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Rain Detector with Alarm

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Abstract: In this paper we present idea related to Cricket stadiums. Cricket is one of the most popular game in this world. But one of the major problem that the Cricket stadiums are facing now a days is that the match gets either cancelled or delayed due to rain. So, to overcome this problem we are introducing a Rain detector with Alarm and also an Automatic Roofing System for the Cricket Stadiums. This system includes auto roof which covers the whole stadium. Whenever there is a rainfall the rain sensor activates and gives intimation to the Arduino UNO, GSM and it will indicate the LED to glow, buzzer to make sound and the servo motor will automatically closes the roof. At the same time message is sent to the connected mobile device regarding the rain alert. When the rain stops, the roof opens automatically.

Keywords: Rain Sensor, Arduino Uno, LED, Buzzer, GSM, Servo Motor.

I. INTRODUCTION

As we know that Cricket is one of the most popular game, many people enjoy it either watching in Television or by directly going to the stadiums. But the problem arises when it rains in the stadium during the match. As human beings we cannot control the natural phenomenon such as rain, humidity, high temperature, etc. Some of the measures are taken against this environmental hazard but they are performed manually. Here comes the need ofautomation. Automation greatly decreases the need for human sensory and mental requirements as well. An automation system consisting of a connection between hardware and software has freed the individuals.

This paper is based on the project which is an embedded system consisting of Arduino UNO and rain sensing system. Our design is a prototype of such system which consists of Rain drop sensor, Arduino Uno board and a SIM900 GSM module. Arduino Uno is the processing and controlling unit of this system which receives and processes the data from the sensors. The GSM unit act as an interface between Arduino and user's mobile and is responsible for communication between them. The rain drop sensor will be placed at open place. As soon as it senses the rain it will pass information to the Arduino which will inturn makes the LED to glow, Buzzer to make sound and the alert message will be sent inturn the Servo Motor will automatically closes the roof.

II. LITERATURE SURVEY

[1] An Automatic Sliding Door Using Infrared Sensor: In this research work, an Automatic sliding door System using an infrared sensor was developed. It uses a sensor, a control unit & drive unit to open and close doors at the entrance of a public building. The primary aim of this research work is to learn in details about how the automatic door system works and to understand the concepts involved. The secondary aim is to fabricate a simple circuit model to show how the system works. The main activities involved in this work are the research done on how the automatic door works, sketching a detailed circuit & then fabricating a simple model.

[2] An Automatic Protection of Clothes from Rain: This system protects clothes in rainy weather automatically. The controllers used are 8051 IC and a driven ULN 2803 is used to control relay for switching between drivers. Sensing system is implemented using LDR with 555 timers. The sensing system is fixed on roof and tray is fixed just below the roof. Tray is controlled by driver circuit via relay. They have used different software tools like keil micro vision, welpro software which works in complex circuitry.

[3] Intelligent Windshield for Automotive Vehicles: Windshield control is a vital operation of driver during driving. The mountings fitted in the windscreen or also called windshields are essential to use for smooth driving. These can be automated by using sensors and microcontroller. A complete windshield controlling system has been developed here to increase human comfort and flexibility. The wiper has been controlled by a water level sensor which regulates the wiper motor through sensing the level of water or rain. A dust sensor has been integrated to spill some water in the windscreen and then wipe it. It senses when a certain level of dust get accumulated in the screen. The sun visor which is mounted inside the car to shade the driver's eye from sun would be easier to control by a servo motor. Here an automatic sun visor has been designed to be controlled through a light sensor which is used to measure the light intensity and send the signal to the main control unit. This project focuses on improving human comfort in the existing system so that the

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driver can pay full attention in driving at all weather even in dusty, rainy or summer.

[4] Automatic Rain Operated Wiper System in Automobile: From the research paper we study about different types of sensor used in automation for the wiper. Windshield Wipers plays an important role in assuring the drivers safety during travelling. So the main aim of this work is to develop a system which control the automatic operated Wiper which is based on electronic sensor is called Automatic Operated Wiper. By adopting this technique we can achieve the high safety of driver as well as passengers. From this system the driver can get better focus on road without any distraction while driving.

III. METHODOLOGY

BLOCK DIAGRAM:

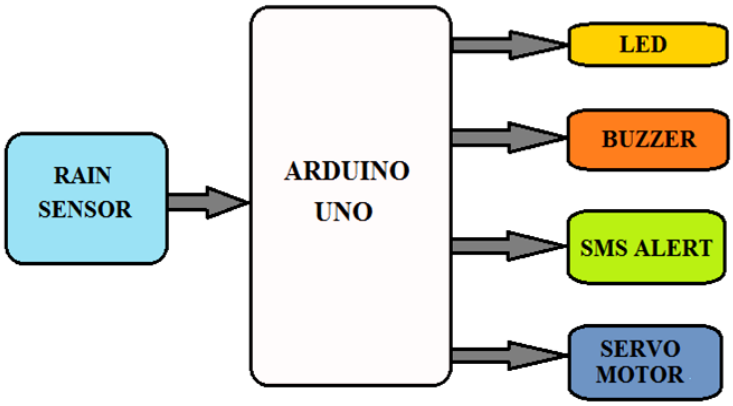

Fig.1 Block Diagram

DETAILS OF COMPONENT:

1. Arduino-UNO

Fig. 2 Arduino-UNO

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, anICSP header, and a reset button. The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller, simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to getstarted. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega8U2 programmed as a USB-to-serial converter."Uno" means one in Italian and is named to mark theupcoming release of Arduino.

2. Rain Sensor

Rain sensor or rain switch is a switching device activated by rainfall. AO (Analog Output) pin gives us an analog signal between the supply value (5V) to 0V. DO (Digital Output) pin gives Digital output of internal comparator circuit. You

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can connect it to any digital pin on an Arduino or directly to a 5V relay or similar device. GND is a ground connection. With the purpose of acting dual role, such as a switch and intensity measuring device is useful. This module has two boards detection board and control board. First the control unit has a LED indicator, potentiometer for other applications. It works like a switch and the working principle ofthis sensor is whenever there is rain, the switch will activate suddenly and sends information to the connected Arduino UNO.

Fig. 3 Rain Sensor

3. Servo Motor

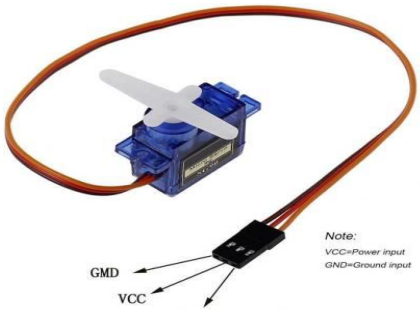

Fig. 4 Servo Motor

Discordant of DC motors, servo motors able to position precisely at some angle with control signals. A Servo Motor is a small device that has an output shaft. This shaft can be positioned to specific angular positions by sending the servo a coded signal. AC servo motors rely on an electric outlet, rather than batteries like DC servo motors. While DC servo motor performance is dependent only on voltage, AC servo motors are dependent on both frequency and voltage. The motor shaft position depends on control signal. Thus, this principle servo motor is used for various applications. Servo Motors vary in size and torque it drives. Mostly low voltage, mini sized servo motors are powered with the supply of Arduino.

4. GSM Module

Fig. 5 GSM Module

GSM is short for Global System for Mobile communication system. It provides three main services of short message, speech communication and data communication. Because service of short message makes the wireless communication module more popular to be used, wireless communication module is also called GSM short message module.GSM short message service has the character of always online, no dialing, low price, large coverage and etc. For GSM technology, short message service is the only one that needn't set up end-to-end channel and also provide service when the mobile

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device is in point-to-point communication. Short message service is asynchronous communication for sending only one sentence per each message. In GSM system, each message is handled as individual time and transmitted by SMSC (ShortMessage Service Center). GSM can offer speed of 9.6 Kbps data communication service when on-line whereas GPRS can offer speed of 100Kbps.Considering the feature of circuit breaker data acquisition and the cost for communication, GSM short message service is suitable to use for transmitting data in large-scale field measurement system.

IV. PROPOSED SOLUTION

One of the major problem the Cricket stadiums are facing is the rain. To overcome this we have introduced a Rain detector with alarm along with the roof coverage. Our system consists of a retractable roof which is build overthe height of the flood lights so that the previous infrastructure of the stadium is not disturbed. The roof canbe built to the already existing stadiums without demolishing or disturbing the construction. Whenever it rains the Rain Sensor activates and passes the information to the Arduino UNO which automatically makes the buzzer to make sound, SMS will be send to the registered mobile number and the roof will automatically cover intimating that the rain alert. It covers the entire stadium that is it covers the pitch, ground and audience too. When the rain stops the roof opens automatically.

V. CONCLUSION

The proposed system helps in avoiding the sudden rain in the cricket stadiums. It also introduces a smart approach to detect the rain by using rain sensor. Once the rain sensor senses the rain which makes the Arduino to activates which inturn makes the buzzer to make sound and the roof will cover automatically. When the rain stops the roof will open. Hence this proposed system helps the cricket players to continue the match even though it's raining.

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