**Project Report**

**Automatic License Plate Recognition System**

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**Abstract**

License plate recognition, license plate text categorization, and character identification are all standard processing processes in License Plate Recognition systems. The detection of a number plate is a difficult operation due to the wide variety of number plate formats and the fact that external elements might cause problems during the image processing stage. Good character recognition and identification rely heavily on effective plate detection.  However, partial defects, poor brightness, greasy plates, and undesired items make it difficult for these methods to recognize them. Furthermore, the types of license plates vary by country and, in certain cases, even by location. As a result, several License plate recognition systems require unique methodologies in order to achieve high identification rates. This report provides a short examination and analysis of some small approaches for detecting and recognizing license or number plates.

# **Introduction**

There is a demand for information systems for data processing in automobiles as a result of the widespread utilization of information technology into all parts of modern life. These systems necessitate the archiving of data by a human or a specific team capable of recognizing automobiles by their license plates in real time and reflecting the realities of reality in the information system. As a result, numerous approaches and identification systems have been developed, and license plates are now applied in a variety of applications. Vehicles are typically identifiable by their license plate numbers, which are legible by people but not by machines. A registration number plate is simply a black spot within a region of a picture with a specific intensity and luminance for machines. These functions are implemented as mathematical patterns in "ANPR Systems" (Automatic Numbers Plate Recognition) and represent a transformation between how the real world is observed and how information systems must store and handle that data. A camera, an image processor, an event logger memory, and a storage unit, as well as connectivity, make up the core hardware of these systems. In our project, we used photos of cars with license plates visible. The quality of license plate recognition software, including the recognition algorithms utilized, and the quality of image technology, including camera and illumination, are the two most important aspects of license plate recognition systems. In the ideal world, for extreme situations and severe problems with normal visibility, special cameras, such as infrared cameras, would be available for such an activity. Infrared cameras are considerably better at addressing these aims and achieving superior results.

# **Methadology**

The project is generally performed on Jupiter notebook which is an open-source web platform for making and sharing documents with real-time coding, equations, visualizations, and text. Firstly, the method we use in the project is reading the image by the help of a python library known as Open CV which helps us to analyses the images and apply different algorithms on the image and solve the computer vision problems and due to unclear image it will return a null matrix. Secondly, we have used a method which is known Edge Detection for detecting the number plates. Edge detection is an image processing approach for detecting item edges inside pictures. It operates by sensing brightness.  In domains like image analysis, computer vision, and object recognition, edge detection is utilized. Also, it is used for picture segmentation and data extraction. Moreover finally, we have used the technique of (Optical Character Recognition) known as OCR to extract the number from the plate which is they’re in the picture. It is the technical processing of images of composed, written, or printed text into computer text, whether from a scanned document, a file image, or a scenario.

# **Problems And Limitations**

The main problem in this project is that the image detection should be clear. If the number plate is filthy, dirty, unclear or in darkness the detection system would not work properly and it will not analyze and would not provide the expected results. Furthermore, we also have to face many limitations as in every different region or every different country has a different number plate style which will cause a barrier for the algorithm to analyze.

# **Conclusion**

Vehicle owner identification, vehicle model identification, traffic control, vehicle speed control, and vehicle location tracking can all be done with ANPR. It can also be used as a bilingual Recognition system to automatically detect the language of characters learning algorithm. It can provide a number of benefits, including traffic safety enforcement, security in the event of stolen car operation, ease of use, and immediate data availability to find for vehicle owner registration details. The majority of number plate recognition systems are designed to perform a single vehicle number plate, but in genuine, multiple vehicle numbers plates may be present while the pictures are being collected.