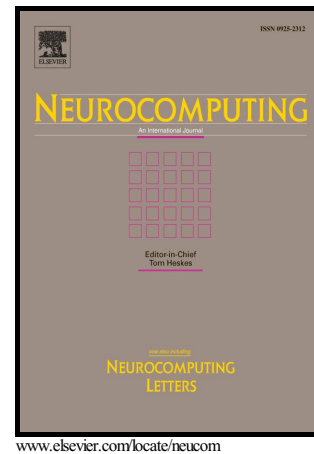


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An Algorithm Combined with Color Differential Models for License-plate Location

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Abstract

Vehicle license plate positioning is the first and most important step in license plate recognition systems. Existing license plate location algorithms are sensitive to light conditions and prone to be influenced by the background interference. To solve these problems, this paper presents an adaboost algorithm combined with color differential model. The proposed algorithm is composed of a coarse location step and a precise location step. In the coarse location step, a binary image is obtained to select the candidate plate regions using the color differential model. Then in the precise location step, the features obtained above together with other features are used by the adaboost algorithm to train the classifiers and precisely locate the license plates. The experimental results show that the proposed algorithm is more robust to the light conditions and background interference. In particular, during nighttime the precision rate can attain above 95.0%.

Keywords: license plate location; color differential model; adaboost algorithm

1. Introduction

In recent years, theoretical and applied research on Intelligent Transportation Systems (ITS) emerged in various countries. License plate recognition (LPR) technology, which is a key step to achieving intelligent traffic management, has been developed rapidly. LPR technology mainly involves three processes, namely, license plate location, character segmentation, and character recognition. Among these processes, license plate location is the first and the most crucial step. With the growing attention paid to license plate location and the continuously deepening research on this field, new license plate location algorithms are constantly being proposed. Although many LPR systems have been developed, most of them only work efficiently in certain environments. For instance, techniques based on the combinations of edge statistics and mathematical morphology do not perform well in images with complex background. Color-based processing methods do not provide a high degree of accuracy because color is not stable when lighting conditions change. Thus, the location of license plates under various circumstances remains a challenging task.

An adaboost algorithm combined with color differential model is proposed for license plate location in this paper. The proposed algorithm is composed of a coarse location step and a precise location step. In the coarse location step, a binary image is obtained to select the candidate plate regions using the color differential model. Then in the precise location step, the features obtained above together with other features are used by the adaboost algorithm to train the classifiers and precisely locate the license plates. By taking the advantages of texture features, color features and adaboost algorithm, the proposed algorithm can improve the robustness of different algorithms and achieve better positioning rate in different light conditions.

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