Application of Mathematical Morphology for Omani Vehicle Number Plate Recognition

Neeraja Mohanan

Abstract

In the past couple of decades, the number of vehicles has increased radically. With this continuous increase, it is becoming very tedious to keep track of each vehicle for the purpose of security, law enforcement and traffic management. This phenomenon of rapidly increasing vehicles on the road highlights the importance for a vehicle number plate recognition system. Number plate recognition is an image processing technique used to identify the vehicle and its owner by the number plate. By recognizing the car plates, the drivers of the vehicle can be identified from the database. Number plate detection system are used in various applications like traffic law maintenance, traffic control, automatic toll collection, parking systems, automatic gate openers. In previous years, many approaches have been proposed for number plate detection, where each approach has its own advantages and disadvantages. The concept of mathematical morphology is used to develop the algorithm used for this project. This approach is used because of its simplicity and thus making it efficient and flexible in the various situations the number plate might go through like rain, smoke, shadow. The algorithm developed for this project works efficiently for all types of number plates of Oman. This algorithm can be easily customized for number plates of other countries as it uses the concept of mathematical morphology. The font and font size of the characters of number plates of other countries must be taken into consideration and customization must be done. The basic step in number plate recognition is the localization of number plate. The approach used in this project for localization is mathematical morphology. The following step is the segmentation of characters on the number plate. This is done by calculating the number of connected components and using the bounding box technique. The next step is to recognize the segmented character. This step is carried out using template matching technique as it had the highest efficiency in all the character recognition techniques used. Image acquisition for this project is done using a very high-quality mobile phone camera due to its simplicity, efficiency and it was easier to take the images in all conditions. The image processing is done by MATLAB software which is one of the common and efficient image processing analysis tools.