



# Data Base Assisted Car Parking System

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**ABSTRACT:** The main concept of this project is the designing of a RFID based system to implement payment based parking process through a card by RFID technology, which provides an ultimate solution for drivers and private parking owners. The proposed system uses Arduino mega kit and a java program to control the system. In this project, a set of IR sensors are interfaced to the microcontroller for detecting the entry and exit of a vehicle. A motor is interfaced to the microcontroller through a motor driving IC. The driver IC works in the principle of H-bridge circuit for the rotation of DC motor in clockwise and anti-clockwise directions for opening and closing the gate. There is a smoke sensor for detecting fire and a pump is placed for extinguishing fire. Whenever any vehicle enters into the gate for parking space, IR sensors detects the vehicle and system asks to swipe a card. LCD display is used for user interface. The details from the card are send to database controlled by the station via serial port. Once the card details and time is stored, the available slot details will be send back to the module and it will be displayed on LCD leads to the opening of the gate. When the vehicle exits from the parking slot, system ask to swipe the card and the details will be again send to database. The java program will then process the details and gives the details regarding the fee and balance amount back to the hardware module. The received details will be send to mobile phones via internet, so that the user will be able to know the balance in the card. So, this is an easy process for parking to reduce traffic in the parking lots of public places like theatres, multiplexes, large-scale industries and commercial enterprises.

**KEYWORDS:** RFID, Arduino microcontroller, PC.

## I. INTRODUCTION

Our proposed system consists of two sections; Hardware module and mobile application. The hardware module mainly consist of an Arduino Mega kit, LCD, Motor, IR sensors, Smoke sensor, pump, RFID Module.

The principal goal of the project was build a Radio Frequency Identification *System* (RFID) vehicle tracking device to provide a more user-friendly, affordable, and an efficient means to track vehicles accurately in a parking lot. Radio Frequency Identification (RFID) based parking entrance system becomes different and provides a more secure way to enter into the parking than traditional parking systems. As in traditional parking systems before entering into the parking the car is checked by the security guards, that whether a car belongs to that particular parking area or not, notes the vehicle registration number, and issued a slip or token due to which time is wasted and it still may not be the secure way.

Radio-Frequency Identification (RFID) technology has seen great advances in recent years. Due to its versatility and low cost of use in system implementations, the effect of RFID technology society is evident. RFID transmitters are attachable to vehicles, animals, people, shipments, merchandise in stores, among other things, fostering greater efficiency in the tracking and inventory control of products in a wide range of fields

In RFID based parking entrance system reader will detect the car, as the car will be 4-5m faraway from gate and guarantees whether the vehicles belongs to that parking area or not? This will ensure the entrance of only authorized vehicles, hence decreasing time consumed and ensuring high security.

## II. HARDWARE AND SOFTWARE

Here we mainly use RFID, Arduino microcontroller, IR sensor, LCD, LDR, LASER, pump, and motor as the hardware components. Now we can go in detail about each components.



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- 1) **Arduino:** The Arduino Mega is a microcontroller board, which has 54 digital input/output pins (of which 6 can be used as Pulse Width Modulation (PWM) outputs), 16 analog inputs, a 16 MHz ceramic resonator, a Universal Serial Bus (USB) connection, a power jack, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC to DC adapter or battery to get started [3].
- 2) **RFID Module:** Radio-Frequency Identification (RFID) is the wireless non-contact use of radio-frequency electromagnetic fields, for the purposes of identifying and tracking tags attached to objects. This is the ID-20LA, a very simple to use RFID reader module from Identifier (ID) Innovations. With a built in antenna, the only hold up is the 2mm pin spacing. Power the module, hold up a 125 kHz card, and get a serial string output containing the unique ID of the card. The new ID-20LA is essentially the same as the older ID-20, but has a lower input voltage. RFID reader is devices that convert radio waves from RFID tags into a digital format that can be transferred to middle ware software. A RFID tag reader uses antenna to communicate with the RFID chip in the tag [1]
- 3) **LCD:** A liquid crystal display is a thin, flat panel used for electronically displaying information such as text, images, and moving pictures. Among its major features are its lightweight construction, its portability, and its ability to be produced in much larger screen sizes than are practical for the construction of cathode ray tube (CRT) display technology. Its low electrical power consumption enables it to be used in battery-powered electronic equipment. We use 16\*2 LCD.[3]
- 4) **IR SENSOR:** It is used to detect the vehicles. Here using IR transmitter &IR receiver leds
- 5) **MOTOR:** DC motor is used to control the gate at the entry and exit. so the driver IC L293D is used to drive the motor. And another motor is also used to drive the pump whenever there is a fire detection
- 6) **The Arduino IDE** itself is written in Java, and it can communicate to the serial port via the RXTX Java library. That library is very similar to the Java Communications API extension. Internally the IDE remembers which port and baud rate you used last time. Unfortunately that internal implementation cannot be considered public API you can reliably use. So you will have to keep your own settings to remember which COM port your Arduino card is using.
- 7) Java uses something called JDBC (Java Database Connectivity) to connect to databases. There's a JDBC API, which is the programming part, and a JDBC Driver Manager, which your programs use to connect to the database.

### III. BLOCK DIAGRAM

Here the smoke sensor attached in the parking area continuously monitors the smoke/fire and it will automatically switch the pump which works as a fire extinguisher. When the car reaches the parking area, the IR sensors automatically detect the arrival of the vehicle.

Then the driver will be requested to swipe his RFID card to get the details of his ID. The RFID reader will now obtain the ID from the card and it will send to the Arduino module for further process. It is then send to the PC over the serial port and with the help of a java program a database is created using SQL. The entry time is obtained from the computer. During the exit time, driver needs to swipe the card again in order to pay the parking fees. The database consist of the ID, entry time, available balance, slot used, exit time, time extend parked and the new balance.

When exit time is obtained, java program will calculate the exit time and will deduct the fees from the prepaid card and the details regarding the parking fees and balance will send back to the Module. Now the user can see the hours, fees and balance in the card as the using java platform sends the message to the card holder. The gate will open for the user to leave. The whole working of the hardware module is controlled by the Arduino Mega Kit. And the system is comparatively simple and user friendly than the existing one.

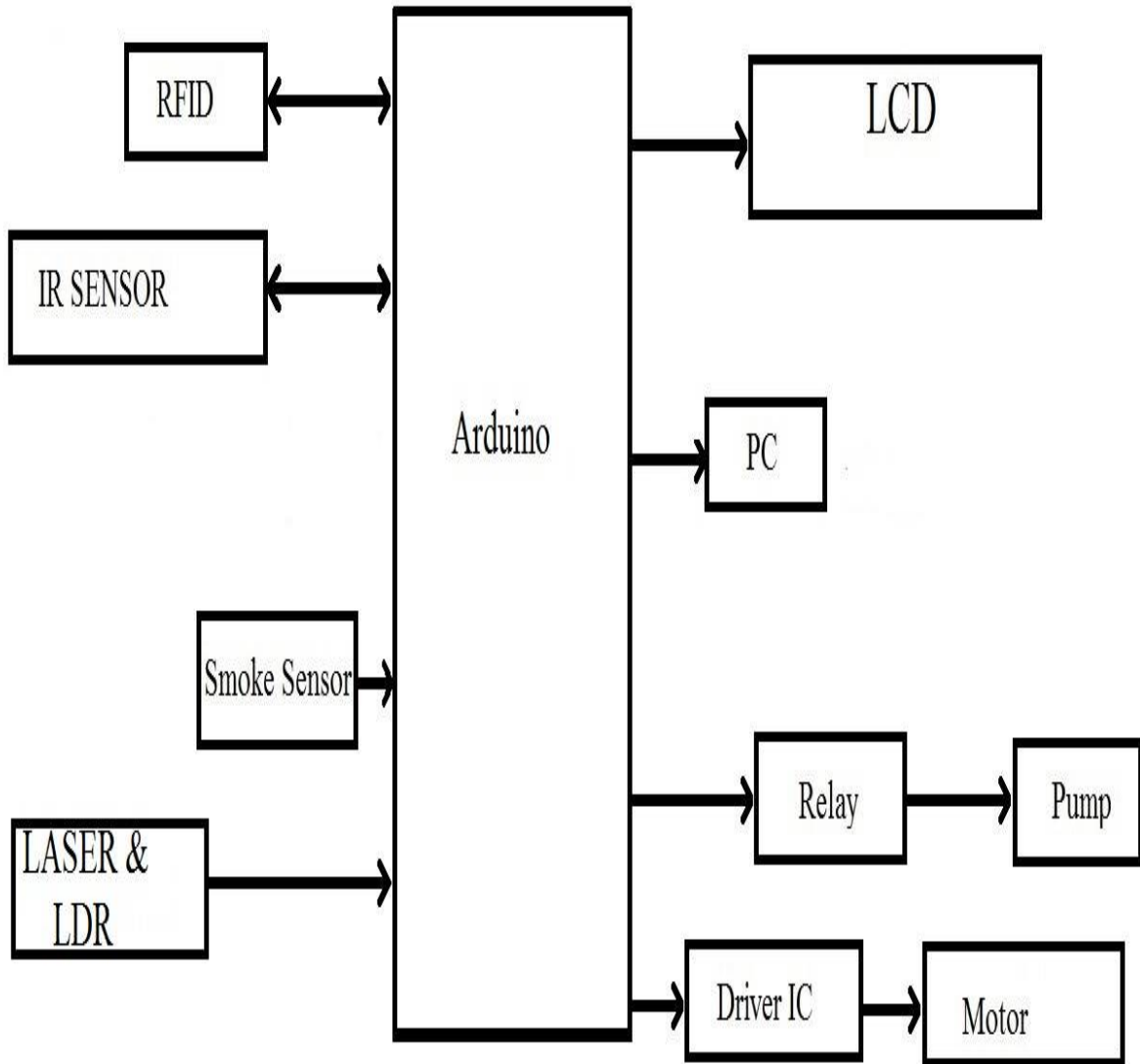


Fig. 1: Block diagram

#### IV. SIMULATION RESULTS

Figure 2 showing the simulation results. In this the system that we have used to swipe card, then the LCD display vacant slots and the gate is opened, fire is continuously monitoring. Then the driver will be requested to swipe his RFID card to get the details of his ID. The RFID reader will now obtain the ID from the card

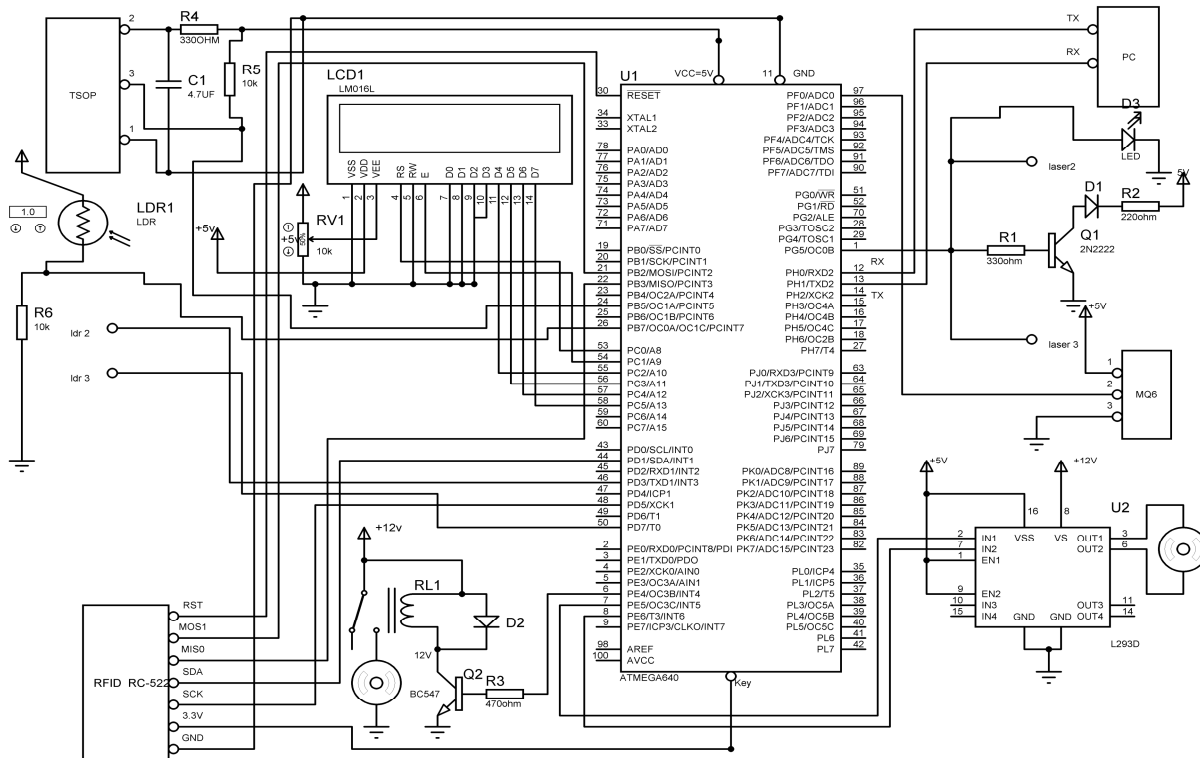


Fig 2: Simulation Results

### V. ADVANTAGES

It can be read at distances of one hundred feet or more, greatly improving the utility of the device. It may have other sensors that can use electricity for power. The system provides Vehicle security .It help to utilize the available space and saves a lot of time. The system provides parking guidance, protection from fire and there is no risk of robbery.

### VI. CONCLUSION

The project offered us lots of services we need to keep up with this age such as: saving time and effort, solving problem of illegal parking, reduction of traffic jam and offering more safety parking which have high technique that helps to prevent accidents. This system continuously monitoring the fire or smoke inside the slot. System is giving a parking assistance inside the slot.

### REFERENCES

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