DETECTION AND RECOGNITION OF VEHICLE LICENSE PLATES USING TEMPLATE MATCHING, GENETIC ALGORITHMS AND NEURAL NETWORKS

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ABSTRACT. *In this paper, we propose a system for automatic detection and recognition of vehicle license plates using template matching, genetic algorithms and neural networks. In the license plate detection part, an artificial template that consists of an outer rectangle that encloses two smaller rectangles is constructed. The size of the outer and inner rectangles, the positioning, size, orientation, position and color of the template are all controlled using the genetic algorithm. To fill the areas outside the inner rectangle, random selection of color pixels from a plate color database are used. In the character recognition part, we combine two methods into a hybrid system. In the first method, we train neural networks to recognize the characters and in the second method, we use template matching. To control the size of both the neural network inputs and the template, we apply a genetic algorithm to guide the search. The final system accuracy achieved is 96.8% for character recognition and 98.01% for license plate detection.*
Keywords: License plates, Neural networks, Genetic algorithms, Template matching, Character recognition

1. **Introduction.** The number of automobiles on roads has increased rapidly since the 1960s. This has stretched the human resources required in monitoring the vehicles. At the same time, advances in the relevant technology in automatic detection and recognition, is now mature enough to help in, and sometimes, solve such problems. It is therefore fitting that, vehicle license plate detection and recognition research is widely carried out by many researchers in many countries. This is not surprising considering the many applications that benefit from it ranging from traffic control, crime prevention, automatic parking authentication systems, etc. In license plate recognition, usually three steps are required. One is the license plate localization, regardless of the license-plate size and orientation. The second step is the segmentation of the characters in the plate and the normalization of other factors like brightness, contrast, illumination, etc. Lastly is the recognition of the characters and hence the license plate. Locating a license plate is not a trivial problem because of different plate sizes, orientations and complexity of the scene. In this work, an adaptive plate template is created using color selected form an averaged plate color database. The color database is created by manually extracting the color from 800 plates. In the localization of the plate, our template is based on the general shape of the plate