

AUTOMATIC WATER DISPENSER

Using MSP430 Microcontroller

MICROPROCESSORS AND MICROCONTROLLERS(EC2003)

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Road map

Input

HC-SR04
Ultrasonic sensor

Microcontroller

MSP430

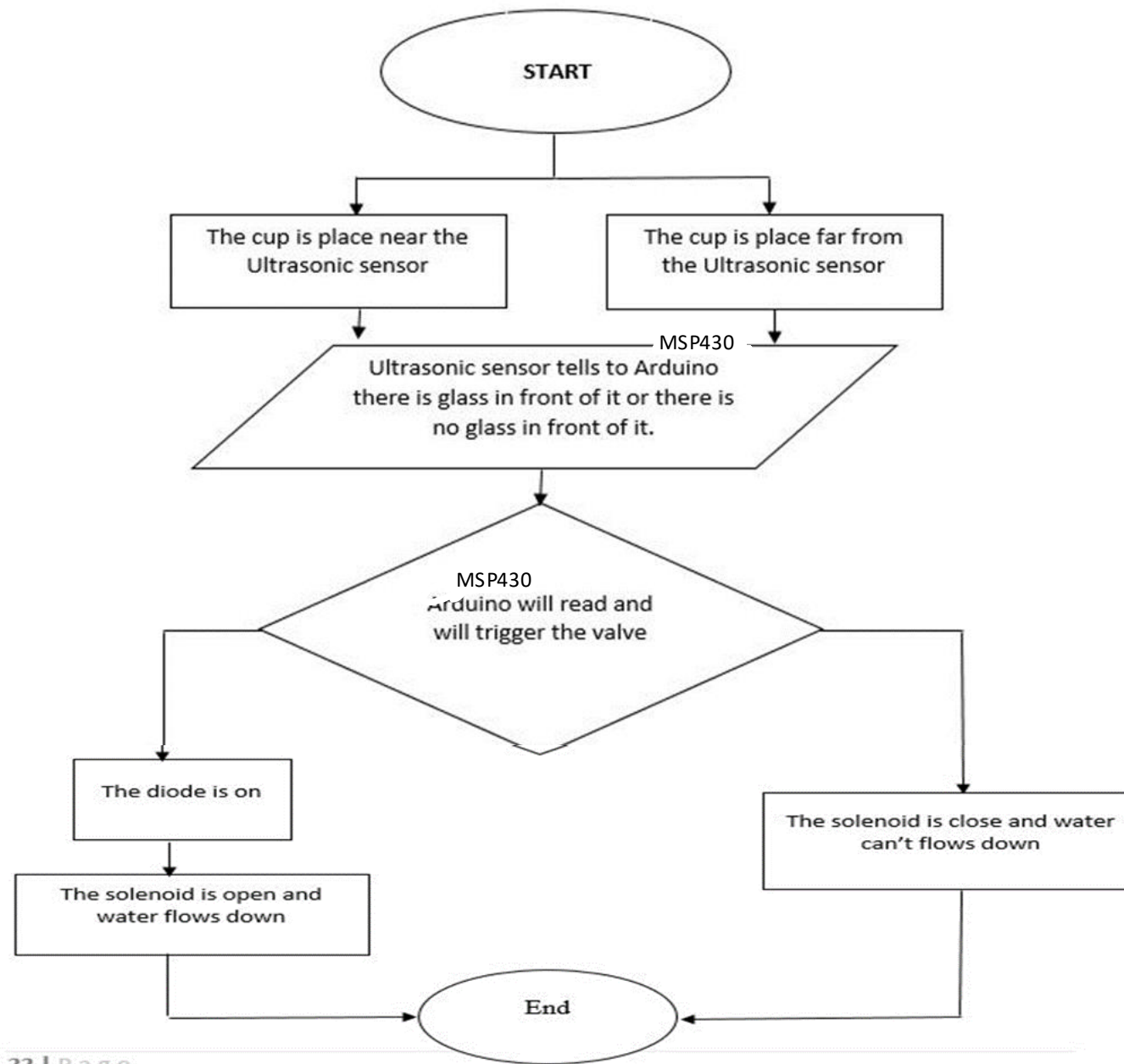
Output

IRF540N
MOSFET

Electronic
solenoid valve

Dispenses water

Road map



Introduction

- In the age of automation, where technology is reshaping everyday life, automatic water dispensers have emerged as a testament to innovation.
- Automatic water dispensers are designed to bring efficiency and convenience to tasks that traditionally required manual intervention.
- One of the significant benefits of automatic water dispensers is their role in resource conservation.
- In this discussion, we will explore the mechanics, advantages, and applications of automatic water dispensers.

Literature

Jurnal Ilmiah Bidang Teknologi Informasi dan Komunikasi Vol.6 No.2 July 2021, P-ISSN : 2502-3470, E-ISSN : 2581-0367

This study aims to make an automatic water dispenser without touching the faucet used for two types of water, namely hot water or cold water.

This research is based on hand gesture detection to choose hot water or cold water.

The APDS-9960 gesture sensor detects hand movements to select hot or cold water, and then a servo motor is used to open the water faucet.

The results show that this automatic water dispenser can detect hand gestures at a maximum distance of 15 cm with a hand movement speed of 2 to 3.7 seconds.

This automatic water dispenser can detect three kinds of glass, namely ceramic, clear glass, and plastic, at a distance of 1 to 3 cm, and the volume of water flowing for 30 seconds is 240 ml.

The water dispenser is one of the technological innovations that functions as a drinking water storage.

Apart from being a place to store water, the primary function of the water dispenser is also to facilitate access to drinking water.

One type of water dispenser selected in this study is a water dispenser with two faucets to drain the cold and hot water.

Bing Li and Jinghong Ji 2021 J. Phys.: Conf. Ser. 2074 012019

In our daily life, water dispenser is essentially used, not only at home, but also in some shopping malls, office buildings, public places, people are inseparable from the water dispenser.

This kind of control object has large inertia and lag, and there are many uncertain factors, it is difficult to establish an accurate and good mathematical model, which leads to poor control system performance, and even unstable control.

The automatic control system of drinking water dispenser is designed in this paper, each module of the whole control part will be adjusted according to the actual situation.

Compared with the control system made of analog circuit, special chip and digital circuit, the water dispenser controlled by microcontroller has a great improvement in all aspects of function and integrity.

Overall scheme of the system Design and Implementation of Automatic Control System for Intelligent Water Dispenser ITBDE 2021 Journal of Physics: Conference Series 2074 (2021) 012019 IOP Publishing doi:10.1088/1742-6596/2074/1/012019 2 2.1.

The structure of automatic control system of intelligent water dispenser In this paper, the microcontroller is used as the core controller, in order to design the hardware and software of the automatic control system of the intelligent water dispenser.

The system can display the temperature and water level in real time, set the temperature alarm threshold and lack of water alarm, and use the display circuit shows the current water temperature and water level.

At the same time, it can also monitor the situation of the water dispenser through the Bluetooth module, the data is transmitted to the mobile phone to realize the control of the water dispenser.

Basic functions of automatic control system of intelligent water dispenser The hardware design includes microcontroller, detection module.

International Journal on Emerging Technologies (Special Issue NCETST-2017) 8(1): 88-91(2017) ISSN No. (Print) : 0975-8364 ISSN No. (Online) : 2249-3255

The first submersible pumps are came into existence in 1920s Automatic Water Dispenser is containing a series of many functions like controlling the water level, showing the value of TDS, showing the value of temperature, and automatic ejection of water.

In today's life there must be some elements which is needed to be controlled, therefore the Automatic water dispenser is providing the good quality of water for the human beings.

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, showing the value of temperature, showing the value of TDS, automatic water ejection.

The thing by which we get motivated is the wastage of water and the impurity of water.

We also know that it will help the environment and water cycle by which we can save water for our future.

RELATED WORKS Many inventions were made to control the water dispurities in order to make the whole system automatic.

The research result were flexible, proposed a web and cellular based monitoring service protocol to determine and sense water level globally.

Big tanks were made to collect the water when the pump fetched the water from the ground level to the tank.

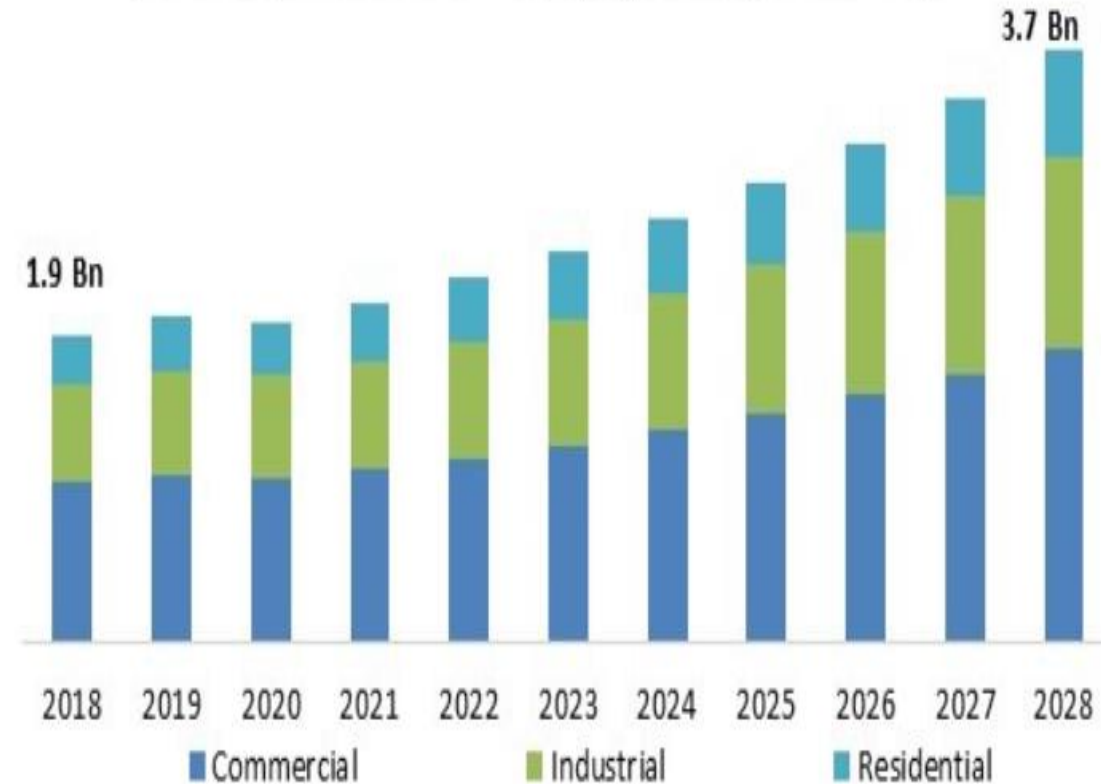
A water level sensor was used so that it can automatically cut off the supply from the pump to tank in order to avoid the wastage of water.

PRINCIPLE OF WORKING Here in this work the block diagram of the operations of the system of Automatic Water Dispenser is presented.

Current scenario

- The market for automatic water dispensers was on the rise. Various manufacturers and startups were offering a wide range of options, from pet water fountains to IoT-enabled smart plant watering systems.
- They offer a hassle-free way to ensure a steady supply of water, making them practical additions to homes and gardens.
- Users had a choice of different sizes and designs, allowing them to select water dispensers that fit their specific needs and aesthetic preferences.

Water Dispenser Market Size, By Application, 2018 - 2028



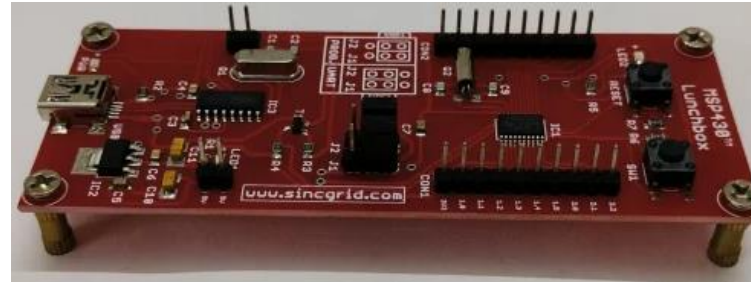
Commercial Products

- Costar Kingfisher Automatic water dispensing pump.
<https://amzn.eu/d/9S4HBqN>
- Hoteon Automatic Water Dispenser Pump.
https://arcus-www.amazon.in/dp/B086RMRPQQ?ref_cm_sw_r_cp_ud_dp_GCGYF1356NB6A64P9G2W



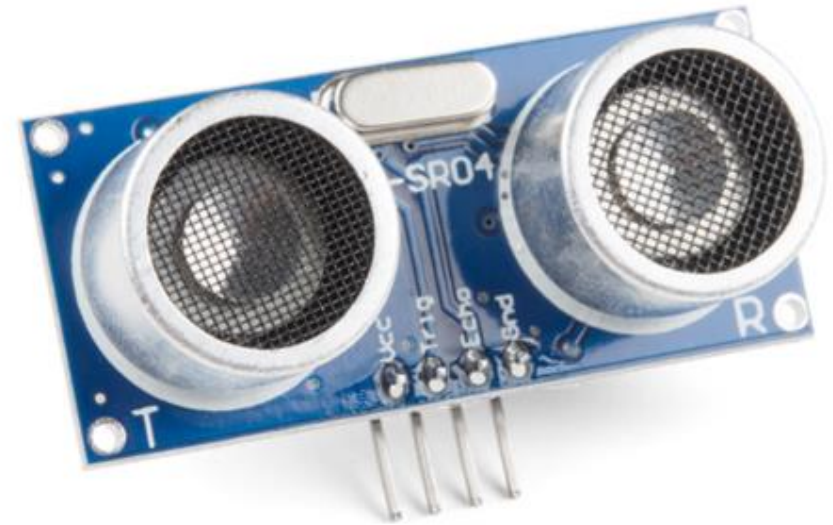
Components Used

- MSP430-Microcontroller
- HC-SR04-Ultrasonic Sensor
- 12v Solenoid Valve
- IRF540N MOSFET
- Bread Board
- Connecting Wires
- 1K and 10K Resistors



Why HC-SR04 Ultrasonic sensor?

- The HC-SR04 is primarily designed for accurately measuring distances. It uses ultrasonic waves to determine the distance between the sensor and an object or surface.
- Unlike some other sensors that require physical contact or immersion in a liquid to measure levels, the HC-SR04 performs non-contact measurements.
- HC-SR04 sensors are known for their relatively high accuracy in distance measurement.
- These sensors are user-friendly and relatively easy to interface with microcontrollers, like the MSP430.

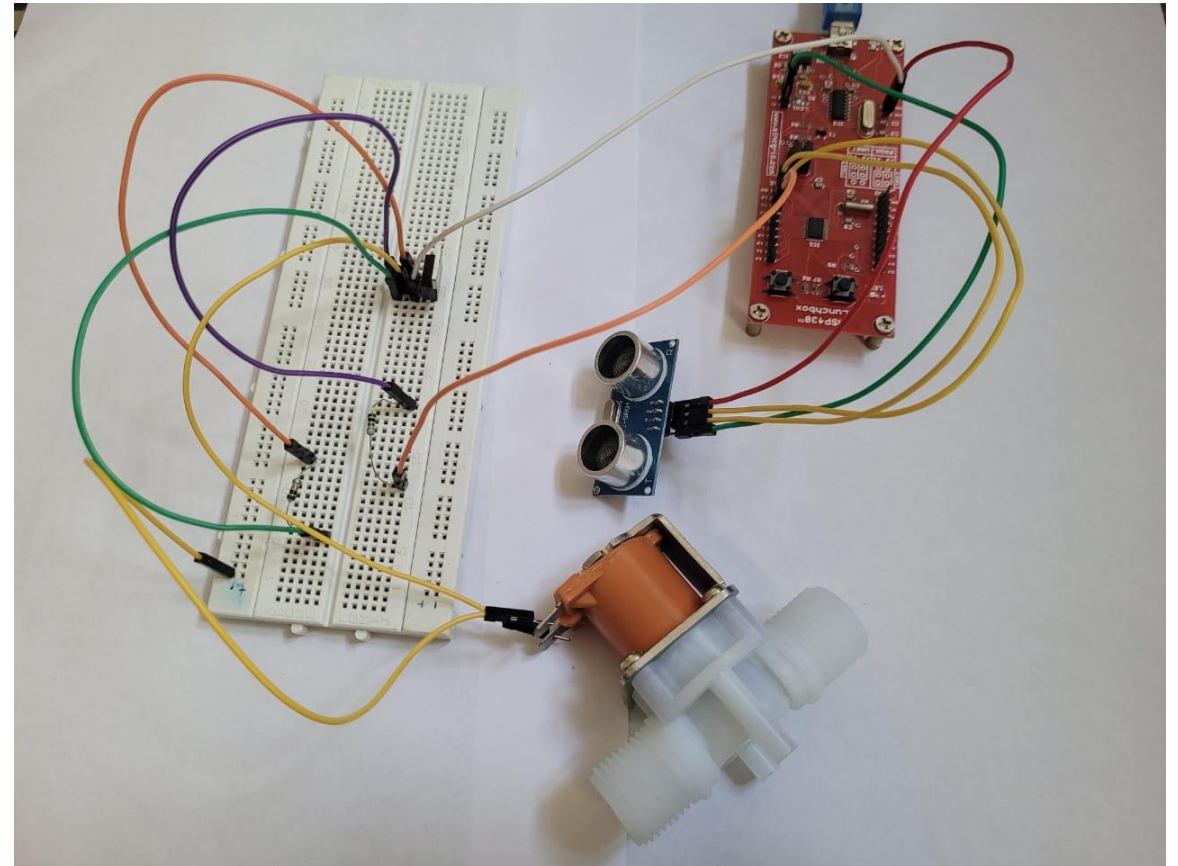


Working Principle

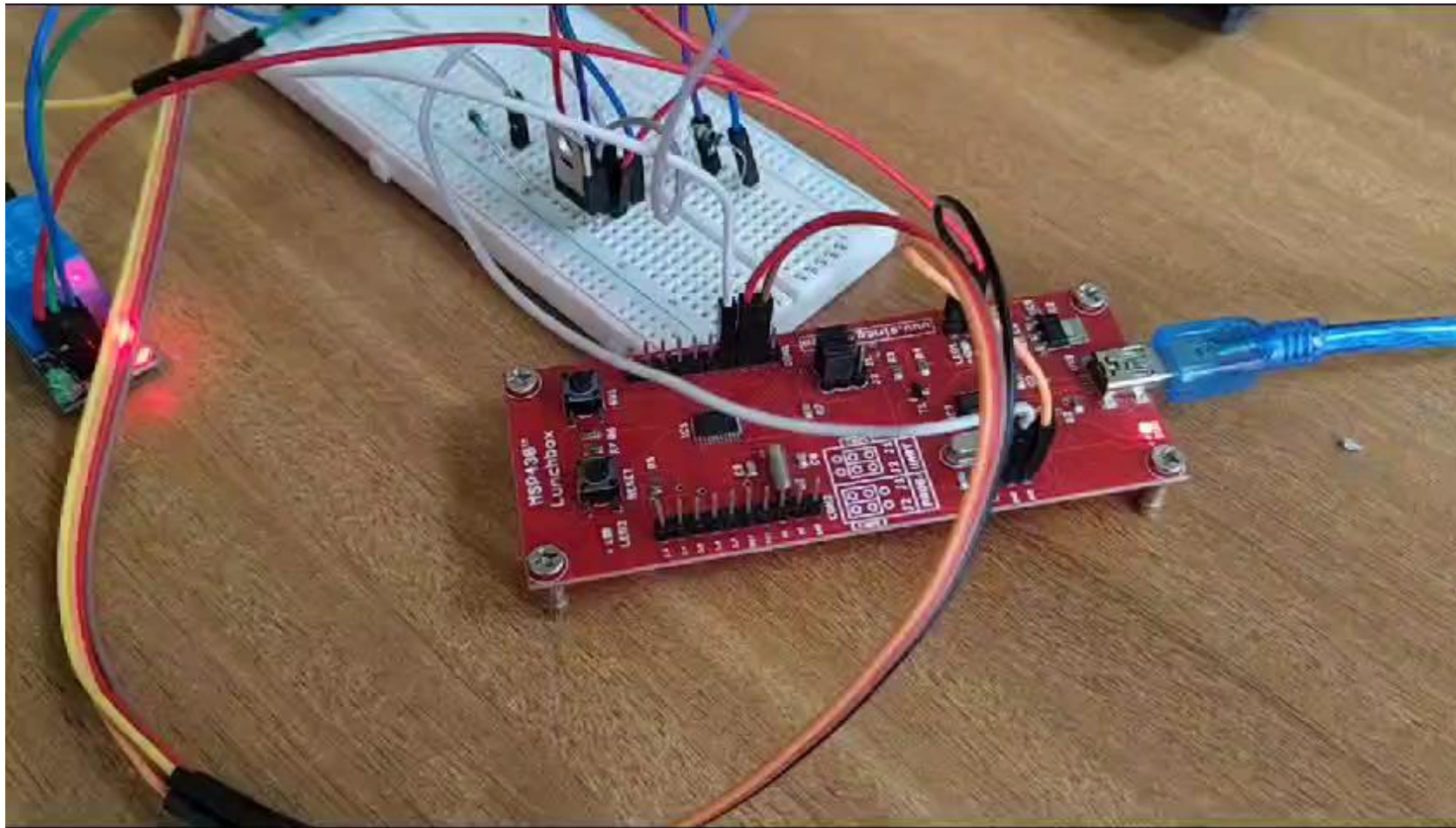
- The Concept behind the **Automatic Water Dispenser** is very simple. We will use a **HCSR04 Ultrasonic Sensor** to check if any object such that the glass is placed before the dispenser. A solenoid valve will be used to control the flow of water, which is when energized the water will flow out and when de-energized the water will be stopped. So we will write an MSP430 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.

Result

- Accurate water level measurement.
- Automatic control for optimized water supply.
- Prevention of overflows.
- Efficient water usage and energy savings.
- User-friendly and reliable.
- Versatile for various applications.
- Cost-effective solution.



Video of end product:



References

- Google
- ChatGPT
- You-Tube
- Circuit Digest
- Academia.edu

Google, a prominent search engine, and ChatGPT (GPT-3.5) by OpenAI offer information and assistance. YouTube provides a wide array of video content, while Circuit Digest focuses on electronics and DIY projects. Academia.edu serves as a platform for sharing and accessing academic research. These references offer a diverse range of tools and platforms for information, communication, and knowledge sharing.

THANK YOU

