

A Noval Approach for Intelligent Car Parking System

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Abstract: People are facing problems during parking their vehicles in the parking slot. The existing parking system cannot be affordable to our flexibility. Our proposed system based on sensor network categorizes the cars based on its length and track the parking slot. The car's image is compared with image stored in database. According to its length, slot would be allotted for each car that enters with a display message in the LCD. The proposed system reduces time consumption as well fuel and carbon footprints in the atmosphere. This system detects vehicles in indoor and outdoor fields, accurately.

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I. Introduction

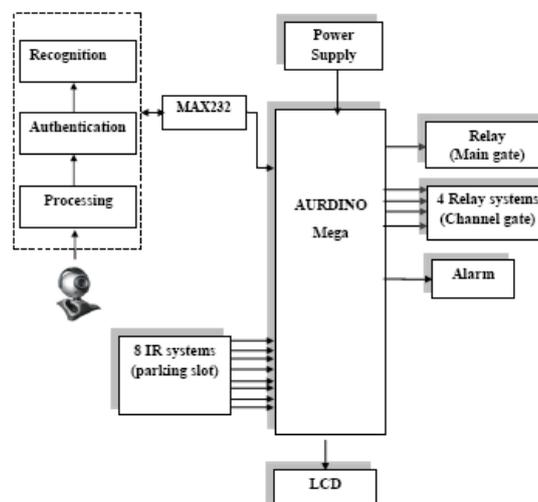
In this system the advanced sensors network are used to find the free slot and display the data in the LCD. It automatically transmit the real time parking space availability data to the knowledge of users. The exiting parking system cannot use the active information exchanging, It does not provide useful Parking information to drivers. The proposed system really do the magic that it captures the length of the car as an image and process it. As per it length gate opens and the slot in which it has to be parked is mentioned. If the slots are occupied, a message will be displayed using LCD. The major software used in this system is Embedded C and ARDUINO IDE.

II. Existing System

There is no automatic system to monitor slot and allot the free slot to the vehicles in the shopping mall and others places according to their length. The following are the drawbacks of the existing system.

- The man power is required.
- There is no any device to display or send the information.
- Collision may occur.

III. Block Diagram



IV. Hardware Requirements

- ARDUINO Mega
- Alarm
- Relays(5)

- IR Sensor(8)
- LCD Display
- Power section

AURDINO Mega

The mega 2560 is a microcontroller Board based on the ATmega2560 .It has 54 digital I/O pins,16 analog inputs ,4 UARTs (hardware serial ports), a 16 MHZ crystal oscillator, a USB connections, a power jack, an ICSP header, and reset button. This board compatible with most shields a designed for the Uno and the former boards Duemilanove or Diecimila.

TECHNICAL SPECIFICATION

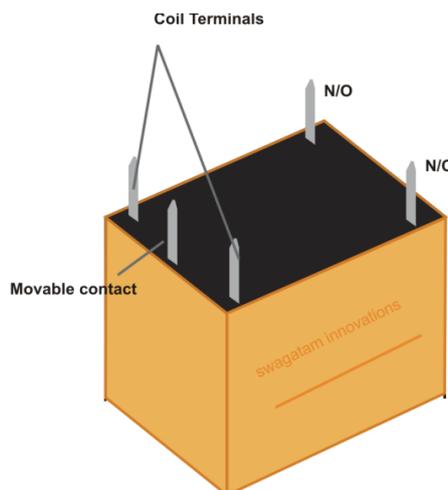
Operating voltage	5V
Input voltage(recommended)	7-12 V
DC current per I/O pin	20Ma
DC current for 3.3V pin	50Ma
Flash memory	256 KB of which 8 KB used by boot loader
SRAM, EEPROM	8KB, 4KB
Length, width	101.52mm, 53.3mm
LED_BUILTIN, Weight	13, 37gm

BOARD PROGRAMMING:

This Mega 2560 board can be programmed with AURDINO software(IDE).The AT mega 2560 comes preprogrammed with a boot loader to upload new code without the use of an external hardware programmer. It is also programmed by Arduino ISP.The firmware source code is available in the Arduinio repository and is loaded with a DFU boot loader.

RELAY

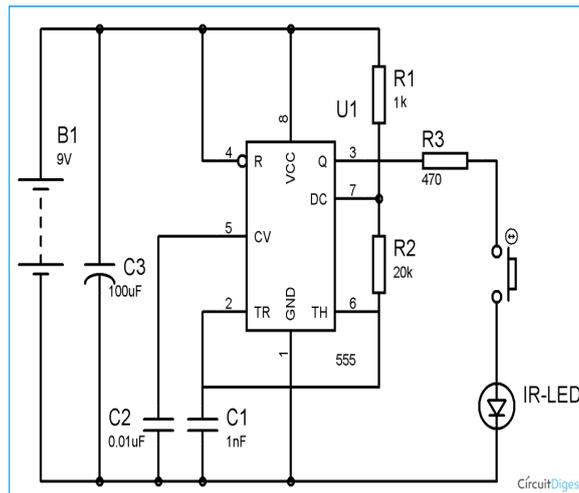
The control circuit functions as the coupling between the input and output circuits. In electromechanical relays, the coil accomplishes this function. A relays Output Circuit is the portion of the relay that switches on the load and performs the same function as the mechanical contacts of electromechanical relays.



Relays are switches that open and close circuits electromechanically or electronically. They control one electrical circuit by opening and closing contacts in another circuit. When a relay contact is normally open (NO), there is an open contact when the relay is not energized.

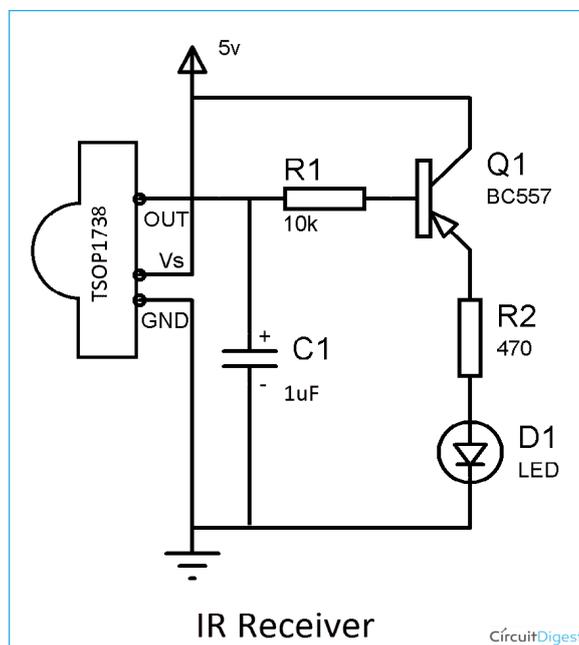
IR TRANSMITTER:

This IR transmitter sends 38 KHZ (frequency can be adjusted using R2). IR carries at around 38 KHZ carrier frequencies are widely used in TV remote controlling and ICs for receiving these signals are quite easily available. IR transmitter constructed by using IC555 timers and mode of operation under a stable multivibrator. Formula frequency, $T=0.69(Ra+2Rb)C$



IR RECEIVER:

This is a very small IR receiver based on the TSOP1738 receiver. This receiver has all the filtering and 38 KHZ demodulation built into the unit. Simply point an IR remote at the receiver, a stream of 1s and 0s out of the data from IR transmitter and TSOP capable of receiver only 38 KHZ frequency because in surrounding so many devices transmitting IR signal at different frequency so we constructed receiver to receive at 38 KHZ frequency only and output of IR receiver given to microcontroller.



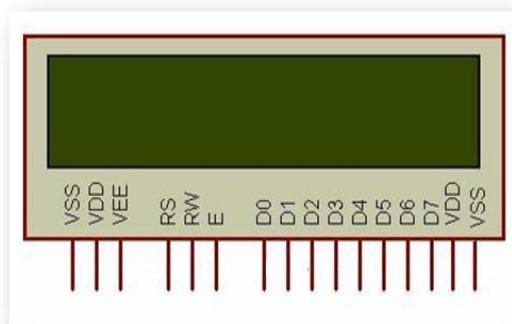
LCD:

LCD(Liquid crystal display) screen is an electronic display module. A 16x2 LCD display is a very basic module and is commonly used in various devices and circuits. This modules are preferred over 7 segments and other multi segments LEDs. The reasons being:

- LCDs are economical
- Easily programmable
- Have no limitation of displaying special and custom characters.

A 16x2 LCD means it can display 16 characters per line and there are two such lines. In this LCD each character is displayed in 5x7 pixel matrix. This LCD has 2 registers namely, command and data. The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing it's screen, setting the cursor position , controlling display etc...The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the LCD.

PIN DIAGRAM:



PIN NO	NAME	DESCRIPTION
Pin no 1	D7	Data bus line 7(MSB)
Pin no 2	D6	Data bus line 6
Pin no 3	D5	Data bus line 5
Pin no 4	D4	Data bus line 4
Pin no 5	D3	Data bus line 3
Pin no 6	D2	Data bus line 2
Pin no 7	D1	Data bus line 1
Pin no 8	D0	Data bus line 0(LSB)
Pin no 9	EN 1	Enable signal for load 0 and 1
Pin no 10	R/W	0=Write to LCD module 1=Read from LCD Module.
Pin no 11	RS	0=Instruction input 1=Data input
Pin no 12	VEE	Contrast adjust
Pin no 13	VSS	Power supply(GND)
Pin no 14	VCC	Power supply(+5V)
Pin no 15	EN 2	Enable signal for load 2 and 3
Pin no 16	NC	Not connected

WEB CAMERA:

Web camera uses one or more video cameras to transmit and sometimes audio images to a monitor, set of monitors or video recorder. Most wireless WEB CAMERA cameras use the 2.4 Gigahertz frequencies to transmit their video images to a monitor or DVR(digital video recorder).

Wireless Web cameras used at this frequency can easily transmit through most walls and obstacles; however each individual location will have its own operating limits.



V. Working Principle

In this proposed system, the parking system consists of energy gate relay and 4 gate relays and IR sensors for length detection and parking slot detection. As soon as a car stands in front of the entry gate, the line sensors detects the length and opens the appropriate gate for parking a particular length of car, and detects the number of parking slots free for that particular length of car.

VI. Software Requirements

- Embedded C
- ARDUNIO IDE

Embedded C: C is the most widely used programming language for embedded processors/controllers. Assembly is also used but mainly to implement those portions of the code where very high timing accuracy, code size efficiency are prime requirements. The wide acceptance of C in the embedded system, makes their importance in compilers & cross compilers, ICE.

ARDUNIO IDE: The Arduino /Genuino Uno can be programmed with the (Arduino software (IDE)). AT mega 328 can be programmed the microcontroller through the ICSP (In-Circuit Serial Programming) header using Arduino ISP .

VII. Advantages Of Smart Parking System

Smart parking is the one of the most adopted and fastest growing smart city solution across the world. Airports, shopping mall, universities and city garages are the few entities that realized the benefits of the automated parking technology. Here are the some of the benefits,

- **Optimized parking-** users find the best spot available, saving time, resources and effort.
- **Reduced pollution-**This system will significantly decreases the driving time, thus lowering the amount of daily emission and ultimately reducing the global carbon footprint.
- **Decreased Management Cost-**More automation and less manual activities saves the labor cost and resource exhaustion.

VIII. Disadvantages

Deterioration and Maintenance-Multi-story parking system supports hundreds of thousands of pounds of vehicles, people, and equipment every day. Because the garages supports very large amount of weights and loads that change constantly, the structure get quickly deteriorate in the absence of constant maintenance activity.

Parking Angle Consideration- The two way traffic in multi story garage presence a number of parking challenges for drivers and designers. Parallel parking and straight parking are not efficient for some drivers. Angled paring parking do not work well with a two way traffic flow and can only work well in garages with separate entrance and exit openings.

IX. Applications

By virtue of their relatively smaller volume and mechanized parking system, APS are often used in locations where multi-storey parking garage would be too large , too costly or impractical. This proposed system can be implemented in the following places where great structures and irregularly shaped areas are involved. Some of the places are,

- Shopping mall
- Airports
- Theaters
- Universities
- Crowded area.

PICTORIAL EXAMPLE

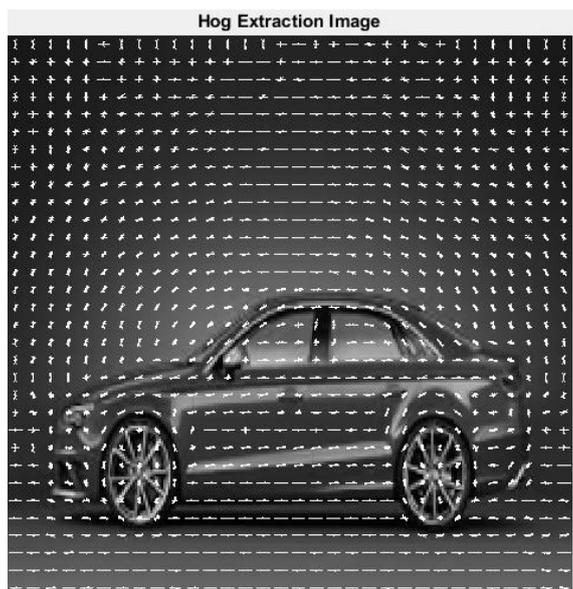
The following pictures depicts the processing of the smart parking proposed system. The input image of the car.



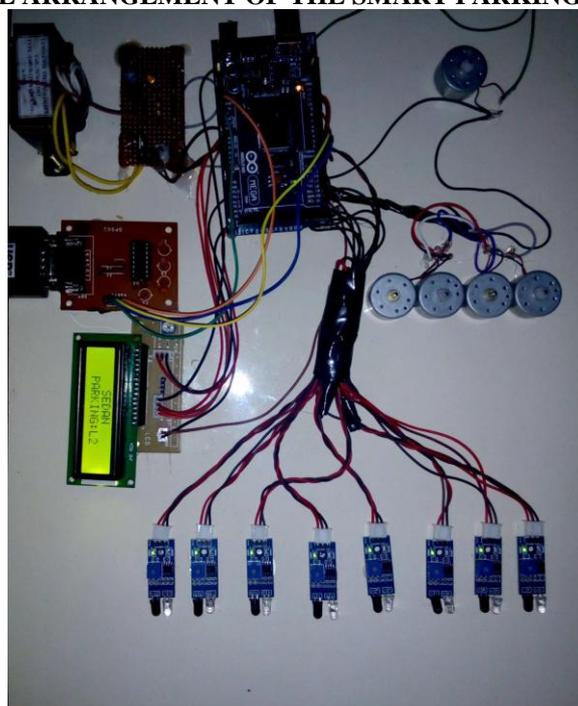
The image that is captured by the proposed system from the original image.



The image is compared with the image in the data base of our smart parking system. The extracted image is displayed in the following pattern.



OVERALL ARRANGEMENT OF THE SMART PARKING SYSTEM:



References

- [1]. "A Time and Energy Efficient Parking System Using ZigBee Communication Protocol" by Abu Asaduzzaman and Kishore K Chidella and Muhammad F.Mirdha (2015).
- [2]. "Traffic Information Acquisition System With Ultrasonic Sensors in Wireless Sensors Network" by YoungtaeJo, Jinsup Choi and Inbum Jung (2014).
- [3]. "Introduction of Intelligent Vehicle Detection sensors ,Intelligent Transportation systems" by T. Matsuo,Y. Kaneko and M.Matano.709-713,1999.

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