



AUTOMATIC WATER DISPENSER USING IR SENSOR

GAGANA B S ¹, K JEEVITHA ², KAVYA S M ³, MADIHA ⁴, Dr. DEVIKA B⁵

Student, ECE, KSIT, Bengaluru, India¹⁻⁴

Associate Professor, ECE, KSIT, Bengaluru, India⁵

Abstract: Water is one of the important natural resources. About 71% of the earth is covered with water, yet 2.3% of it is drinking water. With the rise in population, contaminants, and changes in the environment, it is normal that in the coming years, we will be facing a water deficit. Water dispensers are electronic appliances that are commonly used in offices, schools, colleges, and households. These days we want every machine of ours to be automatic. There is an upswing in the search for people to get their devices automatically. On the off chance that we supplant all manual taps with a brilliant one that opens and closes without anyone's help, we can save water. In this paper, a non-contact, convenient, and low-price automatic water dispenser system is presented using IR sensor, transistor, and water pump that will give water whenever a glass is placed before IR sensor.

Keywords: IR sensor, water pump, automatic, water dispenser, low-price

I. INTRODUCTION

The development of technology in various fields of life is purposive to advance human work. The automatic water dispenser is one of the technical advancements that purpose as drinking water storage. Besides being able to store water, the primary purpose of an automatic water dispenser is to provide access to drinking water. As we all know of COVID-19, our hands are the root cause of this virus's spread because we touch various kinds of things. To maintain a healthy lifestyle, we need to maintain our hygiene. In our daily life, there are many numbers of water dispensers used in various places. Water scarcity is one of the main concerns of pestilence in the world. Nowadays dispensers are commonly used in schools, offices, colleges, and in many public places. Many times, in public places as well as in houses we turn on the tap and forget to turn off taps which leads to wastage of water. This wastage of drinking water can be controlled by using an automatic water dispenser using IR sensor. This automatic water dispenser provides easy access to clean, hygienic, and contact free drinking water when compared to conventional dispensers. It allows a small vessel like a glass to be automatically filled when it is brought close to the dispenser. The main goal of our paper is to control the wastage of drinking water by implementing automatic water dispensers that use IR sensors to detect the glass or tumbler in front of it and pumps water. Hence, we can replace hand-operated taps with these smart ones which 'ON' and 'OFF' automatically, and there is no need for us to operate them with our hands. And these hand operated taps get damaged after long periodic usage and again we need to fix it with a new tap, we can avoid this by using automatic water dispenser that pumps water only when it detects glass or tumbler in front it i.e., IR sensor and automatic water dispenser is non-contact and budget friendly is proposed in the paper.

II. LITERATURE SURVEY

Yudi Kristyawan and Zahid Eaizal Kholil proposed a model of an Automatic water dispenser based on Hand Gesture detection method using Arduino, this model dispenses two types of waters, one is hot water and another one is cold water, as per the requirement of the user. According to user's hand gesture, it dispenses water when the glass or tumbler is within a 5 – 15 cm distance. [1]

Ms. M Saritha and Ms. U Abinaya proposed a model of automatic water tap controlling system that uses entirely IR sensors to control water taps. It replaces habitual taps with automatic ones and is easy to mount, and also is cost efficient. [2]

Abhishek Srivastava, Shubham Dwivedi, Saurabh Bhardwaj, and Mr. Hem Chandra Joshi proposed a Study of Automatic Water Dispenser that uses a microcontroller to automate the process of dispensing water which is used by human beings, and

this system can also detect the level, temperature and TDS of water. Also displays this information on LCD that benefits humans to know about the level, temperature, and TDS of water. Various technologies are used to implement this system. [3] N.B. Bhawarkar, D.P. Pande, R.S. Sonone, Mohd. Aaquib, P. A. Pandit, and P. D. Patil proposed a system that uses various controllers such as microcontroller, PIC controller and ARM controller. This automatic water distribution system focuses on entities like proper supply, red alarm pop-ups, filtration, flow control, supervision using protocols and it also prevents water theft by using PLC and SCADA and water distribution can be controlled by mobile which uses GSM module to send current status. [4]

Mr. Akash Chowdry, Mr. Prathap S Gowtham and Dwarakanath S K proposed a model of automatic water dispenser that dispenses water only on placing a metal tumbler in front of proximity sensor and this model uses proximity sensor, which is cost-efficient. This system can be accessed remotely by using integrated concepts of IOT. [5]

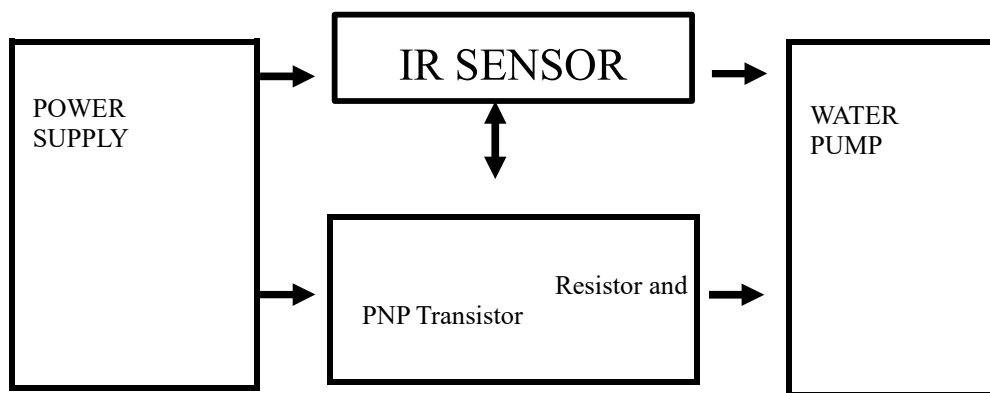
Anuradha T, Shweta Jadhav, and Sridevi Mhamani proposed a model that automatically dispenses water and also monitors the water level using sensors like ultrasonic sensors in an IOT environment. When the water level is low, it sends message using node MCU and alerts the authorized person about it; now, this person can refill the water. These manual taps can be replaced with smart taps. [6]

Mohita Parashar, Roopa Patil, Siddharth Singh, Vipul Ved Mohan, and K. S. Rekha proposed a smart water dispenser system that uses an ultrasonic sensor to measure the level of water and sends data to the Arduino, which updates data to the cloud and from cloud a push notification is sent to respective person if dispenser has low water level. But this system is expensive, and one system is used by one water dispenser only. [7]

Sonam Sherpa, Pema Lachen Sherpa, Krishna Rai, Dil Rupa Rai, Pranay Thapa, Shyam Chhinal, and Deepak Rasaily proposed automatic water, sanitizer, and liquid soap dispenser with an alert SMA, touchless device that uses an advanced feature which contains IR sensor, moisture sensor, ultrasonic sensor, GSM model and Arduino atmega328P. this system is simple yet expensive but can deliver better service for consumers, like sending messages for refilling of water, liquid soap, or sanitizer if any of these goes empty. [8]

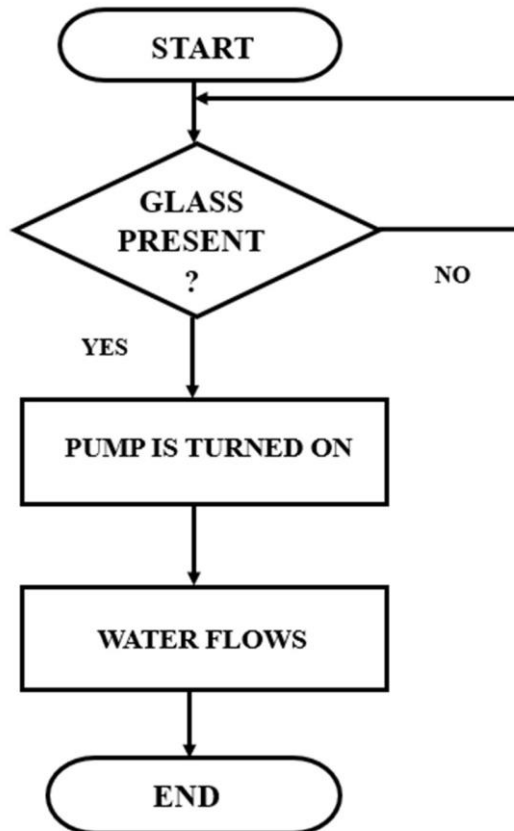
Igbinoba C. K and Okhaifoh J.E proposed an automatic indoor water dispensing machine that uses LDR sensor, water sensor, and object sensor. The overflow of water in the container is controlled by a water sensor placed at the ground level of the dispenser system, and whether the container is present or not is sensed by object sensor. [9]

III. PROPOSED SYSTEM



3.1 Block Diagram

This proposed device is capable of detecting glass or tumbler in front of the IR sensor and dispenses water present in the container using a DC water pump. This method provides non-contact, hygienic, and clean drinking water. The system is controlled by IR Sensor, a PNP transistor and a resistor, and a water pump to dispense water.



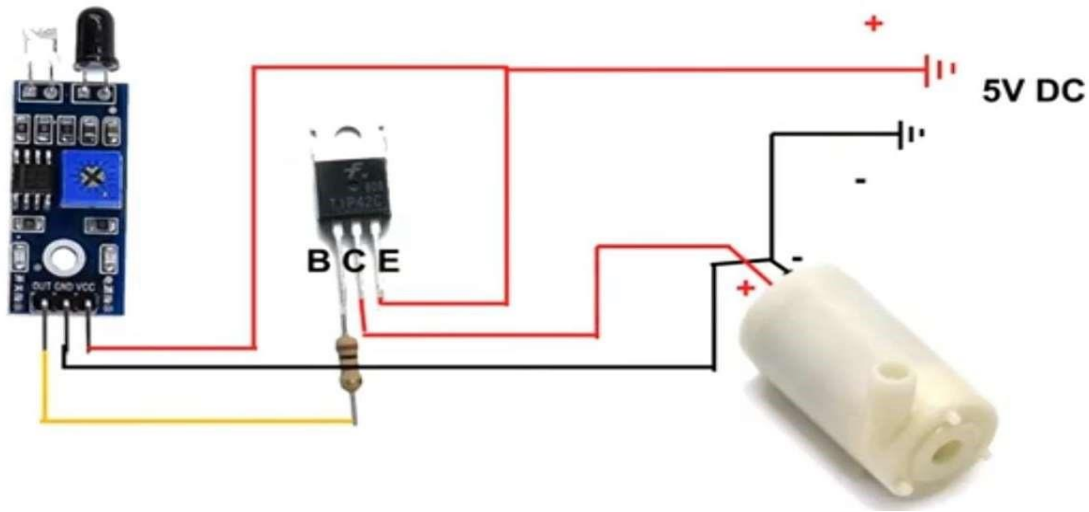
3.1 FLOW CHART

IV. METHODOLOGY

The automatic water dispenser is a device that dispenses water whenever a glass or tumbler is placed in front of IR sensor. This IR sensor is connected to a PNP transistor and resistor. At first, this IR sensor senses the presence of glass, and a transistor is used to control the flow of water, which acts as a switch and it pumps water whenever the IR sensor senses glass or a tumbler in front of it.

HARDWARE IMPLEMENTATION:

This Automatic Water Dispenser is made up of IR sensor, transistor, resistor, water pump, and battery. The transistor is connected to the IR sensor via a resistor, and both the IR sensor and transistor are connected to the battery, as shown below in the pin diagram.



4.1 PIN DIAGRAM

- 1) IR Sensor: This sensor detects infrared radiation emitted by objects. If the object is within the detected range, the reflected infrared rays will be detected by this sensor. This sensor can determine the presence and absence of object. When the user places a glass or tumbler near the sensor, it dispenses water. The detection range of IR sensor is 2-30 cm.
- 2) Transistor: TIP42C is the transistor used in the system; it helps in the switching function of water pump. TIP42C is a PNP transistor that has a maximum voltage of 100v and a peak current of 5Ampere.
- 3) Resistor: A $1K\Omega$ resistor is used between IR sensor and the transistor, which mainly limits the base current.
- 4) DC Water Pump: It consists of a DC motor that helps to pump water. Its operating voltage is about 3-6v. This pump consumes up to 300-400 ma continuous current.
- 5) Battery: 3.7V Li-ion Battery is used that gives power transistor, sensor, and water pump.

V. CONCLUSION

In this project, we aim to reduce water wastage that occurs due to manual taps. At first, we may think it's just a drop of water when these manual taps are damaged, but if it occurs frequently, then this may lead to too many gallons of water wastage. So, we can use a low-cost, user-friendly, and non-contact automatic water dispenser.

This can be installed in all public places like schools, colleges, offices, etc., where it will provide hygienic and clean drinking water.

VI. FUTURE SCOPE

Future work may include a water level indicator that indicates how much water a user needs to fill the glass or tumbler. Also, we can differentiate and dispense hot water and cold water separately by installing the required temperature sensor.

In this project, we need to manually refill the container from where water dispenses; this can be avoided by giving permanent connection to main water supply, which will not need manual refilling of water.

**REFERENCES**

- [1] Yudi Kristyawan, Zahid Faizal Kholil – “Automatic water dispenser based on hand gesture detection using Arduino”, Vol-6, No.-2 (July – 2021)
- [2] Ms. M Saritha, Ms. U. Abinaya – “Research on Automatic water tap control system”, IJCRT, Vol-9, Issue-4 (April 2021)
- [3] Abhishek Srivastava, Shubham Dwivedi, Saurabh Bhardwaj, Mr. Hem Chandra Joshi – “Study of Automatic Water Dispenser”, IJET (Special Issue NCETST – 2017 8(1):88-91 (2017)
- [4] N B Bhawarkar, D. P. Pande, R. S. Sonone, Mohd Aaquib, P. A. Pandit, P.D. Patil – “Automated water supply with monitoring performance system”, IJCET, Vol-4, No. 5 (Oct 2014)
- [5] Mr. Akash Chowdhary, Mr. Prathap S Gautham, Dwarakanath S K – “Automatic water Dispenser”, JCIE, Vol-4, Issue – 3 (2018)
- [6] Anuradha T, Shweta Jadhav, Sridevi Mhamani – “Smart water Dispenser and Monitoring water level in IOT and Android Environment”, vol-7 Issue-5 (May-2019)
- [7] Mohit Parashar, Roopa Patil, Siddharth Singh, Vipul Ved Mohan, K S Rekha – “Water Level Monitoring System in Water Dispensers using IOT”, IRJET, Vol-5, Issue- 4 (April -2018)
- [8] Sonam Sherpa, Pema Lachen Sherpa, Krishna Rai, Dil Rupa Rai, Pranay Thapa, Shyam Chhinal, Deepak Rasaily – “Automatic Water, Liquid, Soap & Sanitizer Dispenser with an Alert SMS”, JETIR, Vol-8, Issue-8, (2021)
- [9] Igbinoba C K and Okhaifoh J E – “Automatic Indoor Water Dispensing Machine”, RJEES, Vol-4(1) (2019)