

**License Plate Recognition Algorithms and their  
Application to Macao License Plates**

by

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Abstract

LICENSE PLATE RECOGNITION ALGORITHMS AND ITS  
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Macao has been developing quickly in the decade and the amount of vehicles gets increasing rapidly. Many problems arise and the need of an advanced Intelligent Transport Solution is obvious. License Plate Recognition (LPR) is one of the most important topics for this. In this research, the core problems of LPR, their challenges and general approaches will be discussed.

In our work, an edge-based method is proposed to locate the license plate. Sobel edge detector is employed to extract the vertical edges, and an edge composition algorithm is proposed to combine the edges into candidate plate regions. They are further examined on the existence of the character “M” by a verification algorithm with template matching. It is a Macao country specific feature that license plate number must contain the character “M” as the first character. A row separation algorithm with projection analysis is also proposed to cater both one-row and two-row types of plates.

With the plate region identified, projection analysis and template matching methods are exploited to segment and recognize the characters. Various pre and post processing steps such as morphological erosion and trimming are proposed other than traditional implementation so as to improve the recognition accuracy.

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## LIST OF ABBREVIATIONS

**LPR** License Plate Recognition

**NN** Neural Network

**CCA** Connected Component Analysis

**ROI** Region of Interest

