AUTOMATIC WATER, LIQUID SOAP & SANITIZER DISPENSER WITH AN ALERT SMS

1st Sonam Sherpa, 2nd Pema Lachen Sherpa, Krishna Rai 3rd, Dil Rupa Rai 4th, Pranay Thapa 5th, Shyam Chhinal 6th,Deepak Rasaily 7th

1st Student, 2nd Student, 3rd Student, 4th Student, 5th Student, 6th Senior Lecturer, 7th HOD

1st, 2nd, 3rd, 4th, 5th, 6th, 7th Department of Electronic and Communication Engineering

[1]Centre for Computer and Communication Technology 1st, 2nd, 3rd, 4th, 5th, 6th, 7th Jorethang, India

Abstract: In describes about Automatic (Water, Sanitizer and Liquid Soap) Dispenser with an Alert SMA. The main aim of this project is to make a hand free device which automatically Dispense when hand is placed before the device. As we all know we are suffering from COVID 19, this device helps us in spreading the virus. In this project we used Arduino Atmega328P and done a program for software. We used IR sensors for the detection of hand and valve for the purpose of tap, moisture sensors and ultrasonic sensors for the indication of water level and GSM for the alert message to refilled any three of the water, sanitizer and liquid soap while it is empty and also, we used RTC and LCD to display the date and time.

KEYWORDS: Arduino atmega328P, Arduino IDE, GSM, IR SENSORS, Moisture Sensors, Valve, Ultrasonic Sensors.

I. INTRODUCTION

To live healthy, we need to maintain our hygiene. We know that there are various types of hygiene, cleaning our hand is one of them. As we know that our hands are major cause for the spread of COVID 19, because we touch a various kind of objects. This project is a hand free device which we can use in any public places such as office, institute and schools etc. The main purpose of the Automatic water, sanitizer and liquid soap with an alert message is to stop the spread of the virus as it is hand free device. IR sensors were used to sense the hand when it is placed under the device. Moisture sensors for the indication of the water, sanitizer and liquid soap level and GSM is used to send an alert message for the refilling of water, sanitizer and liquid soap level. RTC and LCD is used for the purpose of time and date display. Valve for the purpose of tap. Automatic water, sanitizer and liquid soap is very useful for the people in day-to-day-life. By using this device, we can change our life in smart one and also, we are re-commended by different health organization like WHO to wash our hand in each an ever minute in a secure way. By observing this situation, we are here with our smart and hygienic project "Automatic Water Sanitizer and Liquid Soap Dispenser with an Alert Message"

II. LITERATURE REVIEW

Akshay Sharma AS, Review on Automatic Sanitizer Dispensing Machine.

This paper focuses on Automatic Sanitizer Dispensing and also non-contact dispensing is again important to prevent pathogen spreading and finally, hand hygiene is most important part of our daily life

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Abhishek Srivastava, Shubham Dwivedi, Saurabh Bhardwaj and *Mr. Hem Chandra Joshi*, Study of Automatic Water Dispenser

This paper is focused in presenting the embedded into an Automatic Water dispenser in which the system is used by the microcontroller to automatic the process of water which is used by human beings and it has ability to detect the level of the water, the TDS of water, the temperature of water, and the use of LCD in this system provides the output which is very useful for human beings. This research has successfully provided the improvement on existing water condition by which human beings get the good quality of water

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Anuradha T, Shweta Jadhav, Sridevi Mahamani, title of the paper, Smart Water Dispenser and Monitoring water Level in IoT and Android Environment.

In this paper the automatic water dispenser and water level monitoring is been proposed using sensors in IoT. For an automatic water dispenser, they used node MCU and ultrasonic sensors in IoT environment. Here the manual taps, are replaced with a smart-taps that open and closed on its own.

Writer- *Amrith Poonacha M, Bharath M G, Chandra Prakash P, Mahesh Kulkarni, Rakshith Gowda H*, Automatic Liquid Dispenser Based on User Quantitative Demand.

The aim of this paper is done at a precise level of development for the device to operate at an optimum grade and reach the targeted expectation. This system design proves that, it is simple and can deliver a better service by efficiently managing the consumers to buy and drink and also to save the plastic pollution to make the world a better place.

S. M. Omair, Nageen Shahid, M. A. Haleem, M. Azam, M. W. Munir and M. Z. UI Haque, Fluid Dispenser Prototype: A Time-Based Approach

The aim of this work is to introduce a wireless, automated, cost effective, yet reliable and efficient system of fluid dispensing. Here, prototype System can dispense varying amounts of fluids in milliliters (maximum 1L) as per demand of the user. It uses the principle of time-based fluid dispensing achieved through the built-in-timer property of the AT89C51 microcontroller. To satisfy the principle used and verify the system's accuracy, fluids of varying viscosities.

Writer- Rajesh G. Khatod, Chandrashekhar N. Sakhale, Design and Fabrication of Liquid Dispensing Machine using Automatic Control for Engineering Industry

The aim of the project is to present a touch screen operated liquid dispenser machine using a touch screen interface, which can effectively increase operator accuracy, reduce training time and improve overall efficiencies, thus keeping cost down a properly designed touch screen interface can improve overall accuracy.

METHODOLOGY (PART III)

The smart irrigation system can be simulated in two ways, using both hardware and software:

HARDWARE: Accumulate all the hardware as per the requirements and connect all devices according the Arduino sketch and diagram so, we connect section A first the data pin of both moisture sensors are connected in pin no 5 & 6 of an Arduino UNO for the data also Do of both IR sensors are connected in pin no 11 & 8 for the detection of hand, RX and TX of GSM in TX and RX of Arduino UNO for an alert message for the refilling of any liquids and both solenoid valve are connected in pin no of 10 & 12 of Arduino. For section B we connected Trig of ultrasonic sensors in pin no 9 and Echo in pin no 10 of an Arduino UNOI for a data, Do of an IR sensors is connected in pin no 8 for an hand detection and RX and TX of GSM in pin no 2 and 3 of an Arduino for an alert message.

SOFTWARE: To perform this simulation on software Automatic Water, Liquid Soap and Sanitizer with an alert message we prefer Proteus 8 software so, during the simulation we encountered number of difficulties because there will not get required library for the simulation and so on. So, we short out eventually by stick to it somehow by applying different method first step was by download the required library on Google and add to Proteus library. So, before simulating the system first we accumulate all the virtual devices on worksheet and we connect almost each pin likewise to the hardware. To doing simulation onto software and hardware there where a vast different between them like to giving process of Vcc and GND to the virtual devices and we gave it to the devices as per to the requirement. If we are talking about hardware there was no need to put hex file onto the hardware just, we need to upload the cod merely but in the case of software there were need to put hex file to each device whatever there were used for simulation like moister sensor, IR sensor, GSM module, Arduino UNO, Solenoid Valve and Ultrasonic sensors. To tasting the system the sensor, need to give interrupt so, we used potentiometer. Last crucial thing is that the connectivity between GSM module and user is that Virtual Terminal which is a tool used to view data coming from Serial port.

IV. MODELING AND ANALYSIS

LIS OF COMPONENT USE FOR SMART IRRIGATION SYSTEM

1) Arduino UNO
2) GSM module
3) Moisture Sensor
4) IR Sensor
5) Relay Module
6) Ultrasonic Sensor
7) Solenoid Valve
8) 16*2 LCD

Arduino UNO: Arduino.cc developed an open-source microcontroller board based on the Microchip ATmega328P microcontroller. The board has a number of digital and analogue input and output pins that can be used to connect to expansion boards and other devices. The board features 14 digital input and output pins, six of which can be used for PWM output, and six analogue input and output pins. It can be programmed using the Arduino IDE and a type B USB connector. It can be powered by a USB cable or an external 9-volt battery, with voltages ranging from 7 to 20 volts. It's similar to the Arduino Nano and Leonardo microcontrollers.

GSM module: A GSM module is a physical device that connects to a remote network using mobile phone technology. They are substantially equivalent to a typical mobile phone in the eyes of the mobile phone network, including the necessity for a SIM to identify them to the network. So, in this project, we'll be using a GSM SIM800L module, which is a tiny cellular module that can transmit GPRS data, send and receive SMS, and make and receive voice calls. This module's low cost, small footprint, and quad band frequency capabilities make it an ideal choice for any project requiring long-range connectivity.

Moisture Sensor: A Soil Moisture Sensor is a low-cost electrical sensor that detects the moisture content of the soil. The volumetric content of water within the soil can be measured with this sensor. The Sensing Probes and the Sensor Module are the two primary components of this sensor. The probes allow current to pass through the soil, and the resistance value is calculated based on the moisture content of the soil. The Sensor Module collects data from sensor probes, processes it, and converts it to digital and analogue outputs. As a result, the Soil Moisture Sensor may produce both digital and analogue outputs. The soil moisture sensor is a sensor that analyses soil moisture content in the active root zone before each scheduled irrigation event and is coupled to an irrigation system controller.

IR Sensor: An infrared sensor is an electrical device that emits infrared light in order to detect certain features of its environment. An infrared sensor can detect motion as well as measure the heat of an item. These types of radiations are undetectable to human sight, but an infrared sensor can detect them. The emitter is a simple infrared led, and the detector is a simple infrared photodiode that detects infrared light of the same wavelength as the IR led. When infrared light strikes the photodiode, the resistances and output voltages change in response to the intensity of the IR light.

Relay: Electrical energy is converted to mechanical energy by solenoid valves, resulting in a magnetic response. When an electrical current pass through the wire coil, the solenoid activates.

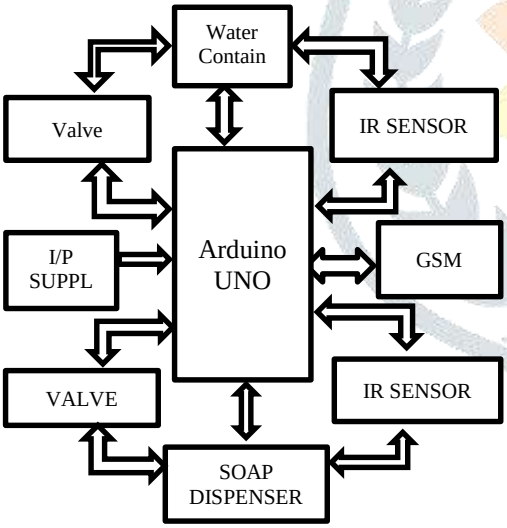
Ultrasonic Sensor: An ultrasonic sensor is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal. Ultrasonic waves travel faster than the speed of audible sound (i.e., the sound that humans can hear).

Solenoid Valve: A solenoid valve is an electromechanically-operated valve. Solenoid valves differ in the characteristics of the electric current they use, the strength of the magnetic field they generate, the mechanism they use to regulate the fluid, and the type and characteristics of fluid they control.

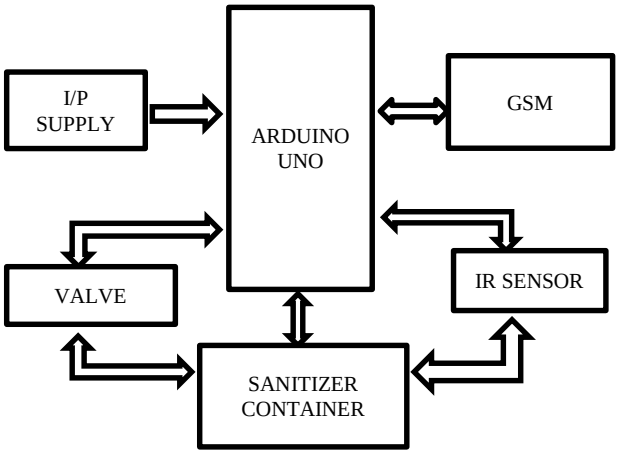
16*2 LCD: A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. A 16x2 LCD means it can display 16 characters per line and there are 2 such lines. In this LCD each character is displayed in 5x7 pixel matrix. ... This LCD has two registers, namely, Command and Data

V. BLOCK DIAGRAM

SECTION A:



SECTION B:



V. BLOCK DESCRIPTION

SECTION A:

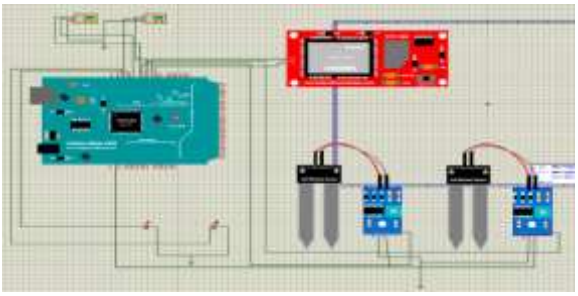
1. It consists of water dispenser and soap dispenser, two different cabinets or container.
2. Soap dispenser cabinet consists of two IR sensors and a valve (works as an automated tap) connected. One at the dispensing part and the other at the inner top of the container.
3. So, whenever we place our hands or any object needed to be cleaned under the tap, the IR sensor takes the input and turns on the valve, as a result the soap gets dispensed for a certain time and then automatically gets turned off.
4. The IR sensor placed at the inner top of the soap container is programmed in such a way that it only takes input when the soap level is too low, then sends the input to the GSM module via Arduino, which sends an SMS alert to the owner that the soap container needs to be refilled.
5. Also, its functioning is linked with water container in such a way that no water dispensing is possible when the soap is empty.
6. Similarly, the water dispensing cabinet functions in same way and the sensors are also connected in same fashion.
7. The only difference is here there is no dispensing time fixed. As the water is required more, the tap remains on until the object is under the tap.

SECTION B:

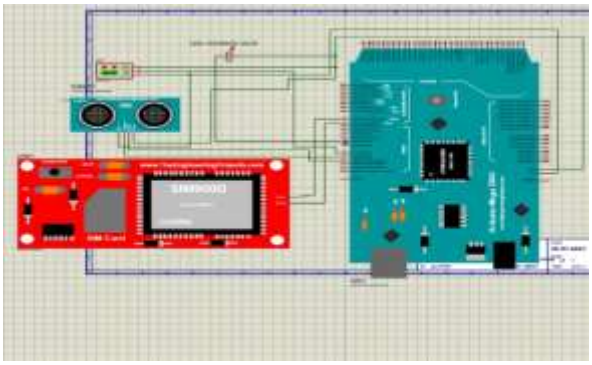
1. Section B consists of sanitizer dispenser cabinet, which has same components as of section A also connected in same way. The only difference is here we only have one cabinet instead of two.
2. IR sensor placed along with tap senses the object whenever placed under tap, sends the input to controller board and with that input signal turns on the valve and the sanitizer is dispensed for a certain time. Automatically gets turned off after that delay time.
3. The sensor placed at inner top of the cabinet provide the input to the GSM via Arduino, when the amount is too low. Which sends SMS alert to the owner that the Sanitizer container needs to be refilled.

III. RESULTS

Section A:



Section B:



The "Automatic Water, Liquid Soap and Sanitizer dispenser with SMS alert in one of the resources getting empty" was successfully accomplished.
The observed output achieved was fully as of the required ones, for section-A of the block, consisting of water and liquid soap dispenser, does the work as of required i.e. the tap senses the hand and activates the valve automatically for certain time delay mentioned in the code uploaded to the microcontroller board. Also sends the SMS to the server when one of the resources is empty.
The section-B of the block consists of sanitizer dispenser, which also does the same as of the previous block i.e., section-B.
The last section i.e. section-C consists of the display module, RTC-LCD display. Here with the help of RTC the present time, date is been displayed along with the project title. The Display module runs 24*7 and the time, date is updated because of the use of battery in RTC.
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V. CONCLUSION

Looking to this current situation of covid 19 we had been instructed to maintain a distance. An automatic water, sanitizer and liquid soap dispenser with an alert SMA a touchless device was successfully developed in connection to a prospective in public area, institute, office for dispensing different liquids. This system proves that, it is a simple and can deliver a better service for the consumers. Features like message can be send to consumer for refilling of water, liquid soap and sanitizer if any of container goes empty and release a sufficient amount of water, liquid soap and sanitizer when required. The main advanced features added in this automatic water, liquid soap and sanitizer with an alert message is that there were added a Moisture sensors, Ultrasonic sensors and GSM module which it works out smartly by alerting users via call phone and alarming consumer for refilling of water. The greatest advantage of using this device is that we can stop spreading of virus.

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