Smart Parking Space Detection Using Image Processing

INTRODUCTION

Nowadays, car has become a necessity; it is no more a luxury especially for the working people. People even purchase car on installments. When talking about metropolitan, then traffic jams have become quite common recently during large number of vehicles. Also, we cannot deny the existence of the cars in our daily life. Whenever we go out by car, we face problems to find an available parking space.

When driver enters a certain parking lot, the first thing that he does is to look for some sign which tells whether the parking lot is fully occupied, partly occupied or vacant. , He also does not know how many parking slots are there and where to find a parking division for his car. Some of the parking divisions may remain unoccupied even when the total occupancy is high. This causes ineffective use ofparking divisions as well as traffics jams around the entrance of parking lot. Therefore, by offering drivers with relevant information about the parking lot while entering the parking lot becomes an important issue.

When driver enters a certain parking lot, the driver takes a long time just to find an available parking space. Counting Available Parking Space using Image Processing helps to solve the problem that the driver faces at low cost.

PROPOSED PARKING MODEL & METHODOLOGY

The main flow of the framework is shown in the Fig-I. Videos are acquired from the top view of the parking arena with the help of a fixed camera. Video is segmented into frames. Then from each segment a key frame is extracted and further processing is applied on this key frame, to reduce the computational complexity

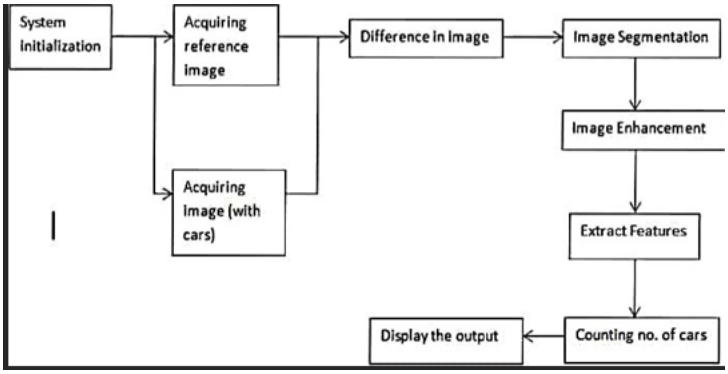


Fig-I: Block diagram

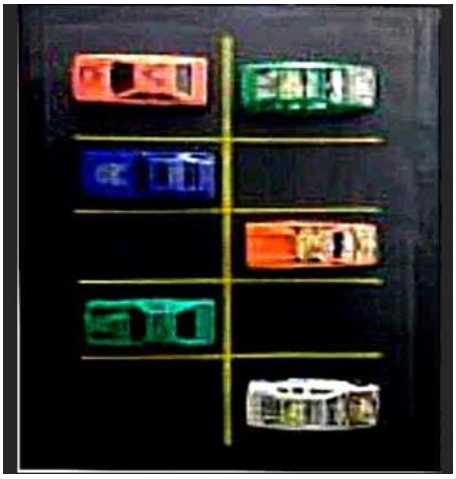
System Initialization

In the initial stage, a certain number of images are captured and their average is calculated to make an averaged background reference image. This reference image does not contain any cars. The main purpose is to identify the parking slots in the image. The camera which is used to take the images is fixed at a certain position and it faces a fixed direction all the time.

Fig-2: Empty parking lot

Image Acquisition

In this step, the picture of parking space containing cars is taken with the help of a high-definition camera. The image data is then supplied to the MATLAB software for further processing. [1] [2]



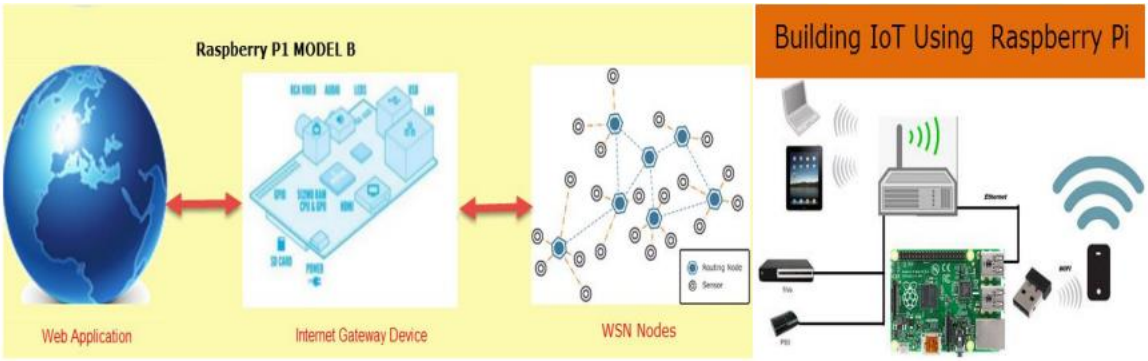
Parking lot with cars

Internet of Things (IOT) Using Raspberry Pi

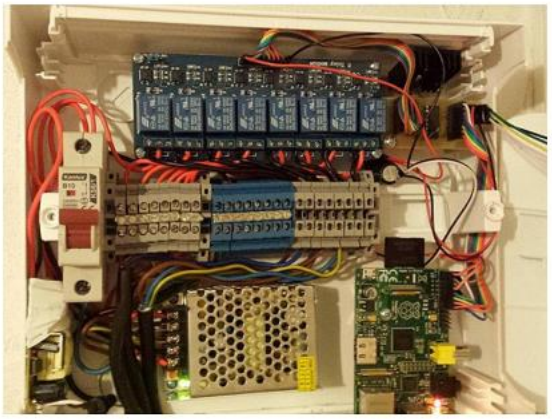
Internet of Things has been in development for decades and just in 1999 it is proposed in a conference. The first Internet appliance, for example, was a Coke machine at Carnegie Melon University in the early 1980s. The programmers might connect to the machine more to the internet, check the status of the machine and conclude whether or not there would be a cold drink pending on them, should they decide to make the trip down to the machine. This article gives an overview of IOT using Raspberry Pi.

Five steps are used in web applications

- Installing Apache Web server
- Create My SQL database system
- Developed web application For the GUI (Graphical User Interface)
- Write lots of PHP, JAVA script, CSS and Python Programs for the Web Application
- Host Web application on our Web server



IOT can help to perform any desired action like controlling a device or monitoring from a remote location. This technology makes equipment and machinery more digitized and connected. This technology is preferred even by the government to achieve better energy efficiency, a cleaner city and higher productivity. A few IOT projects for smart cities are baggage tracker, smart trash collector, smart energy meter reading and smart liquid level monitoring



Raspberry Pi performances The Raspberry Pi performances will be compared with following IoT prototype platforms (Fig. 3): Arduino – an open-source physical computing platform• based on a simple microcontroller board, and a development environment for writing software for the board (Fig. 3 a). It can receive input from variety of sensors and can affect its surroundings by controlling lights, motors, and other actuators. The microcontroller on the hardware board can be programmed using the Arduino programming language and the Arduino Integrated Development Environment (IDE). Arduino supports two working modes, stand-alone or connected to a computer via USB cable [3]

EXPERIMENTAL RESULTS

An intelligent parking lot detection system based on image processing have been tested and proposed in this paper. This results are included the sequences of the car park detection from empty lot (10 parking available) until the full parking lot. The system shows the number of availability of parking

CONCLUSION AND FUTURE WORK

The parking space detection system based on image processing in MATLAB was designed and tested. It is possible to manage large area by just using several cameras. It is consistent in detecting incoming cars because it uses actual car images. It is cheap and easy-installed because of the simple equipment. Drivers can get useful real-time parking lot information from this system by the guidance information display.