



# A New Approach for Registered Car Parking System

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**Abstract** — The recognition of car license plate for Registered parking system is important for identifying the car at the entrance of the parking because the car license plate has unique information for respective car. This paper proposes the recognition of car license plate for Registered parking system which is accurate and robust to environmental variation by using car license plate patterns according to motor vehicle regulation. In this project, the candidate's car license plate number is determined after 4 steps, precisely a plate localization sub-algorithm, a contrast-brightness normalization, a character segmentation sub algorithm, followed by [3] Optical character recognition algorithm.[3] The image acquisition technology determines the average image quality the license plate recognition algorithm has to work on.[5]Further after determination of License plate number , License Plate Number will validated against the entries in corresponding database to determine whether candidate's car belongs to which of the categories. Categories precisely are Host and Visitor. [1][7]Further, automated gate opening technology will be implemented using arduino uno 328p development board technology and unipolar stepper motor for entry of car which will be dependent on category of car.

*Optical Character Recognition (OCR), character segmentation, arduino uno 328p, Localization, edge- detection.*

## I INTRODUCTION

Registered Parking System is security mechanism which monitors the movement of automobiles through entry and exit of organisational premises and in doing so it plays a crucial role in providing security and thus takes care of safety issue of an organisation. This project mainly makes use of Automatic Car plate recognition method which is based on the concepts of Digital image processing which is implemented using MATLAB software, Database for validating the car's License plate number against the home Database and also of Arduino uno328p and Stepper motor which plays an important role in automated gate technology. We plan to create a working model of Registered Parking System using the concepts of Digital Image Processing, Database, arduino uno 328p and stepper motor.

## II Aims and Objectives

The main objective of our project is Security for Housing Societies. Now-a-days people have become aware of the need for better ways to protect occupants, assets, and buildings from human aggressors (e.g. disgruntled employees, criminals, vandals, lone active shooter, and Terrorists) .This is the reason why security guard has become *necessity* at condominium and apartment buildings. Security guard's job is to patrol and guard the inner and outer premises of the property. A security guard also needs to patrol the parking areas to ensure the visitor parking is not being abused, and that all entry and exit points on the premises are safe and secured. The aim of this project is to reduce the work of the security guard by automatically monitoring the vehicles entering the society thus providing improved and robust security mechanism. This can be done by verifying whether the car is registered. The registered car can be allowed to enter while the visitor car wont allowed to enter until further enquiry is done. We are also using automated gate opening system.

## III LITERATURE SURVEY

One of growing monitoring and security mechanism across the globe is License plate Recognition combined with technologies such as automated gate technology for use in either Organisational premises for Registered parking or at toll plaza for collection of fees. Seeing the current scenario, from the point of view of security this mechanism is going to gain a lot of positive response in near future. In the literature, many license plate detection algorithms have been proposed. Although license plate detection has been studied for many years, it is still a challenging task to detect license plates from different angles, partial occlusion, or multiple instances. License plate detection investigates an input image to identify some local patches containing license plates. Since a plate can exist anywhere in an image with various sizes, it is infeasible to check every pixel to locate it. Generally, it is preferable to extract some features from images and focus only on those pixels characterized by the license plate. Based on the involved features, traditional license plate detection methods can be classified into three categories: colour-based, edge-based, and texture-based. In what follows, we will review the related work in each category

Colour-based approaches are based on the observation that some countries have specific colours in their license plates. It is intuitive to extract license plates by locating their colours in the images the collocation of license plate colour and character colour is used to generate an edge image. Then, it checks neighbours of pixels with a value within the license plate colour range to find candidate license plate regions Edge-based approaches are the most popular, with reliable performance in license plate detection. Generally, as a prior, license plate is characterized by a rectangular shape with a specific aspect ratio, and can be extracted by checking all possible rectangles in the image kinds of traditional locating methods, some other approaches based on local features have been proposed recently.

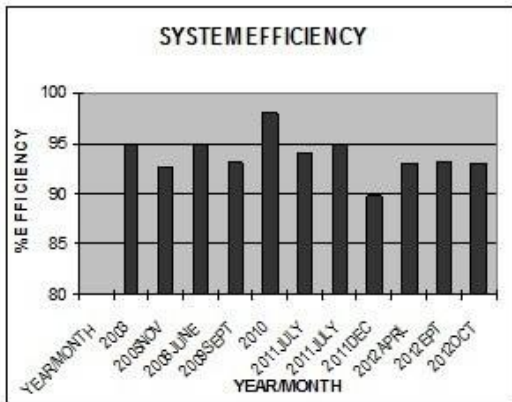


Figure 1- System Efficiency

#### IV PROPOSED SYSTEM

Our project deals with monitoring of movement of automobiles through the gate of an organisational premises/housing societies in order to enhance the security mechanism of the same along with reduction in manual work. Our proposed system first captures the image of automobile's license plate using the camera and extracts the license plate number using the concepts of digital image processing. Further it validates that license plate number against the home database to classify whether the automobiles belongs to which of the predefined categories that is a. **host** b. **visitor**. Further depending upon that automated gate technology will play its role that is if automobile belongs to host category then the gate will automatically get open and if automobile belongs to visitor category then the watchman will personally note down the details of the car and then gate will be opened. The automated gate technology will be implemented using the micro-controller and stepper motor.

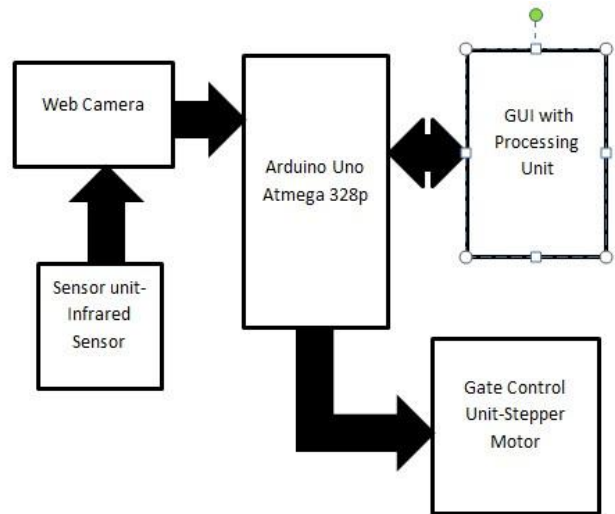


Figure 2- Proposed System

#### V METHODOLOGY

##### A. Sensor Circuitry

[2]We make use of Infrared sensor to detect the presence of car. The detection range for infrared sensor is around 20cm to 22 cm .Below this range it detects the obstacle and Provides a trigger to Web Camera. The sensor circuitry requires 5V supply



Figure 3- IR Sensor

##### B. Web Camera

The Web Camera comes into use after it gets input trigger from sensor circuitry .The Web Camera Captures the image of Car standing at distance as mentioned by sensor circuitry. The Web camera provides its output to matlab software for image processing.

### C. Matlab Processing

[3]Matlab Software is used to perform following operations such as image preprocessing, image segmentation , template creation and template matching (Optical Character Recognition Technique) and finally extracting the desired License plate number.

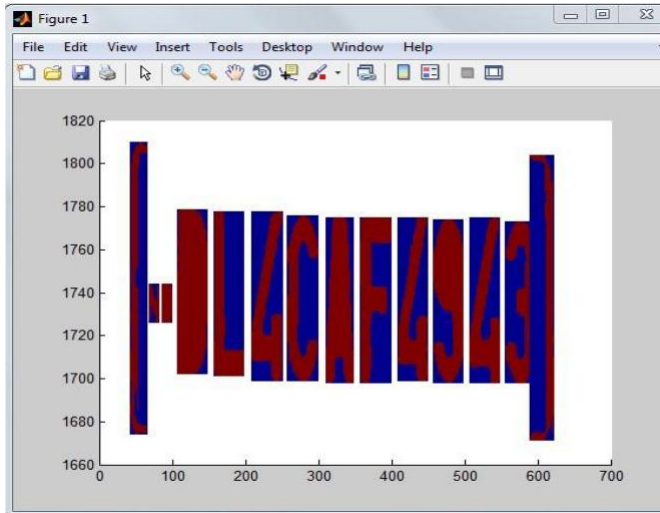


Figure 3- Matlab Output -Segmented Image



Figure 4 – Extracted License Plate Number

### D. GUI with Database Unit

[5]The Graphical User interface of the software first asks permission to enter the software which can be done using necessary credentials. Different forms are created for administrator as per the software requirements which include Registration, List of Registered Cars , Current status , History ,Visitor entry.



Figure 5 – Graphical User Interface



Figure 6- Graphical User Interface

### E. Arduino Uno Atmega 328p.

[1][7]Arduino is based on Atmega 328p which is used to trigger the web camera used for the project and also to control the stepper motor. [4]Arduino is connected to Stepper motor via ULN 2003a driver board. Circuit of the following is given below :

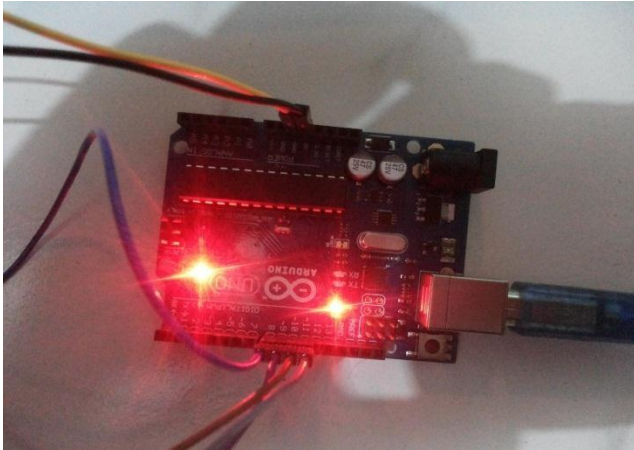


Figure 7 – Arduino Uno Atmega 328p

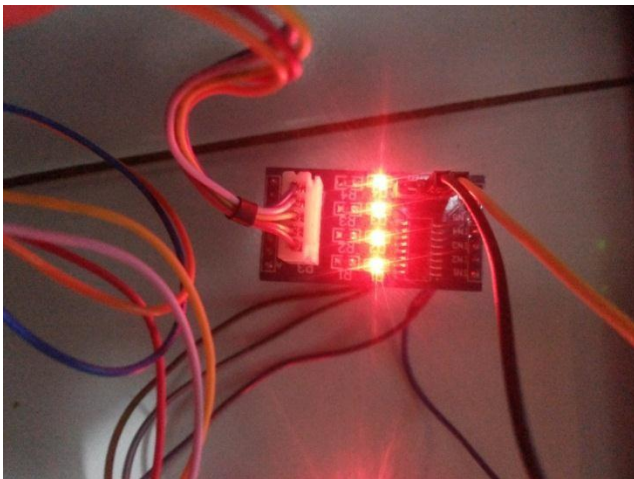


Figure 8 – ULN 2003a Driver Board

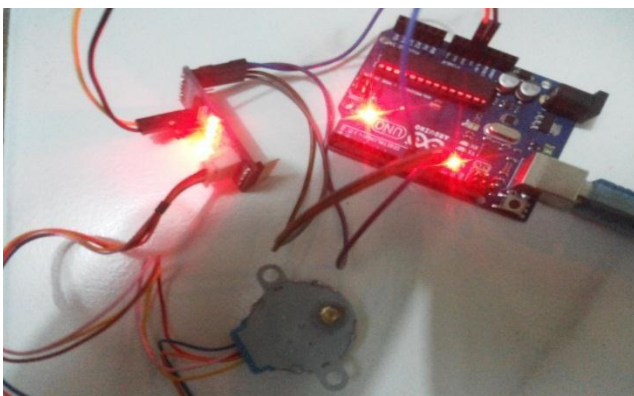


Figure 9 – Interfacing Stepper motor with Arduino Uno

## VI Conclusion and Future Scope

In this paper we have discussed the application which helps to enhance the security mechanism of residential complex and corporate using the technologies discussed as above.

This project has future scope where in system can be expanded to handle more than 1 entry point at the time and also the efficiency of Optical character recognition can be improved using various algorithm

## VII REFERENCES

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