

General Introduction

Vehicle identification is a research area where image processing methods are used to identify vehicles by detecting and identifying the license plate numbers. Typical vehicle identification systems consist of three main stages. They are: locating the license plate, accurately identifying the numbers in the license plate and the identification of vehicles.

Although many intensive research studies have been conducted in other countries in the area of automatic vehicle identification, to our knowledge, there is virtually no research studies conducted in Algeria in this area. However, vehicle identification is an essential area in the development of intelligent traffic systems and surveillance. Given the current security situation in the country due to ethnic conflicts, this is one of the areas where there is an urgent need for the development of devices that could be used in variety of situations to ease the security concerns. In addition, the use of vehicles in Algeria has increased rapidly due to urbanization and modernization, especially in recent years, and thus, traffic congestion in cities has become a major issue due to inadequate road infrastructure. Therefore, control of vehicles and identification of traffic violators to maintain discipline, is becoming a big problem in many cities. Automatic vehicle identification systems can be used effectively for this purpose.

The recognition problem is generally sub-divided into two parts are:

- Number Plate Variations can be one of the given below: location: plates exist in different locations of an image, size: plates may have different sizes due to the camera distance and the zoom factor, color: plates may have various characters and background colors due to different plate types or capturing devices.
- Environmental variations: Illumination: input images may have different types of illumination, mainly due to environmental lighting and vehicle headlights, Background: the image background may contain patterns similar to plates, such as numbers stamped on a vehicle, bumper with vertical patterns, and textured floors, for example, in Algeria the norm is printing the license plate number in black colour on white background for front of vehicles and on a yellow background for back of vehicles. Number plate is a pattern with very high variations of contrast. If the number plates is very similar to the background it's difficult to identify the location, Brightness and contrast is changes to it. The morphological operation reused to extract the contrast feature within in the plate

The objective is to present architecture of ANPR (Automatic Number plate recognition system) by invariant moments to extract the parameters of discrimination and supporting vectors machine as classifiers.

This document includes four chapters, which allow us to present the various aspects of our work.

The first chapter will be devoted to plate registration, firstly present a general of the plate overview and historic, we will present them later in Europe, Africa and Asia the number plate and the description of the different series of license plate in the Algeria (Normal and special series).

We will present in the second chapter the general architecture and the various stages that make up the process of recognition of the license plate in general. We will present the most frequently cited techniques used at the every stage of Automatic Number plate recognition (ANPR) system (Image Acquisition Vehicle Image Pre-Processing, Extraction License Plate, License plate Pre-Processing, Character Segmentation and Character Recognition) and includes some works already done on this system by various researchers using different methodologies and algorithms.

In chapter three, we will discuss the classification method particularly well suited for treating high dimension data (support vector machine SVM).

In chapter four, we will first present the development environment and the different algorithms used. We present in this chapter a detailed description of the license plate recognition system, which includes six major phases: the vehicle image acquisition, preprocessing of the vehicle image, license plate extraction, preprocessing on the license plate character segmentation, and character recognition. Then we will present the experimental results obtained for each stage of the system made and the different discussion about these results.

We will finish the work with a conclusion and perspectives for future work in this research area.