Abstract
Automatic license plate recognition (ALPR) is the extraction of vehicle license plate information from an image or a sequence of images. The ALPR uses either a color, black and white, or infrared camera to take images. The extracted information can be used with or without a database in many applications, such as electronic payment systems (toll payment, parking fee payment), and freeway and arterial monitoring systems for traffic surveillance. ALPR as a real life application has to quickly and successfully process license plates under different environmental conditions, such as indoors, outdoors, day or night time. The quality of the acquired images is a major factor in the success of the ALPR. It should also be generalized to process license plates from different nations, provinces, or states. These plates usually contain different colors, are written in different languages, and use different fonts; some plates may have a single color background and others have background images. The license plates can be partially occluded by dirt, lighting, and towing accessories on the car. In this paper, we present a comprehensive review of the state-of-the-art techniques for ALPR. We categorize different ALPR techniques according to the features they used for each stage, and compare them in terms of pros, cons, recognition accuracy, and processing speed. Future forecasts of ALPR are given at the end.
1. Introduction
Automatic license plate recognition (ALPR) is the extraction of vehicle license plate information from an image or a sequence of images. The extracted information can be used with or without a database in many applications, such as electronic payment systems (toll payment, parking fee payment), and freeway and arterial monitoring systems for traffic surveillance. The LPR uses either a color, black and white, or infrared camera to take images. The quality of the acquired images is a major factor in the success of the ALPR. ALPR as a real life application has to quickly and successfully process license plates under different environmental conditions, such as indoors, outdoors, day or night time. It should also be generalized to process license plates from different nations, provinces, or states. These plates usually contain different colors, are written in different languages, and use different fonts; some plates may have a single color background and others have background images. The license plates can be partially occluded by dirt, lighting, and towing accessories on the car. In this paper, we present a comprehend severe view of the state-of-the-art techniques for ALPR. We categorize different ALPR techniques according to the features they used for each stage, and compare them in terms of pros, cons, recognition accuracy, and processing speed. Future forecasts of ALPR are given at the end.

2. Problem Prevailing
Existing System Needs:
- Large Amount of Database
- More Training Sets
- Large Memory to Run the System
- Sensitive to Distance and Angle between Camera and License Plate

3. Our Proposed System:
- Minimize Database Requirement
- Less Training Sets
- Minimize Memory Requirement
- Can Be Able To Recognize Image From Any Distance And Angle

4. Block Diagram

Figure 3.1: Basic Block Diagram of ALPR System
Block Diagram Explanation

► Image acquisition:

In image acquisition explained that from where images are acquire. Image can be input to the system by different methods by analog camera, or by digital cameras, but nowadays digital technology has their advantages so better input method is by digital cameras or by direct digital photos.

![Captured image](image1.png)

**Figure 3.2: Captured image**

► License Plate Extraction:

By whole capturing image we having license plate covered by background of vehicle body, so by this step only plate are is extracted from whole body. our task now is to identify the region containing the license plate. In this experiment, two features are defined and extracted in order to decide if a candidate region contains a license plate or not, these features are

![License plate area extraction](image2.png)

**Figure 3.3: license plate area extraction**

► Character segmentation:

By this step characters on license plate are segmented and identify. This step is the most important step in license plate recognition because all further steps rely on it. This is the second major part of the License Plate detection algorithm. There are many factors that cause the character segmentation task difficult, such as image noise, plate frame, rivet, space mark, plate rotation and illumination variance. We here propose the algorithm that is quite robust and gives
significantly good results on images having the above mentioned problems. For the segmentation pre-processing is required by conversion to gray scale and binarization. Different algorithms are used for segmentation which are explained further later in literature review. Segmented license plate example is given in figure.

![Segmented license plate](image1)

**Figure 3.4: Segmented license plate**

- **License plate number recognize:**

  By number plate extraction step final result is founded. Consider figure as an final extracted license plates

![License plate number recognize](image2)

**Figure 3.5: License plate number recognize**

The variations of the plate types or environments cause challenges in the detection and recognition of license plates. They are summarized as follows:

i. Location: Plates exist in different locations of an image.
ii. Quantity: An image may contain no or many plates.
iii. Size: Plates may have different sizes due to the camera distance and the zoom factor.
iv. Colour: Plates may have various characters and background colours due to different plate types or capturing devices.
v. Font: Plates of different nations may be written in different fonts and language.
vi. Occlusion: Plates may be obscured by dirt.
vii. Inclination: Plates may be tilted.
ix. Other: In addition to characters, a plate may contain frames and screws.
4. Flowchart

Start

Is the camera activated?

Yes

Input image

Locate license plates

Is there any license plate?

Yes

Identify license number

Is a valid license number?

Yes

License number and vehicle class

No
5. Result

a) Input Image  
b) Grayscale Image

c) Unwanted Lines Elimination Algo  
d) Vertical Edge Detection Algo

e) Candidate Region Extraction  
f) Output

g) Final Output
6. Advantages, Disadvantages & Applications

Disadvantages:
- Needs high resolution digital camera
- Sensitive to environmental conditions

Advantages:
- Vehicle access
- Traffic control
- Stopping vehicle related crimes
- Searching for missing or wanted persons
- Recovering stolen cars

Applications:
- Parking
- Access Control
- Motorway Road Tolling
- Border Control
- Journey Time Measurement

7. Conclusion & Future Scope

Hence we have seen Automatic license plate recognition (ALPR) system. It is a extraction of vehicle license plate information from an image or a sequence of images. Secure transportation will occur in this system. The extracted information can be used with or without a database in many applications. It is also monitor traffic surveillance. We can also use this system in electronic registration of vehicle.

References