Piezoelectric based Smart Parking System

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ABSTRACT

In this moving world of technology, the concept of a digital city has become a topic of interest. Parking is a growing problem in urban areas. The parking problem can be transformed into a new opportunity given to the latest styles to meet the ongoing global communication. This article describes an intelligent piezo-based parking system. This document allows users to automatically find a free site for parking at low cost without wasting time or fuel.

Keyword : - *Piezo,Atmega16,LDR Sensor*

1. INTRODUCTION

The current system of parking work learns the frustration of the user. All vehicles must be parked somewhere if the drivers leave. Because of the unorganized parking spaces, people have difficulty finding a parking space and remembering it. Time is wasted on finding a parking space as you enter the area and we wander around many places to see any free space available. Sometimes, the driver may not see the empty space or wander around unaware that the parking lot is full unless the driver re-connects to the parking lot , he will not be able to identify vehicles in large areas while fetching them. This consumes valuable time and allows for frustration, fuel wastage, pollution and traffic congestion. Overcoming all these problems these types of smart parking system are important in big cities. The main goal of a smart piezoelectric-based parking system is to use power using the piezoelectric element. The Piezoelectric element has the potential to generate electricity by converting mechanical energy into electrical energy. The system uses various sensors and controls that control the system automatically. This paper describes the Piezoelectric Based Smart Parking System that uses, the LDR sensor, the IR sensor and the L293D Motor Driver IC used for automated parking. This program contains an LDR sensor that controls light function by turning on or they are automatically extinguished in the parking lot .The system has automatic exit gates operated by the RFID System for cash withdrawals. The energy generated by the piezoelectric solar panel and roof is used to power the entire system and help save energy from the power grid. The main goal of this project is to generate energy from the electric part of the piezo when the car enters the parking garage. For example, a car entering a piezo electric parking garage will bring power as a result of the opening left will continue to show the green of the empty space and red in the operating area.

2. COMPONENTS REQUIRED

2.1 Battery:

It stores the amount of power generated by the piezoelectric and the solar panel that can be used in further generations.

2.2 LDR Sensor:

An LDR is a component that has a resistance that changes with the light intensity that falls upon it.

Fig.1 LDR sensor

2.3 IR Sensor: IR sensor work with radar technology and they both emit and receive infrared radiation. This radiation hits the objects nearby and bounces back to the receiver of the device.

Fig.2 IR sensor

2.4 AT mega16: It is the microcontroller used to control the whole system.

Fig.3 AT mega 16

2.5 Printed Circuit Board: Zero level PCB is to mount the microcontroller, voltage regulator and IC's.

2.6 Jumper Wires: It is used as a connector between the components and the micro controller.

2.7 L293D Motor Driver: It helps to drive dc motor.

Fig.4 L293D motor driver

2.8 Display: It indicates the empty or occupied space in the parking lot.

2.9 Solar Cell: Solar cells are the devices that uses
The photovoltaic effect to convert the energy of light

directly into electricity, producing electrical charges
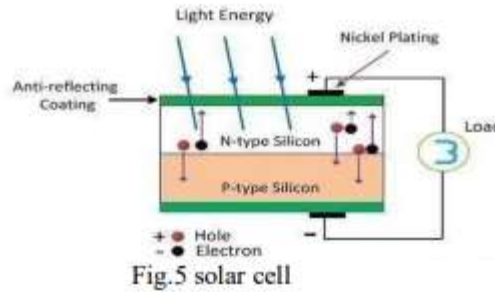
that can move freely in semiconductors.

Fig.5 solar cell

3. DESIGN OF THE PARKING SYSTEM

The entry and exit gates are controlled by dc engines to open and close the gate by detecting the presence of a vehicle.

4. WORKING OF THE PARKING SYSTEM

When the car arrives at the entrance to the parking lot the infrared sensors gain presence and open the gate for the car to enter and the vehicle passes through a door that includes a piezoelectric element and the power output of the vehicle is directly proportional to the piezoelectric output. The solar panel on the roof also generates daytime energy and the energy of both types is stored in batteries to keep the system running. The display section used in the parking lot shows the number of vacant lots and living areas in the parking lot with the help of IR sensors. The system also contains an LDR sensor that controls the activity of parking lights. All vehicles must be parked somewhere if the drivers leave. Because of the parking lots, people have a hard time finding a place to park in a short time and remember it. Time is spent finding a parking space so overcoming the problem the parking system is designed.

5. CONCLUSION

Our proposed framework provides an efficient parking system that controls various vehicles to the nearest parking lot at a given time depending on where the parking space is located. The client requires the Parking Control Unit to monitor the status of easily accessible parking areas. When a client wants, all free access points are shown to the client. Parking is monitored continuously in real time and space status is updated. By using knowledge, we can simplify parking and reduce fuel consumption.
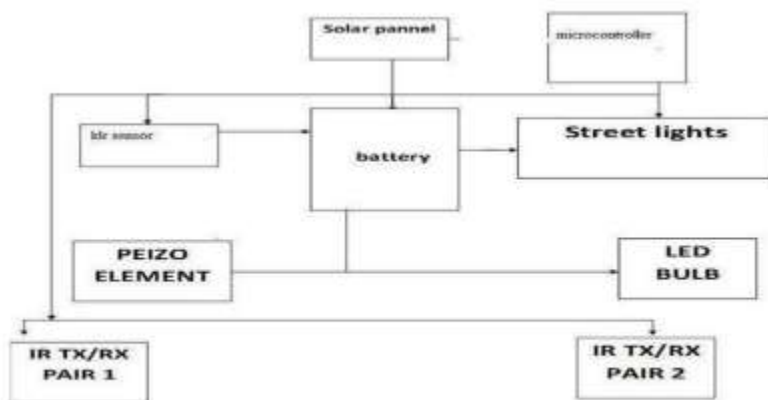
6. BLOCK DIAGRAM

Fig.6 Circuit Diagram of parking system

7. FUTURE SCOPE

A. The automated parking costs framework will allow people to travel free of charge. Also, it will reduce waiting time, long lines, difficulty, pressure and increase the efficiency of the parking frame.

B. A smart parking management framework can be used to control air and boat and ships.

C. With private and indoor parking framework the device can be connected to the Home Automation framework which can control the various home appliances by detecting whether the client enters or exits the parking lot.

8.ACKNOWLEDGMENT

9. REFERENCES

[1] Fabrication of Car Parking Prototype Using Piezoelectric Sensors Mr. S. Nagakalyan, Research Fellow, Dr. B. Raghukumar, Professor, L. University, India522502
[2] Smart Car Parking System Jayakshei Dadaji Bachhav1, Prof. Mechkul M. A.2 1Dept. Of Electronics and Telecommunication, SNJB's COE, Chandwad, Maharashtra, India 2SDept. Of Electronics and Telecommunication, SNJB'sCOE, Chandwad, Maharashtra, India
 [3] Gautschi, G. (2002). Piezoelectric Sensorics: Force, Strain, Pressure, Acceleration and Acoustic Emission Sensors, Materials and Amplifiers. Springer. doi:10.1007/978-3-662-04732-3. ISBN 978-3-662-04732-3.