

# Intelligent Parking Allotment System

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**Abstract** –The fact of increasing population causes many problems, one of them is parking of vehicles. Lack of space availability has always been a problem in urban areas and also in the major cities and to add to it there are cars parked callously on the streets that further limit the space. In the last two decades there has been tremendous change in the electronics business field. In today's fast developing world quality product and relationship with the customer becomes the basic essential need for every company. Every company takes the efforts to provide quality products for its customer satisfaction. To achieve this goal every company and management body have to adopt comfortable technology. "Intelligent Parking Allotment System" (I-PAS) is basically a data acquisition system which owns a multi-storeys parking space. It is an extremely user friendly and fully menu driven with additional features.

**Keywords:** Intelligent parking allotment system, Image processing, electronics business field, data acquisition, menu driven, comfortable technology.

## I. INTRODUCTION

Currently, the car parking is the increasing problem of our day-to-day life. Finding a space to park in the city is becoming difficult due to increase in number of vehicles. Also now-a-days the car parks do not have a systematic system. Most of them are manually manages and little inefficient. Time is the major factor which gets affected, while searching for available parking spaces. Users need to keep on circling the parking area until they find an empty parking space. This problem is generally faced in urban areas due to increasing number of population causing increase in number of vehicles too.



FIG NO. 1 CONGESTED CAR PARK

Due to roadside parking, most of the place is occupied

because of cars causing traffic on the road. With the growth of technology, the systems have been implemented to solve these problems of car parks. Many methods for detecting the available parking lots has been implemented, just to avoid the problem of space and wastage of time. The few existing studies had focused on the applications of car parking system using sensor technologies. I-PAS uses camera, which is used a sensor to detect the available lot in the parking area. The I-PAS system adopts cameras to collect the information in car parking field. I-PAS uses Image processing for the detection of parking lots. The camera used in this innovation uses two slots, i.e. one camera uses two slots for the detection of slots whether it is available or not.



FIG NO.2 SYSTEMATIC CAR PARK

MATLAB is used as software platform in this I-PAS process of car parks. LCD is also used; it will be displayed at the display unit. The seven segments display shows the number of current available parking lots in the parking area.

In this innovation it is required to sense empty space and the respective floor where the car should be parked. This must be done with the help of sensors so; various sensors that are available are temperature sensor, Infrared sensor, Touch sensor, UV sensor, proximity sensor, image sensor and acceleration sensor. Thus, for locating the floor in which the space is available, Infrared sensors are used to emit and/or for detection of infrared radiation, and also to sense a particular phase in the environment. It is easy to interface and is readily available in the market. Now, for detecting the space available in a particular floor, proximity sensors are used as it detects the presence of objects that are nearly located without any point of contact.

This system also required a camera for the movement and observation of cars in the parking slot which would be allotting the car. Many cameras are available for image processing but for low costing we will be using

webcam with high resolution. The whole process will be using a controller to control the whole system, for that a microcontroller is used.

## II. REQUIREMENT ANALYSIS

In this section, we describe the requirements of designing an intelligent car parking system. Although the conventional requirements of a car parking system can thus be easily satisfied. In the following we list, some important requirements of a car parking system.

The common goal for all car parks is to attract more drivers to use their facilities from the business aspect. Since, their basic facilities are required to fulfil the following conventional requirements:

- (a) The location of the car park should be such that it must be easily located on the street.
- (b) The entrance of the car parking lot should be easy to discover.
- (c) The number of parking lots should be satisfactory.
- (d) A parking lot should obtain a large space enough to park a car in.
- (e) Easy to exit and re-enter on foot.

However an intelligent car parking system should provide more comfort and automation to both the business and the customers. It should also satisfy the following requirements:

- (a) Cost of ownership should be low and simple.
- (b) Environmental protection should be provided by reducing vehicular emissions and energy savings.
- (c) Prevention of damages and safety should be provided, as well as dents to the car must be avoided while parking through narrow drive ways.
- (d) All types of car's and SUV'S should be easily accommodated.

In accordance with the above requirements, an intelligent car parking system should minimize human operations, so as to reduce the manpower and the loss from human mistakes.

## III. METHODOLOGY

This project is used mainly for the easy movement in the parking slot. We have used FIFO technique for our project. Once the car has entered into the parking area the sensor switch gets enabled and LCD displays the availability in parking slot. Camera at the entrance detects the car and records the timing and the tag to that car is given with respect to the time. Then the car is driven to its assigned slot. The camera on top the car is then on and keeps track of the movements of the car and the camera takes the image of the slot at every 10 minutes with a given buffer time. Once the camera detects that there is change in the image in slot it will check the tag time at the exit and display at the LCD will be given that the slot is empty and it is available for the next car. There are sensors also placed in every slot which is used as the option, also if in case of camera doesn't work. Industrial camera is used for this project so that we get a proper output. This is the ideal camera used for the detection and surveillance of the car. At the exit junction the car image is again captured and the slot in

which this car was allotted is made vacant and the charges process is done.

The function of each and every component is simple and is interfaced with the microcontroller. The sensor is used to send the input 0 & 1 to the controller and is used as an ON-OFF parameter and to sense the movement of the car. Multiplexer contains full on-chip decoding to select the desired data source from the sensor.

Microcontroller is the heart of the system which controls the working and the circuitry and also interfaces the display unit, smart card memory and energy measuring unit. The microcontroller gets all the inputs from the circuitry and it does working and displays it on the GLCD.

Graphical Liquid Crystal Display (GLCD) is a type of LCD which has graphic display. They are dot matrix display. They are used at component level in place of less efficient displays such as Cathode Ray Tubes (CRT's). It belongs to the class of no emissive technologies, or displays that do not generate light of their own but control the transmission or reflection of external light sources.

The block diagram of I-PAS is shown below. Sensors, camera, controller, display is used in this I-PAS project. In this block diagram there is a vital role of each and every component used. The Sensor here senses the car and activates the system. The sensor takes the input and gives it on the multiplexer which goes on to one of the serial port input of the microcontroller. Microcontroller is given two inputs one from the sensor and the other is from the camera; the sensors are connected to the system and other sensors in the parking facility with the help of ring topology method. In this method if the controller wants to know the input from a sensor then the multiplexer will give the input of the desired sensor by asking its status on the select line with specified address mentioned in the command. Using this method in us can get the results of the particular slots faster. Multiplexer IC 74151 is used. Multiplexer input is taken from the sensing switches which are simple ON-OFF switches.

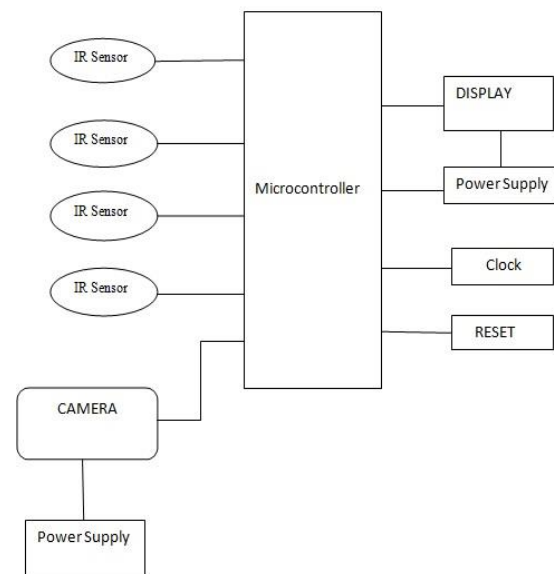


FIG NO. 3 BLOCK DIAGRAM OF I-PAS

The output of the mux is given to input port of the microcontroller. The cameras used in the project is also

connected to the controller with the help of star network topology as they are connected to each of the cameras for the better vision and working of the model. The display used is graphical LCD which is interfaced with the controller is a 8-bit data bus. The 8-bit data bus is used will require a total data lines. The three control lines are EN, RS and RW. Note that the EN line must be raised or lowered, before or after each instruction sent to the LCD regardless of whether that instruction is read or write. In short, you must always manipulate EN when communicating with the LCD. Port of the controller will be used as data line to connect data pins of LCD.

From the flowchart we can see that as the car enter the vicinity of the parking lot the LCD displays the total number of spaces available. The system is initialized and then the welcome message is shown to the user. The system then checks the vacant space in the 1<sup>st</sup> floor if the space is available the car is directed towards the 1<sup>st</sup> floor, If not it is forwarded to the next floor and so on. If the parking is full then the LCD displays parking is full.



FIG NO.5 PROPOSED MODEL

The main objective is to design the parking guidance and information system using image processing. By using the technique of image processing technique, the car is being identified only. The pros (advantages) of our model is mentioned as below

- (1) The parking system of I-PAS is secured and also saves the time.
- (2) It has well managed system with no confusions about parking places.
- (3) The innovation of I-PAS is also suitable for long and short hours of parking.
- (4) The amount of time spent in searching for a parking lot is reduced considerably.
- (5) Parking of illegal vehicles is reduced considerably
- (6) Use of cameras is a good way to allot and can be used as a security purpose.
- (7) The construction cost of multi-storey parking facility will increase.

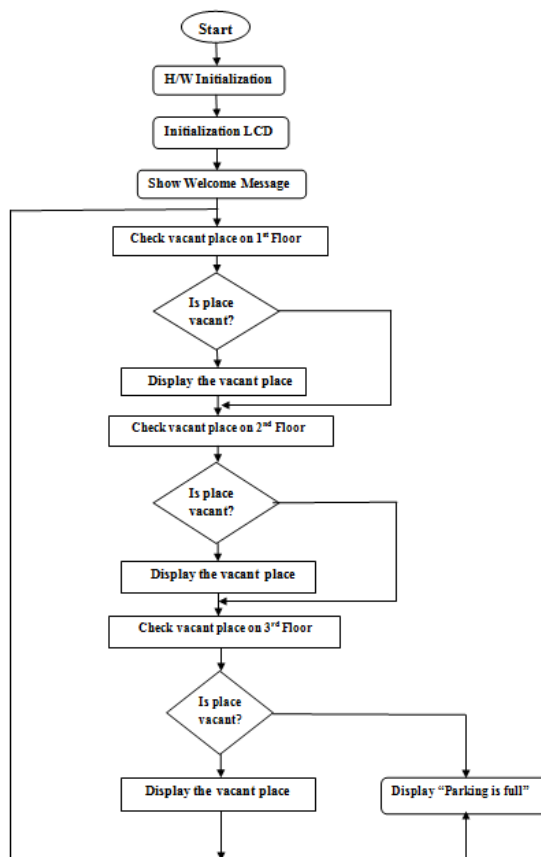


FIG NO.4FLOW CHART OF I-PAS

#### IV. PROS AND CONS FOR I-PAS

The proposed model for the I-PAS system is also shown as below.

#### V. CONCLUSION AND FUTURE SCOPE

This innovation is developed and the model made for the I-PAS system is convenient and makes life easy for the user. This model is rigid and is capable of holding all the components required for the safety of the system. The whole system uses the First come First serve method and it is most useful for this type of parking projects. Also, the car park system is required to provide higher accuracy, robustness and flexibility in operations, more convenience to customers, lower cost of operating and maintaining overall system. The time for searching the availability of parking lots has been eliminated by displaying the status of the parking lots at the entrance of the parking area. The integration of image processing have made it a smart system. The simulated results are obtained in the MATLAB and the number of vehicles is displayed in the LCD..

The scope of this project is to make the parking system easier, faster, convenient, and the most important parameter is time saving. This type of project can be used in the malls, corporate offices, etc. and thus parking problems can be avoided in India

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