on the use of neural networks in quality evaluation based on the chemical composition of the food particles and on the use of the neural network model, perceptron for colour recognition.

Two Neural Network paradigms, the perceptron and Learning vector quantization (LVQ) were used for this classification and results were compared. The colour of the food particles were detected using a three-element colour sensor as the 8-bit resolution of the basic colours red, green and blue. Based on this values the classification was done using the above two paradigms after training them using a sample set of data and a set of targets.

The comparison of results of the two paradigms showed that the perceptron was weak in classifying data while LVQ model was successful. This concludes that for this specific colour recognition and classification problem, the LVQ is better than the perceptron.

