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AUTOMATED GATE BARRIER SYSTEM

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ABSTRACT

Waiting long time at a gate until gate is opened is a major problem occur with busy life style. Many gate barrier systems has been introduced these days, both manual and electrically. An entrance of place is special are to the both visitors and owners. The first impression of a person about the place is started to build up from the entrance. Most of the electrically controlled gate barriers come out with center separator, it also a big problem for narrow entrances. The traditional, manually operated gate barriers being still used in most of the places in Sri Lanka. It spend more time and money. Although these gate barriers don't come up with data storing method. All the IN and OUT data were stored as written document. To overcome these problems and weakness' "Automated gate barrier system" project was proposed. The system is based on arduino technology and the identification part developed using RFID technology. Both IN and OUT gates are controlled by servo motors. Only authenticated vehicles are allowed to enter the premises. A prototype has been built on Arduino mega 2560 using RFID readers, tags and ultrasonic sensors.

Keywords: Rfid, Ultrasonic, Arduino, Automation

1. INTRODUCTION

Time and cost are two important factors of human life, whether for an individual or a business organization. As quality of life increases, more and more people inhabiting to luxury life styles. Those people expect effective service from others. Nowadays People don't like to spend their time for unimportant things. Traditional gate barriers which was operated by security officers manually doesn't helps satisfy the busy people. So it should need to enhance the accuracy and the efficiency of the work process. Also there should be a time consuming and cost effective technique do this process. By considering these drawbacks and the improvements I implemented Automated Gate Barrier System

System consist with RFID reader and a powerful antenna also pre-registered or authorized people must have RFID Tag. When someone try to access to the premises, RFID reader checking a RFID tag, and if found it, System check whether Tag was registered or not. If it was a registered one Open the IN gate [1].

When someone leave from premise, he was identified as a leaver using IR beams, then never check his access level and free to out from premise. All arrival's and leaver's details store in a computerized data base with time. After happen leave or arrival the gate was closed. A prototype has been built on Arduino mega 2560 using RFID readers, tags and ultrasonic sensors.

2. EXPERIMENTAL

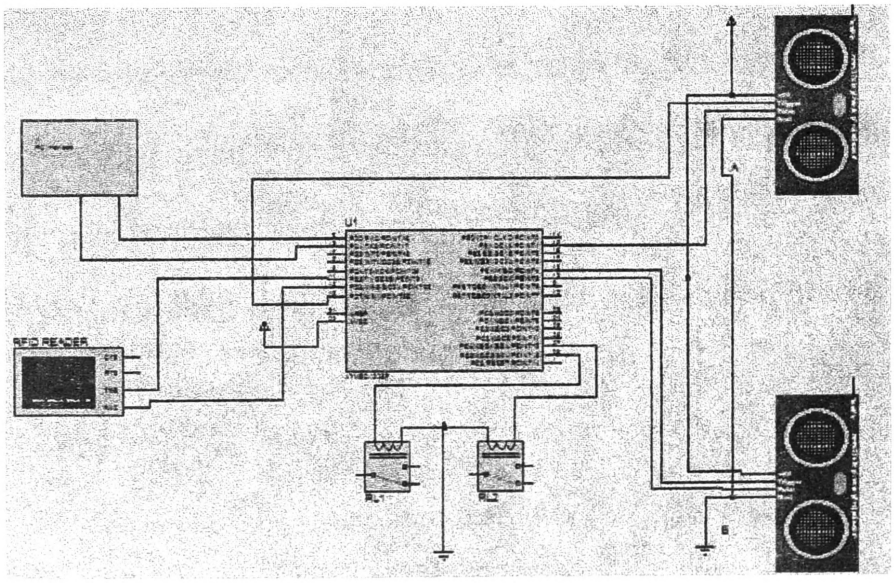

Figure 1: Circuit diagram automated gate barrier system

The Circuit diagram of the gate barrier system is shown figure 1. The RFID reader was connecte to the Aduino mega 2560 using pin 18, 19 to receive RFID tag input through serial monitorin Arduino mega was programmed using C language. Output of RFID reader was displayed in seri monitor. Ultrasonic sensors were connected to arduino mega using 2, 3 to get inputs. Thos Ultrasonic sensors used to arrival and leave vehicles separately. Servo motors were connected t pin 9, 10 of arduino mega and it was powered using output of arduino [2]. Also proposed system consists with Windows application was modified by C# language. It was used to store the arriva and leave vehicles details in a MYSQL Data base. Windows application access to the syste using serial communication.

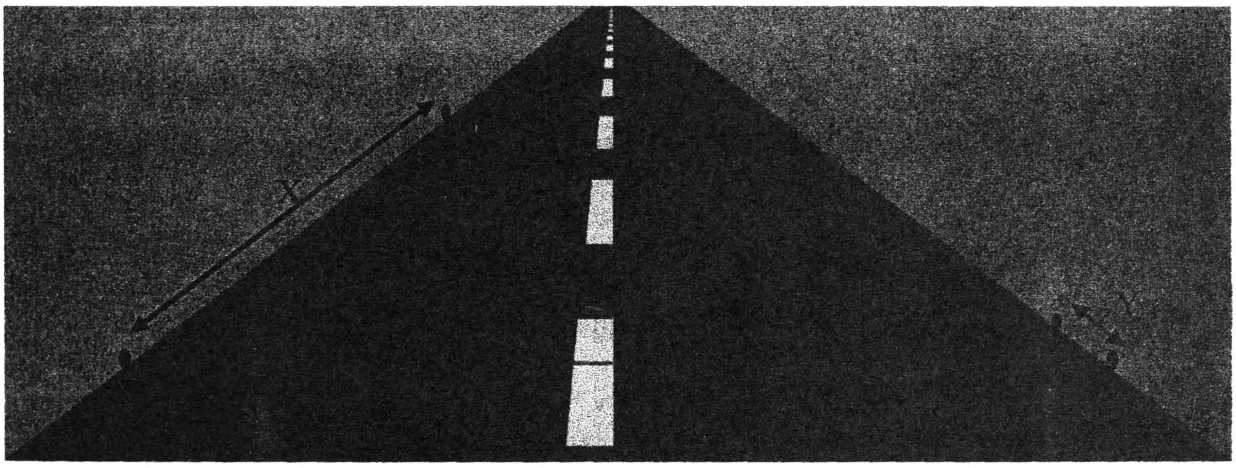

Figure 02: Sensor Architecture.

The Ultrasonic sensors are placed as in figure 2. This Ultrasonic sensor architecture is used to correctly identify the leavers and arrivals to the premise without center separator and give signal to microcontroller to open and close the relevant gates [3].

3. RESULTS AND DISCUSSION

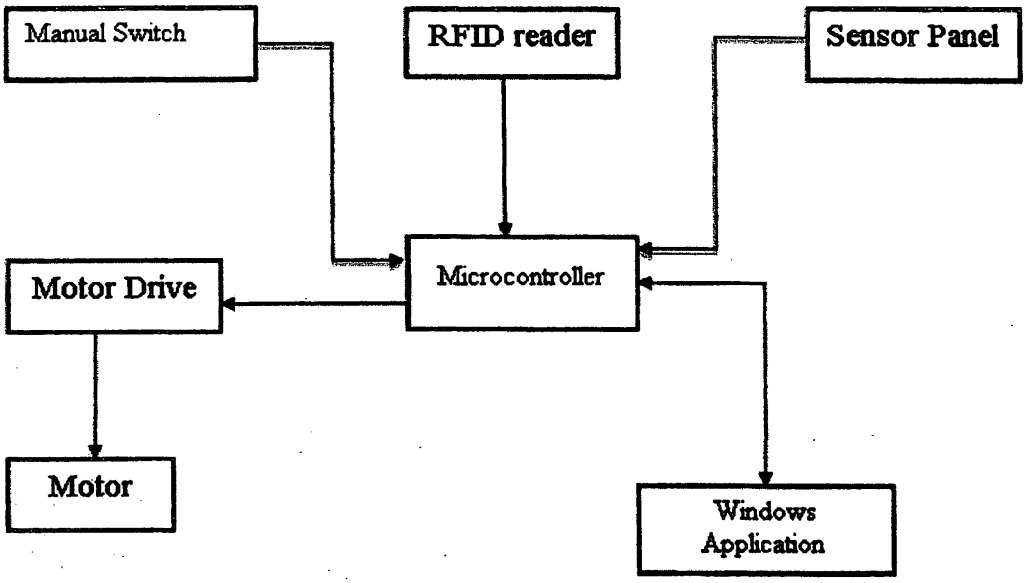

Figure 03: Block diagram of the system

The automated gate barrier system is designed and developed as in above figure using arduino and RFID technology. Identification results were displayed on serial monitor and store in MYSQL data base as the tag ID number, name of the user and time with arrival and leave. IN and OUT gates were opened for arrivals and leavers respectively and automatically they were closed. Cost of the used requirement is depending on the accuracy of the system. The cost of producing this device is around Rs.5200.00 (Arduino mega 2560 1400.00, RFID reader and Tags 800.00, Ultrasonic sensors 2000.00, Servo motors 1000.00)

4. CONCLUSION

The main goal of this project was to design and implement a low cost, time consuming and computerize data storing automated gate barrier system without center separator using RFID technology.

To improve the accuracy and reliability of the system more accurate RFID reader and Ultrasonic sensors should be used. If the project need to be developed as an industrial application, Ultrasonic sensor should be replaced by outdoor industrial Ultrasonic sensors and RFID antenna should be replaced by high gain antenna. All the coding of the project written by C and C# languages.

ACKNOWLEDGEMENTS

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