VISION BASED PARKING OCCUPATION WITH EMBEDDED PROCESSOR

P. Swathi[1]

,[1]Assistant professor, Dept of ECE PBR VITS Kavali, AP, India.
B Pavan Kumar[2], T Krupa Tejaswini[3], N Jashwanth[4], P Sampath[5], P Raja Mahendra[6]

Abstract - In recent times the concept of smart cities has gained grate popularity. Thanks to the evolution of Internet of things the idea of smart city now seems to be achievable. Consistent efforts are being made in the field of IoT in order to maximize the productivity and reliability of urban infrastructure. Problems such as, traffic congestion, limited car parking facilities and road safety are being addressed by IoT. In this project, we present an IoT based cloud integrated smart parking system. The proposed Smart Parking system consists of an on-site deployment of an IoT module that is used to monitor and signalize the state of availability of each single parking space. A mobile application is also provided that allows an end user to check the availability of parking space and book a parking slot accordingly. The project also describes a high-level view of the system architecture.

Index Terms IOT, Arduino, RFID reader, LCD, DC motor, PHP server

I. INTRODUCTION

Smart parking development implies an IoT-based system that sends data about free and occupied parking places via web/mobile application. The IoT-device, including sensors and microcontrollers, is located in each parking place. The user receives a live update about the availability of all parking places and chooses the best one. In order to investigate technologies behind the smart parking solution, we implemented an internal research project. The main idea was the creation of smart parking using the Internet of Things and ultrasonic sensors, where available parking places could be displayed in a web application. Billions of devices are able to connect through internet of things (IoT) at any time, in any place with various application. Searching for the free parking lot is one of the daily task for peoples of any country. The people waste a lot of their valuable time in searching for the parking lot. The main motive of this paper is to develop a system by which peoples can access the real time data about the presence of parking lot nearer to the user wherever they want. Integration [1] of networked sensor/actuator and radio frequency identification (RFID) technologies is explored to enable sophisticated services via the Internet in the emerging internet of things (IoT) context. In this paper [2], we present an IoT based cloud integrated smart parking system. The proposed Smart Parking system consists of an on-site deployment of an IoT module that is used to monitor and signalize the state of availability of each single parking space. A mobile application is also provided that allows an end user to check the availability of parking space and book a parking slot accordingly. **[3]**We develop a smart parking solution that uses a single low power wireless radio technology to seamlessly perform parked vehicle localization and transport of sensor data for use by a central management system.[4] In this paper, we present an IoT based cloud integrated smart parking system. The proposed Smart Parking system consists of an on-site deployment of an IoT module that is used to monitor and signalize the state of availability of each single 22 parking space parking space. A mobile application is also provided that allows an end user to check the availability of parking space and book a parking slot accordingly.

II PROPOSED SYSTEM

In this project presents a simple and effective method to easily identify the parking slots for that we are proposing a technology using Arduino and PHP Server. Here we are using web camera to detect the parking slot availability. Web camera is connected to the PC which has python software installed. If the slot is filled it display on LCD. RFID reader and Tags is for vehicle numbers, whenever the vehicle entered into parking Zone then gate will open after some time it will close again. 1st the person has to swipe the card then the in time will be taken. The slot data will be uploaded to the PHP server.
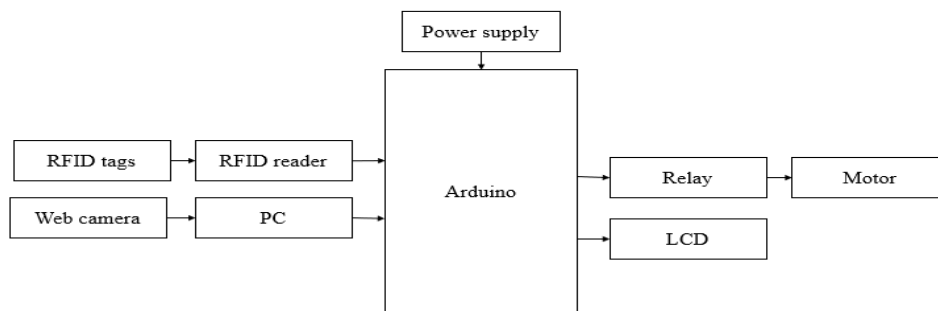
Figure 3-1: block diagram of proposed method

II(a) HARDWARE REQUIREMENTS

Arduino:

Arduino Uno is a very valuable addition in the electronics that consists of USB interface, 14 digital I/O pins, 6 analog pins, and Atmega328 microcontroller. It also supports serial communication using Tx and Rx pins.

There are many versions of Arduino boards introduced in the market like Arduino Uno, Arduino Due, Arduino Leonardo, Arduino Mega, however, most common versions are Arduino Uno and Arduino Mega. If you are planning to create a project relating to digital electronics, embedded system, robotics, or IoT, then using Arduino Uno would be the best, easy and most economical option.
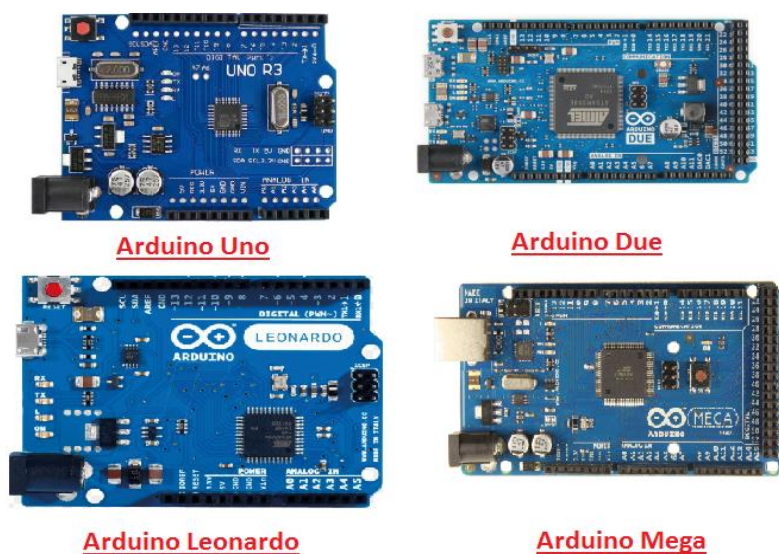

Figure 4-2: Types of arduino

Features of Arduino

- Arduino Uno comes with USB interface i.e. USB port is added on the board to develop serial communication with the computer.

- Atmega328 microcontroller is placed on the board that comes with a number of features like timers, counters, interrupts, PWM, CPU, I/O pins and based on a 16MHz clock that helps in producing more frequency and number of instructions per cycle.
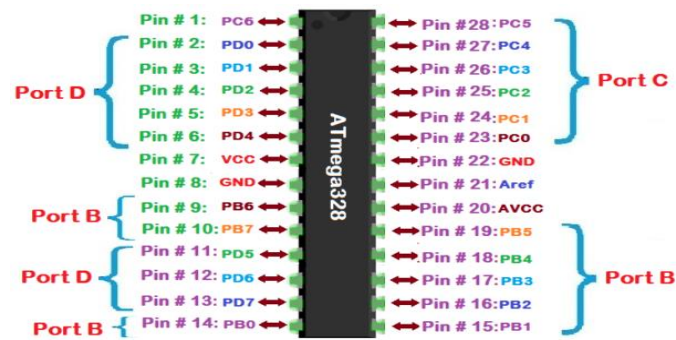
Atmega328 Microcontroller

Figure 4-3: Port Sections of Arduino

- It is an open source platform where anyone can modify and optimize the board based on the number of instructions and task they want to achieve.

- This board comes with a built-in regulation feature which keeps the voltage under control when the device is connected to the external device.

- Reset pin is added in the board that reset the whole board and takes the running program in the initial stage. This pin is useful when board hangs up in the middle of the running program; pushing this pin will clear everything up in the program and starts the program right from the beginning.

- There are 14 I/O digital and 6 analog pins incorporated in the board that allows the external connection with any circuit with the board. These pins provide the flexibility and ease of use to the external devices that can be connected through these pins. There is no hard and fast interface required to connect the devices to the board. Simply plug the external device into the pins of the board that are laid out on the board in the form of the header.

- The 6 analog pins are marked as A0 to A5 and come with a resolution of 10bits. These pins measure from 0 to 5V, however, they can be configured to the high range using analog Reference() function and AREF pin.

- 13KB of flash memory is used to store the number of instructions in the form of code.

- Only 5 V is required to turn the board on, which can be achieved directly using USB port or external adopter, however, it can support external power source up to 12 V which can be regulated and limit to 5 V or 3.3 V based on the requirement of the project.

III EXISTING METHOD

In an existing system, we have ultrasonic sensors and led. If the parking slot fill then that time the red led will glow and if the slot is empty then the green led will glow so that can easily identify which slot is empty.

Drawbacks

- Not advanced

- Not accurate method
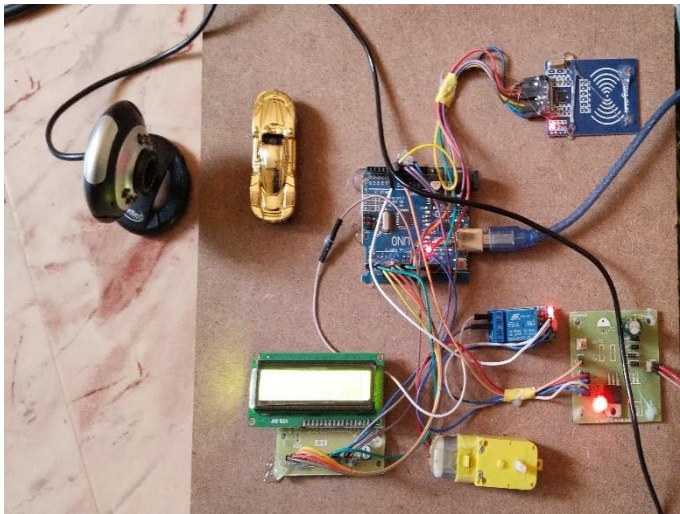
IV RESULTS AND DISCUSSION
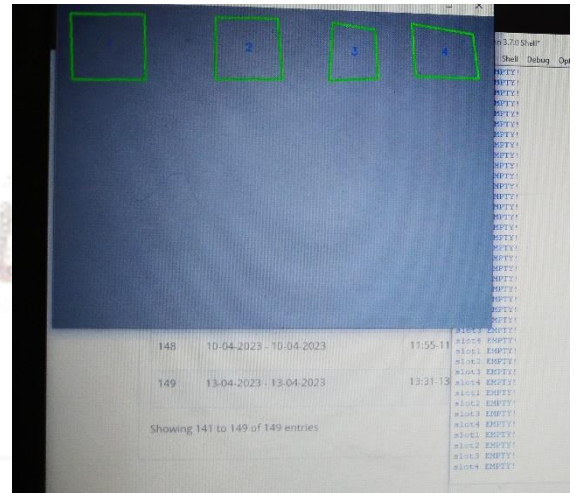

Fig 4.1: overview of project

Fig 4.2: slots are empty
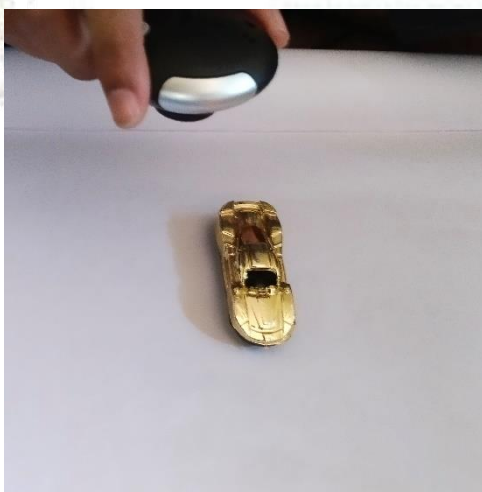

Fig 4.3: Automobile details in PHP server

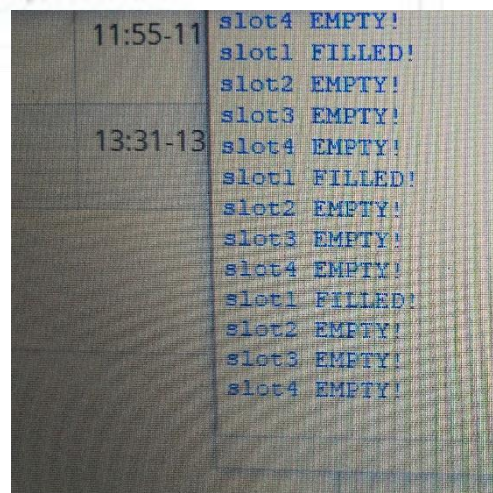Fig 4.4: webcam detecting the car
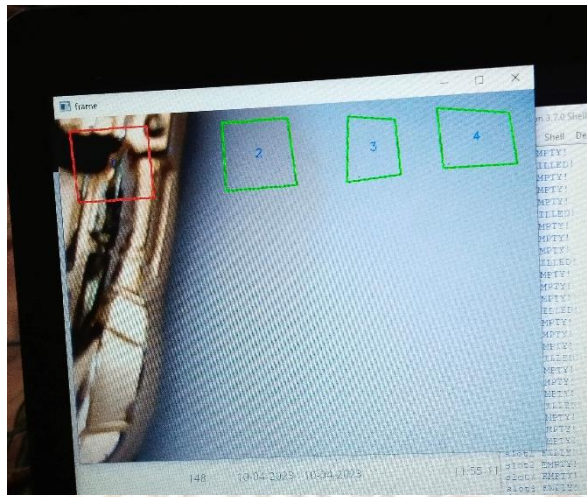

Fig 4.5: Displaying slot filling

Fig 4.6: slot detected by webcam

V CONCLUSION

The concept of Smart Cities have always been a dream for humanity. Since the past couple of years large advancements have been made in making smart cities a reality. The growth of Internet of Things and Cloud technologies have give rise to new possibilities in terms of smart cities. Smart parking facilities and traffic management systems have always been at the core of constructing smart cities. In this project, we address the issue of parking and IoT based Cloud integrated smart parking system. The system that we propose provides real time information regarding availability of parking slots in a parking area.

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