International Journal of Education and Science Research Review
ISSN 2348-6457
Volume-2, Issue-2
April- 2015
www.ijesrr.org
Email- editor@ijesrr.org

Self Sustained Intelligent Parking System

Shreshth Mohan, Khushal Pachory
B Tech Students
Department of Electronics and Communication Engineering
SRM University
Modinagar, Ghaziabad

ABSTRACT
Nowadays parking has become such a hazel in our lives. In present scenario there are more cars than the available space to park. Even if the space is available the navigation to that space is a problem again. Even in multi level parking areas people face problem on where to park their car if guard assistance is not present. And moreover these multi level parking consume a lot of energy. So the cost of parking in such areas is even higher than regular MCD parking. So we have to develop a concept in which the parking will be hazel free and the establishment cost and the operational cost is low.

In this paper, an Intelligent Parking System is proposed which not only will help the public in parking their car but will also reduce the operational cost of such multi level parking buildings thereby decreasing the parking cost. In this the car will be able to see the desired parking slot with the help of LED lamps attached to the roof which will go off as soon as the car is parked at that particular spot. To reduce the operational cost we will use some re usable sources of energy to power our multi-parking building. Keeping in mind the future aspect and more and more use of CNG and LPG as a fuel we have incorporated gas leak detector which detects gas leakage and switches on the exhaust fans.

Keywords— Parking system, Reed Senors, LCD,LED, Gas sensors

I. INTRODUCTION

In this project we have multi level parking with self sustained energy generation and consumption. We have also made a provision of using the AC power supply in case of failure by DC stored energy source. The re usable power supply is generated by means of solar panel, wind tower. Design and Implementation of Domestic Solar-Wind Hybrid Energy System Hybrid systems are the ones that use more than one energy resources. Integration of systems (wind and solar) has more influence in terms of electric power production. Such systems are called as "hybrid systems. We also use Rack pinion under speed breakers, and piezoelectric material sandwiched between rubbers. As rubber has higher static coefficient of friction it will slow down the car quickly on the ramps.

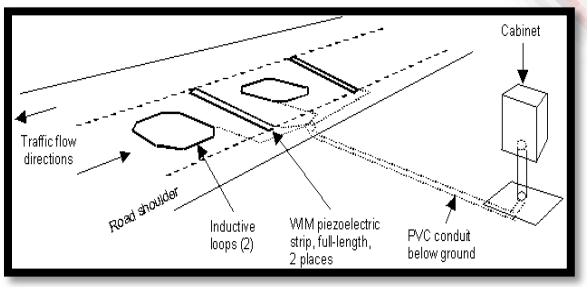

Fig 1. Display of Piezo electric material in road

We enter the parking area with the help of IR sensor which are connected to the gates which are connected to a DC-motor. This motor governs the opening and closing of gates. There is LCD display to show car parking slot availability .We use magnetic switches connected to LCD display via microcontroller to show vacant parking spot. This part is for the outside building. Now as the car enters the parking area it needs to navigate itself to find the available spot. Here comes the idea of intelligent parking. We use red glowing LED light attached to the roof to indicate the vacant spot and no light to indicate the occupied spot. The lights in parking are divided in section so when car parking have less traffic less light glow hence the intensity of light is regulated. There by saving the energy. Besides this we have kept in mind the future safety aspect so we have installed a gas exhaust system to avoid leakage of CNG or LPG in parking area. If leakage occurs then the entry gate won't open for car entry and display will also show a gas leak warning status to alert the public. In addition to that this system will automatically switches on the exhaust fans

I. BLOCK PRESENTATION

Here we have taken both D.C or A.C power as input depends on availibily. The switching of AC or DC is governed by the power grid. The DC source is in the battery which is charged by the hybrid energy (solar+wind), piezo electric materia and rack and pinion joint. Infrared detectors are used which are connected to gate for entering in parking area. This gate is further conected to a DC-motor which in turn is connected to microcontroller via darlington pair. We use reed sensors attached at ground connected at port 1 of the micro conroller. Ouput of magnetic swith taken and show by LED and display on LCD. The LCD Display shows the available parking slots to the person whose comimg for parking. LCD output shows the the available parking slot outside the buliding. Reset switch is given which is conected to RC circuit to give manual reset option. We are also using gas sensors to avoid any accident caused by the gas leak. This gas sensor is connected to the micro- controller at the input. The output of the micro- controller is connected is connected the exhaust fans. The mirocontroller comapres the input and gives the output signal which drives the exhaust fans.

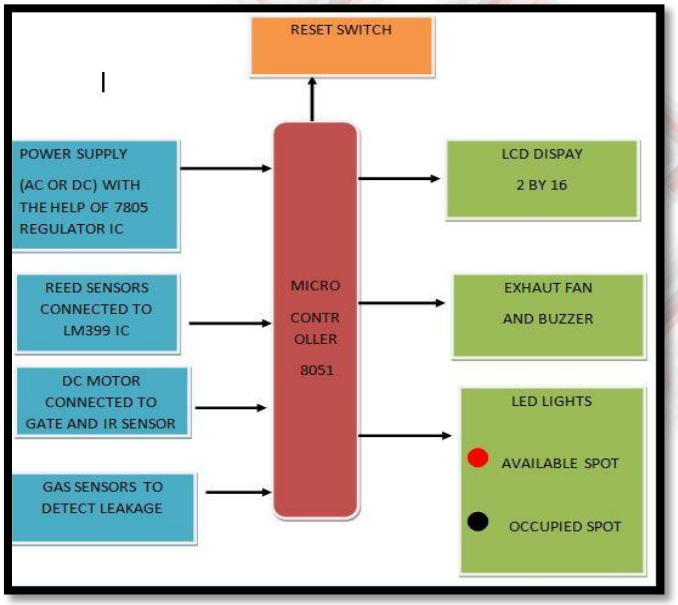

Fig 2. Block Diagram of Project

II. CIRCUIT DIAGRAM

In the above circuit diagram we have used one step down transformer to step down the voltage from 220 volt AC to 9 volt AC. Output of this step down transformer is further connected to the rectifier circuit. Rectifier circuit converts the AC voltage into dc voltage. For this conversion we use two diodes as a rectifier. Output of this rectifier is further connected to the filter capacitor circuit. Capacitor converts the pulsating DC into smooth DC. Output of the rectifier is now connected to the 7805 regulator circuit. The regulator provides a 5 volt

regulated output to the circuit. This constant 5 volt is given to the micro controller circuit. Pin no 40 of the controller is connected to the positive supply (5 V). Pin no 20 is connected to the ground pin. Pin no 9 is reset pin and connected to external capacitor and resistance to provide a power on reset logic. Pin no 18 and 19 is connected to the external crystal oscillator to provide a clock pulse to the controller circuit. Input infra red sensor is connected to the P3.0 via op-amp circuit. Here we use IC LM 339 to compare the input signal from photodiode and reconnected to the micro-controller. Here we use two infra red sensors, one for the entry and second for the exit. As the beam is interrupted photodiode provide a signal to the op-amp which is connected to the micro-controller circuit. Upon this the micro-controller circuit checks the availability of the parking space. If the space is available then micro-controller shows the message on the LCD and immediate open the gate and close the gate after some time. For parking position monitor we use reed sensors for activation. When the reed sensor is activated then sensor provides a signal to the controller and controller switch on a specific LED. For opening and closing of gate we use DC motor.

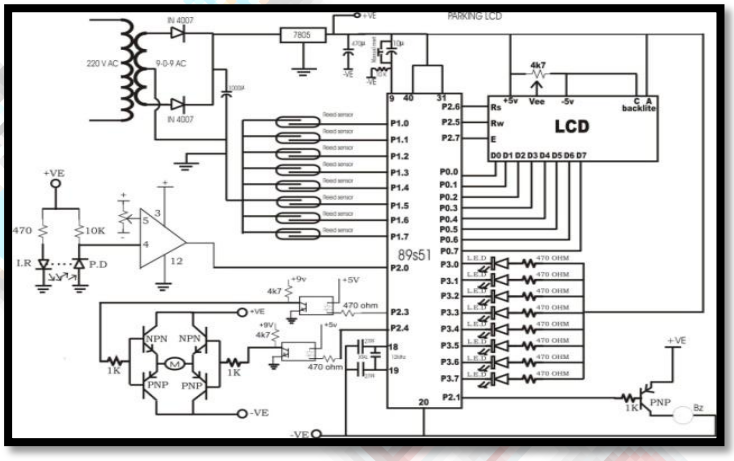

Fig 3. Circuit Diagram of Project

A. POWER SOURCE

This DC power source will be generated with the help of non conventional source of energy and stored in form of a battery. The non conventional sources used here are domestic solar-wind hybrid energy system and piezo electric system. The concept of solar-wind hybrid system is given in Fig4. Photovoltaic solar panels and small wind turbines depend on climate and weather conditions. Therefore, neither solar nor wind power is sufficient alone. A number of renewable energy expert claims to have a satisfactory hybrid energy resource if both wind and solar power are integrated within a unique body. In the summer time, when sun beams are strong enough, wind velocity is relatively small. In the winter time, when sunny days are relatively shorter, wind velocity is high on the contrast. So all round the year the total energy generated will be near about constant. Second is piezo electric source. The piezoelectric effect is understood as the linear electromechanical interaction between the mechanical and the electrical state in crystalline materials with no inversion symmetry. This project is a combination of two logical thinking in this project. First is to charge the battery with the help of re usable energy. And second is to show the level of battery charged with the help of few LED so that we can check the status of the available battery. AC supply option is also provided in case the DC supply is not sufficient.

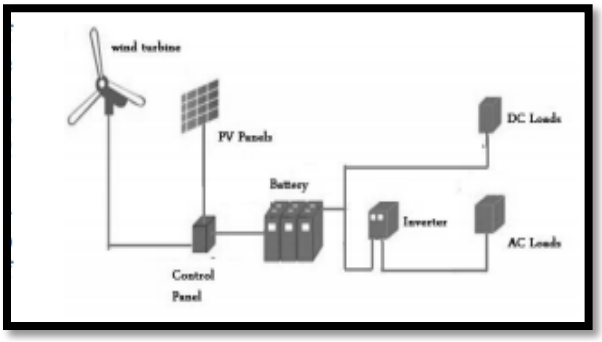

Fig4. Solar-Wind Hybrid System

B. WORKING OF GAS SENSORS

Gas sensors with IC 555 timer are incorporated keeping in mind the future fuel of cars. With this we monitor the gas leakage from any car parked in the building. Upon detection it will automatically switch on exhaust fans for ventilation and buzzer will go on indicating emergency. During this period the entry gates will not open for parking.

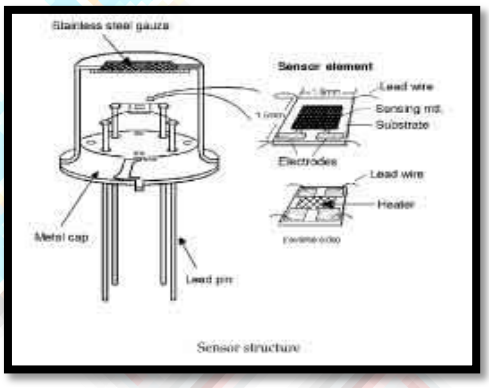

Fig7. Internal structure of Gas Sensor

Here IC 555 works as a mono stable timer. Pin no 4 and 8 of the IC are connected to the positive supply. Pin no 1 is connected o the negative voltage. Pin no 3 is the output pin and connected to the buzzer via NPN transistor circuit. Pin no 6 and 7 is for the time period circuit. Gas sensor changes its resistance, when gas strikes the gas sensor. It has a filament to heat the chemical plate inside. When gas reacts to this chemical plate then this plate chances its resistance and we covert this change of resistance to change of voltage. This voltage pulse is connected to the Pin no 2 via NPN transistor. IC 555 gets activated. As the IC is activated the output is generated on Pin no 3 which is connected to the exhaust fan via NPN transistor. Emitter of the NPN transistor is connected to the negative voltage and the collector to the exhaust fan with indicator led.

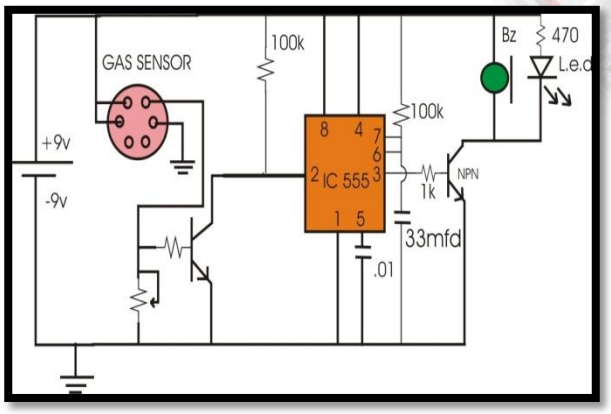

Fig8. Circuit Diagram of Gas Sensor

C. WORKING OF PROJECT

The basic operation of the parking system is explained as: When a vehicle enters in the parking lot, LCD displays, if the space is available in parking lot or not. If the space is available then stepper motor rotates and door opens for vehicle entrance. RF module is used to transmit and receive slot availability information. According to RF Module's output, LED glow. The working is shown in Fig 9. This is the inside layout of the parking lot.

Fig9. Inside of Parking Lot

Now when the vehicle enters there will be lights attached to the roof. With the help of this project we have made the navigation much easier as compared to normal parking system. The green light will indicate the empty spot where as the red light will indicate the filled spot. These lights will be LED lights which will be connected through a microcontroller. The intensity of light here can also be varied in accordance with the density of car.

III. COST ANALYSIS

Total cost of parking helper has been calculated to be □ 4500 approx. This amount has been calculated by taking the major components as shown in Table I.

Table I. Cost Analysis of Intelligent Parking

Components	**Quantity**	**Cost** □
Microcontroller	1	570
LCD Display	1	160
LED Lights	15	150
Gas Sensor	1	340
Power Source (Piezo, solar ,wind)	NA	550
IR Sensors	4	60
Reed Sensors	8	150
Buzzer	1	100
Mechanical Model	NA	1000
Motor	2	300
Miscellaneous Items	NA	800

IV. SUMMARY AND CONCLUSION

Multi-storied car parking system is very good substitute for car parking area. Since in modern world, where space has become a very big problem and in the era of miniaturization it has become a very crucial necessity to avoid the wastage of space in modern, big companies and apartments etc. In space where more than 100 cars need to be parked, it's a very difficult task to do and also to reduce the wastage of area, this system can be used. This Intelligent Car Parking enables the parking of vehicles-floor after floor and thus reducing the space used. Intelligent car parking system implementation is really very challenging; this system can be implemented up to many floors but in out project we have shown only one. This system also reduces the traffic and congestion in finding the available parking spots. We have also seen the future scope of vehicular fuel and keeping that in mind we have added a gas detect system which detects the gas leakage switches on the exhaust fans thereby preventing any accident in future due to gas leakage.

REFERENCES

1. ASWIN SAYEERAMAN, P.S.RAMESH,"Zigbee and GSM Based Secure Vehicle Parking Management and Reservation System", Journal of Theoretical and Applied Information Technology, Vol. 37 No.2 31st March 2012.
2. Mala Aggarwal, Simmi Aggarwal ,R.S.Uppal, "Comparative Implementation of Automatic Car Parking System with least distance parking space in Wireless Sensor Networks", International Journal of Scientific and Research Publications, Volume 2, Issue 10, October 2012.
3. Ramneet Kaur and Balwinder Singh, "Design and Implementation of Car Parking System of FPGA",International Journal of VLSI design & Communication Systems (VLSICS) Vol.4, No.3, June 2013.
4. Tariq Jamil, Senior Member IEEE, Member IET, IAENG, "Design and Implementation of a Parking Helper", Proceedings of the World Congress on Engineering and Computer Science 2009 Vol. I WCECS 2009, October 20-22, 2009.
5. Itika Tandon, Alok Kumar, '' A Unique Step towards Generation of Electricity via New Methodology", International Journal of Advanced Research in Computer and Communication Engineering Vol. 3, Issue 10, October 2014