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Ultrasonic Sensor based Water Dispenser

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Abstract: *We are all familiar with the water crisis the world is going through. No matter how carefully we use it there is always a fright of the crisis that may arise in future. So, this project is a small step towards the less wastage of this renewable resource. So this Arduino and ultrasonic sensor is an efficient way for the less wastage of water. Here the water dispensation is controlled by the ultrasonic sensor due to this saving of water is achieved which is a biggest challenge nowadays. This technique changes the lifestyle of the public since they don't need to operate the tap manually through their hands. With many more modifications this dispenser has a very good future scope which also ensures minimum wastage of water.*

Keywords: *Water, Arduino, ultrasonic, dispenser, ultrasonic sensor*

I. INTRODUCTION

Water is the most essential and one of the most widely used natural resource available in nature. The abundance of this resource is the depletion of this resource. However, the earth is covered with 71% of water, out of which only 3% of the water is fit for consumption rest of it is in the oceans which is too salty and not to be fit for consumption. The technology is commonly made in order to help the people perform some activities easy. Consequently, the cultural change is usually triggered by the technological transformation. One of the present technologies is the automation technology. In some cases, the people sometimes want to carry out their work to be set automatically so that they can save the energy to perform another activity. Some sophisticated automation materials have been established in order to set some works automatically such as Arduino microprocessor, which enable to control the electrical circuits logically.

Automatic water dispenser provides a good quality water. In day to day life intelligent systems are used in a wide range and these are embedded in design. There are some physical elements which are needed to be controlled in day to day life in order for them to perform their expected task. We are showing our research as the Automatic water dispenser it is a series of function to maintain each parameter of water such as water level, automatic water ejection. A control system therefore can be defined as a device or set of devices that manages, commands directs or regulate the behaviour of other devices. This ultrasonic sensor water dispenser uses Arduino to function which uses a normal C++ programming. When certain object is placed in front of the ultrasonic sensor it dispenses water only until when the object is placed in front of the ultrasonic sensor.

A. Objective

The objective of the model is

- 1) To design and implement automatic water dispenser pouring machine
- 2) To study and learn the type and characteristic of pump motor for fluid system and sensor.
- 3) To learn about the Relay function
- 4) This project is to design and develop an automatic water dispenser pouring machine that suitable for various kind of container
- 5) This machine purposed in this project where consumer that using this machine only need a motion that detect by a sensor and machine would fill the liquid to the container.

II. WORKING

A. Components

- 1) An Arduino Uno board
- 2) An HC-SR04 ultrasonic sensor
- 3) A relay board
- 4) Water pipes 2cm diameter
- 5) Air pump 6V Jumper
- 6) Wires Two 20cm long cables
- 7) Wood (to make the outer body)
- 8) Spray or a water-based paint Bottle for water storage.

- a) **Arduino Uno:** Arduino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button.

Arduino Uno Specification •

Microcontroller: ATmega328P • Operating Voltage: 5V

- i) Input Voltage (recommended): 7-12V • Inout Voltage (limit): 6-20V
- ii) Digital I/O Pins: 14 (of which 6 provide PWM output)
- iii) PWM Digital I/O Pins: 6
- iv) Analog Input Pins: 6
- v) DC Current per I/O Pin: 20 mA
- vi) DC current for 3.3V Pin: 50 mA • LED_BUILTIN: 13
- vii) Length: 68.6 mm
- viii) Width: 58.4 mm
- ix) Weight: 25 g

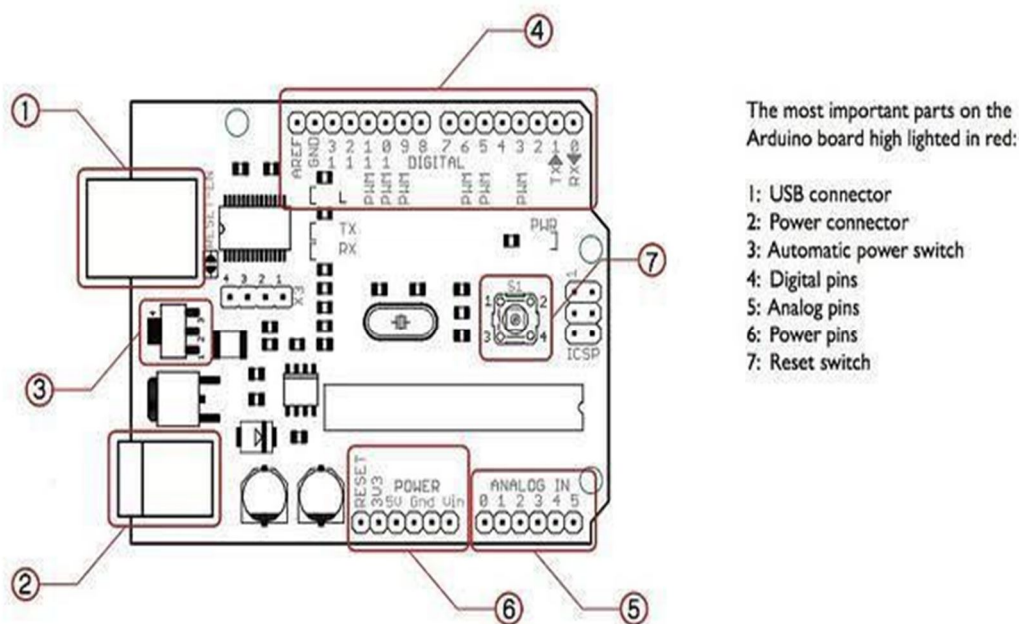
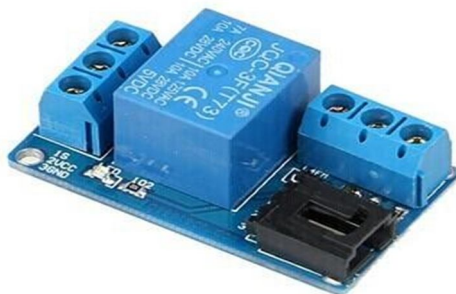


Figure:Arduino Uno

- b) **Relay Board:** A relay is an electrically operated device. It has a control system and (also called input circuit or input contactor) and controlled system (also called output circuit or output contactor). It is frequently used in automatic control circuit. To put it simply, it is an automatic switch to controlling a high-current circuit with a low-current signal.



- c) *HC SR01 Ultrasonic Sensor*: The HC-SR04 ultrasonic sensor uses sonar to determine distance to an object like bats do. It offers excellent non-contact range detection with high accuracy and stable readings in an easy-to-use package. It comes complete with ultrasonic transmitter and receiver modules.



B. Actual Working

The Concept behind the Automatic Water Dispenser is that we will use a HCSR04 Ultrasonic Sensor to check if any object such that the glass is placed before the dispenser. A solenoid valve will be used to control the flow of water, which is when energised the water will flow out and when de-energised the water will be stopped. So we will write an Arduino program which always checks if any object is placed near the tap, if yes then the solenoid will be turned on and wait till the object is removed, once the object is removed the solenoid will turn off automatically thus closing the supply of water. First we program the Arduino board with a program further shown after programming the Arduino is connected to the relay board and one of the connection is with the airpump and other is to main power supply . now there are two pipes one inside the air tight container and one to the outlet . So the airpump is placed outside and the container is filled with water so when a glass is placed in front of the ultrasonic sensor the air pump creates pressure in the container which forces the water to move through the outlet pipe and when the object is removed the water is stopped flowing from the pipe. This is a efficient way to make use of water properly with minimum possible wastage .This system minimizes the wastage of water and also uses modern techonolgy.

C. Ardriuno Program

The following program is used :

```
#define trigger 5
#define echo 4 #define Relay 6 float time=0,distance=0;

void setup()
{
  Serial.begin(9600); pinMode(trigger,OUTPUT); pinMode(echo,INPUT); pinMode(Relay,OUTPUT);
  delay(2000);
} void loop()
{
  measure_distance();
  if(distance<5)
  {
    digitalWrite(Relay,HIGH);
  }
  else
  {
    digitalWrite(Relay,LOW);
  }
  delay(500);
}

void measure_distance()
{
  digitalWrite(trigger,LOW); delayMicroseconds(2); digitalWrite(trigger,HIGH); delayMicroseconds(10);
  digitalWrite(trigger,LOW); delayMicroseconds(2); time=pulseIn(echo,HIGH);
  distance=time*200/20000;
}
```




III. CONCLUSION

This study presented the design phase of Water Dispensers using Arduino and ultrasonic sensors. The requirement analysis and the system design details have been conducted in depth for the better understanding of the project. From the above analysis we can conclude that the entire system can be built with low cost, reliable instruments there by providing an efficient Water Dispensers . We have seen how effectively we can use this system to make minimum wastage of water .

IV. ACKNOWLEDMENT

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