ABSTRACT

The studies of Optical Character Recognition (OCR) are being developed since it still needs a performance improvement. The previous study of alphanumeric character recognition had been conducted by Blumenstein and Liu using Modified Direction Feature (MDF) and Multi Layer Perceptrons (MLP) network. The study reaches the accuracy rate of 70.22% for lowercase characters and 80.83% for uppercase characters.

In this study the OCR system is proposed to improve the existing performance and have a capability to recognize all case-sensitive alphanumeric characters simultaneously. One of the problems is that there are several characters having similarities in gesture and shape, so that the classifier of the OCR system encounters many ambiguities when classifying some particular characters, especially when recognizing all case-sensitive alphanumeric characters.

To overcome those problems, this study proposes a technique of grouping. All character classes are clustered into some groups using Fuzzy C-Means (FCM) clustering method. The OCR system that uses MDF and nested MLP network solves the problems and reach the research objectives. The nested MLP is the novelty method that is implemented in this study. This is a kind of multi-level MLP network that classifies the problem domain hierarchically. The first level classifies the character into the designated group and the second level continues the classification into the recognized character class.

The OCR system using the methods in recognizing all case-sensitive alphanumeric characters yields an accuracy rate of 84.38% for the uppercases, 76.43% for the lowercases, and 78.92% for the digits respectively. Any misclassified characters are mostly happened in distinguishing several uppercase and lowercase characters having similarities in gestures and shapes.

Keywords: recognition, OCR, MDF, nested MLP, case-sensitive alphanumeric characters.