

WSN Car Parking System

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Abstract--- To cope with the growing problem of traffic management and parking management this paper proposes an advance solution for managing and monitoring free parking space and automated guidance for people to park their car. It aims at implementing smarter and better parking guidance system which reduces significant parking time. In this system, Optical sensor senses the status of the car space and accordingly transfer the information to the AVR controller. Then the AVR controller will sense the status of car parking space and displays the information on the LED screen for the driver, thereby reducing the time for the driver to find vacant empty space and almost reduces the chances of entering into the unusual space which might lead to traffic jam.

Keyword: - AVR controller, optical Sensor, ATmega16 controller, lcd screen.

I. INTRODUCTION

Recent advancements in the automobile industry has made many people use private vehicles for travelling instead of public vehicles. Hence, there is a huge demand for parking spaces .But in metro cities it is not possible to create new parking spaces. Hence, there is a need to research and develop new technologies in order to efficiently utilize the existing parking systems.

This paper proposes a WSN Parking System based on wireless sensor network technology which provides advanced features like remote parking monitoring, automated guidance. Parking status can be known by the driver at the entrance of the parking lot only. That means a car driver can know whether the car parking space is available in the parking lot or not without entering into the parking lot by observing the monitor.

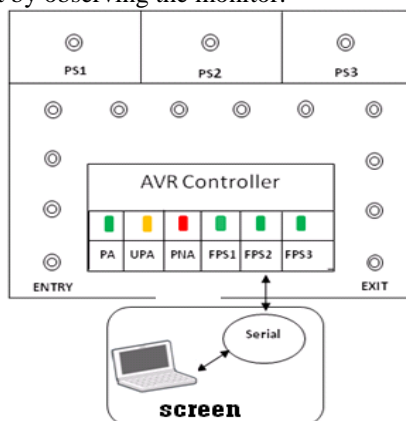


Fig. 1: Basic block diagram of system

II. PROBLEM DEFINITION

To develop an efficient system which will help in proper monitoring of parking lots , number of vacant slots and number of occupied slots. It aims at implementing smarter and better parking guidance mechanism which reduces

significantly parking time and elp in better management of parking space..

III. RELATED WORK

A. A Car Parking Monitoring System Using Wireless Sensor Networks

In this paper, a car parking monitoring system using wireless sensor networks. Multiple sensor nodes and a sink node, a gateway, and a server constitute a wireless network for monitoring a parking lot. Each of the sensor nodes is equipped with a 3-axis AMR sensor and deployed in the center of a parking space. Each sensor node reads its sensor values periodically and transmits the data to the sink node if the current and immediate past sensor values show a difference exceeding a threshold value. The sensor nodes and sink node use the 448 MHz band for wireless communication. Since RF transmission only occurs when sensor values show abrupt changes, the number of RF transmission operations is reduced and battery power can be conserved. The data from the sensor nodes reach the server via the sink node and gateway. The server determines which parking spaces are taken by cars based upon the received sensor data and reference values. The reference values are average sensor values measured by each

sensor node when the corresponding parking spot is not occupied by a vehicle. Because the decision making is done by the server, the computational burden of the sensor node is relieved, which helps reduce the duty cycle of the sensor node.

B. A Car Parking Monitoring System Using Wireless Sensor Networks

This paper presents a car parking monitoring system using wireless sensor networks. Multiple sensor nodes and a sink node, a gateway, and a server constitute a wireless network for monitoring a parking lot. Each of the sensor nodes is equipped with a 3-axis AMR sensor and deployed in the center of a parking space. Each sensor node reads its sensor values periodically and transmits the data to the sink node if the current and immediate past sensor values show a difference exceeding a threshold value. The sensor nodes and sink node use the 448 MHz band for wireless communication. Since RF transmission only occurs when sensor values show abrupt changes, the number of RF transmission operations is reduced and battery power can be conserved. The data from the sensor nodes reach the server via the sink node and gateway. The server determines which parking spaces are taken by cars based upon the received sensor data and reference values. The reference values are average sensor values measured by each sensor node when the corresponding parking spot is not occupied by a vehicle. Because the decision making is done by the server, the computational burden of the sensor node is relieved, which helps reduce the duty cycle of the sensor node.

IV. PROPOSED WORK

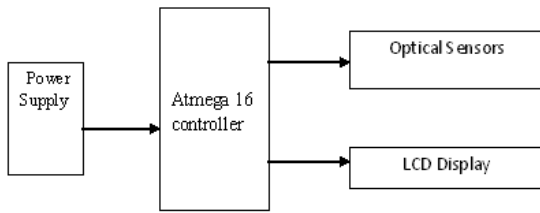


Fig. 2: System architecture

We have used Optical Sensors for each parking slot. The Sensors are connected to AVR microcontroller. Sensor rays are obstructed when a car is parked in any parking slot. Thus AVR will come to know that which slot is empty and which slot is full.

We have chosen Optical instead of RF module because we want a receiver having line of sight communication with the transmitter. But RF does not require line of sight communication. And in case of LDR, there is scope for false triggering due to sunlight or headlight of car. So considering all these points we have finalized to use Optical module.

The controller will then send the signal to the visual basic application which will show the status of each slot on the screen.

The circuit board is designed using eagle (Easily Accessible Graphical Layout Editor).

This software will help in proper designing of circuit using pcb layout and schematic diagram .

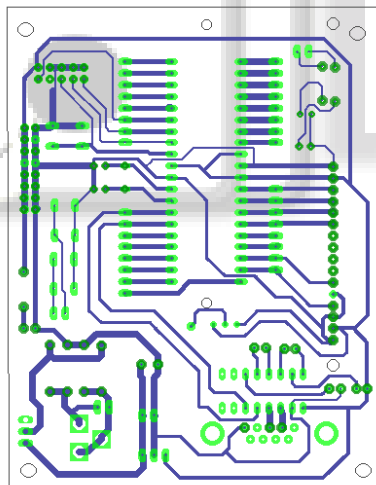


Fig. 3: Pcb layout

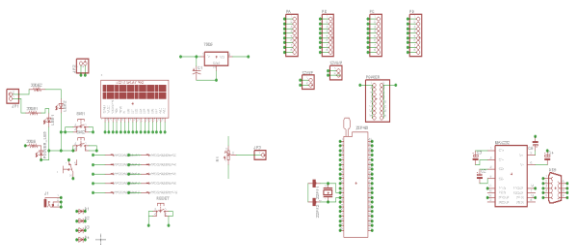


Fig. 4: Component diagram

The eagle software will help in making the following schematic diagram based on the above components. We can create the appropriate

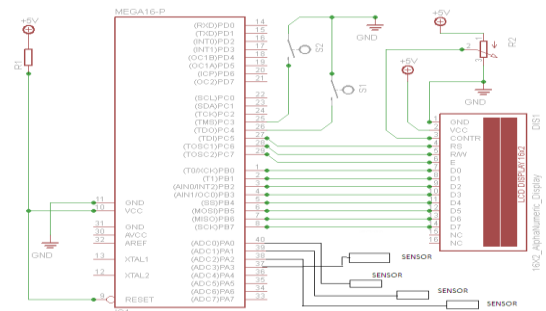


Fig. 5: Schematic diagram

V. RESULTS

We implement the car parking system using visual basic 6.0 software and the database part is done using MS Access software. It checks the number of slots occupied or free and gives appropriate output regarding whether the parking slot is free or empty.



Fig. 6: all slots full

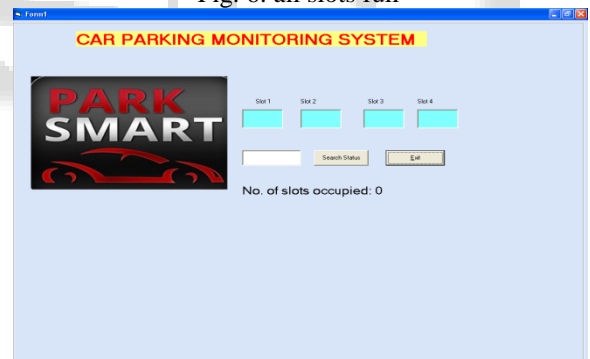


Fig. 7: all slots empty

A. Test Results

- The results of the connectivity tests & application tests can be summed up as follows:
- Connectivity in the test environment is not solely dependent on transceiver distance.
- Uneven surfaces can be highly detrimental to connectivity.
- Connectivity is often asymmetrical to some degree.
- The presence of a vehicle at the transceiver has significant effects on connectivity.
- Transceivers are prone to burst by communication blackouts.
- These communication blackouts are local and do not effect significant areas

VI. CONCLUSION

- This paper introduces a WSN system based on optical sensor nodes which will help in determining parking spaces.
- The customer can readily determine space availability before entering the parking .
- The parking operator can use this system data to predict future parking patterns and trends of parking .
- The parking operator can use this system to prevent vehicle thefts.
- The parking operator can reduce the staff requirements for traffic control within the facility.

DISCUSSION

Our paper has described a complete system for car-park management using a wireless sensor network. Our architecture follows a tiered methodology and we found the most difficult practical challenges emerged at the lowest (sensing node) level. We noted that the presence of the objects being sensed (vehicles) can cause significant interference and degradation in communication performance, and that the reliability patterns found had a high temporal correlation but a low spatial correlation. In closing, we hope and believe that this report on our practical experiences will be useful to others working in this exciting area of research.

VII. FUTURE SCOPE

This application can be further developed to cover larger areas such as shopping malls and housing societies. But, to do so we will require large amount of sensors

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