AUTOMATIC WATER TAP

A small help for humankind

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ABSTRACT

Automatic water tap is a sensor-based water tap which controls the impulsive flow of water. This paper presents the development of an Automatic water tap based on an industrial grade adjustable infrared sensor. A typical Automatic water tap can switch the device on and off continuously and mitigate the usage of water from wastage. The industrial grade adjustable sensor is used which can sense transparent or opaque with maximum sensitivity of about 80 cm. Active infrared sensor emits and receives infrared radiation, which detects the presence of objects nearby and bounces back to the receiver of the device. The high or low signal generated by the IC is used to control the water flow by switching the solenoid valve and vice versa. The overall design and unique feature an automatic water tap makes the product user-friendly. It is comfort and easy to plug in a regular water pipe socket for standard hand-washing. The extensively tested of device results to achieve the high levels of reliability. By considering the hygienic to avoid cross contamination, automatic water taps make significant on saving water.

Keywords— Infrared Sensor, Automatic tap, Solenoid Valve, IC, Switching.

I. INTRODUCTION

The concept of an Automatic water tap was first introduced by the Australian Inventor Norman Wareham. Norman Wareham initiated electronic controls of water flow for domestic, commercial, medical and industrial sector. The automatic faucet is equipped with a proximity sensor. The working mechanism helps to opens its valve to flow water in response to the presence of a user's hands in close proximity. The water tap closes its solenoid valve, after a few seconds when it no longer detects the presence of a user's hands. The developed system is able to control the water tap to protect the wastage of water. This device is low-cost compared to other commercial devices available in the market.

Benefits of Automatic Water Taps

Hygiene

Automatic water taps is an hygienic option for washing hand. An increase in the growth of population, to avoid cross contamination automatic water tap plays an important aspect for everybody.

Reliability

Automatic water taps is designed ideally and extensively tested to achieve the high levels of reliability. The Automatic taps can be more reliable with mitigation of price for the consumer.

Save Water

Automatic water taps play a vital role to save the adequate quantity of water. Automatic water taps control the flow of water. It only run when the hands are placed under the spout, limiting the water use to the precise time.

II. EXISTING SYSTEM

Automatic sensor-based taps aid to improve hygienic by eliminating physical need to touch and turn the taps. Most of the automatic water taps follow the classical method of fabrication, where there is in lack of proper hardware components and optimization. These automated taps mitigate the usage of water from wastage.

The device needs a DC power source to power up the device. The initial investment to build the electrical infrastructure made the product little expensive. The existing technology which are available in the market are costly and can't be affordable by normal class people.

III. PROCEDURE / METHODOLOGY

The sensor-based water tap that automatically turns on the solenoid valve when it detects a hand or object near it and turns off after when the object will be far from the sensor. The optical proximity sensor used in this device performs very well and helps to determine the distance between the tap and the users hands. The active infrared sensor emits and receives infrared radiation, which detects the presence of objects. The adjustable infrared sensor can sense transparent or opaque objects and has a maximum sensitivity of about 80cm.

The device is powered by a 12V DC power supply and it also charges the battery parallelly. During the power cut the battery provides the power supply to switch the device. This device is cost-effective and can be fabricated with low cost comparatively less than the market price.

The accurate pre-set control with precise time allows the correct quantity of liquid to be dispensed each time. The precise control of flow rate and time of flow combination, ensures the predetermined quantity needs to be dispensed, which avoids water being wasted. When users move their hands from basins, the sensor controlled the flow of water concurrently without wasting the water.

1. System Architecture

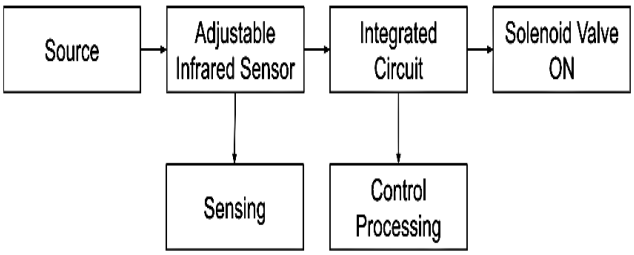

Fig 1.0 System Architecture of Water Tap

2. Flowchart

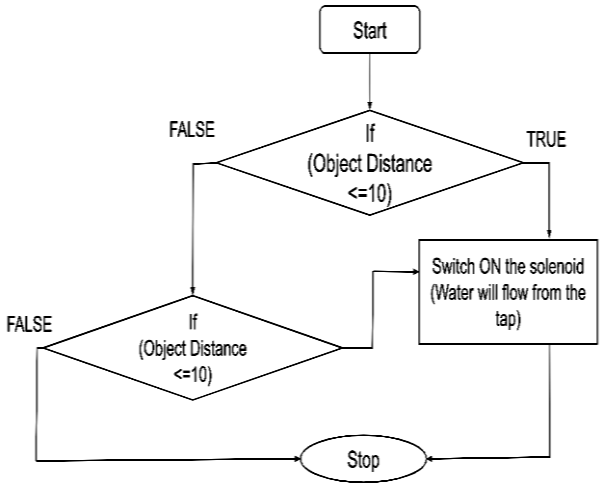

Fig 2.0 Flowchart of Water Tap

A. *Prototype*

Fig 3.1 Front View

Fig 3.2 Back View

Fig 3.3 Side View

Fig 3.4 Side View

Fig 3.5 Down View

Fig: 3.0 Prototype

B. **Result and Discussions**

The development of automatic water taps functioning well and as execution takes minimum amounts of time. With the limited number of resources, this project was developed by using IC chip. The device is powered by a 12V DC power supply. The active infrared sensor emits and receives infrared radiation, which detects the presence of objects.

The accurate pre-set control mechanism controls the flow rate, and precise time allows the flow to be accurately set to provide the correct quantity to be dispensed for each purpose.

C. **Testing**

Once the automatic water tap is done testing will be started to meet the requirements like operations, power consumptions and response time.

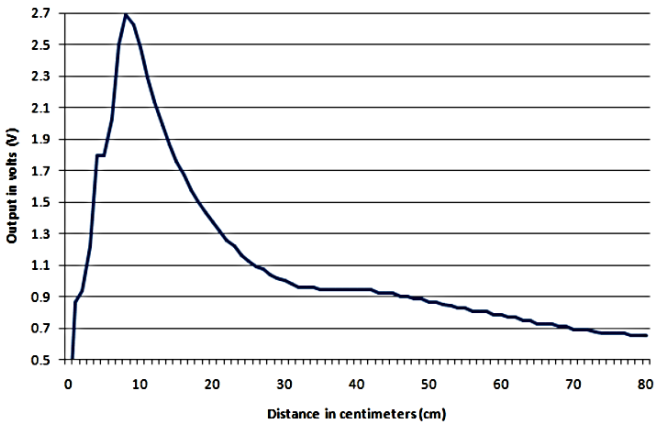

Fig 4.0 Distance Measurement with respect to voltage

ADVANTAGES

1. Fast sensor activation response.
2. Advanced infrared sensor technology.
3. This device helps in conservation of water.
4. The device can be installed easily and it plays a vital role to mitigate the power of electricity and save energy.
5. There is no cross-contamination.
6. Easily Operated by providing external power supply.
7. Cost-Effective, 3 times less compared to market price.
8. It operates on 12v DC supply.
9. The liquid pressure does not affect the switching operation of solenoid valve and won't damage the operation mechanism of it.
10. The outer structure of solenoid valves is fabricated by plastic, it protects the device from the corrosion.

DIS-ADVANTAGES

1. Initial investment is little more compared to traditional taps.
2. Maintenance is mandatory for its long run.
3. The DVA overall design of automatic tap is simple, the various parts is replaceable compared to classical taps.
4. Battery needs to be charged properly even to operate during power cuts.
5. Maintenance as well as proper care is necessary.
6. Continuous power supply is fed to the device.

APPLICATIONS

1. Industrial Application
2. Home Automation
3. Shopping Complex
4. Airports
5. Restaurants and School or Colleges

OBJECTIVES

1. To eliminate the touch aspect while using a tap and mitigate the germs transmission from contact.
2. To mitigate the amount of water wastage caused by the regular taps.
3. The automatic water tap requires less maintenance as compared to a regular tap.
4. Automatic water tap is extensively tested to achieve the high current level of reliability.
5. The quality and cost-effective solutions mainly target the mass where they can use the product.
6. We want everyone to own luxury with an affordable cost.

CONCLUSION

The overall design and implementation of an automatic water tap makes the device unique for hand wash. The tap turns ON automatically whenever it detects the user's hand and turns OFF whenever the user's hand is removed from the tap.

Automatic water tap devices are cost-effective and can be fabricated with low cost comparatively less than the market price. These devices can be used in various sectors, even these days the whole world is suffering from COVID 19, so these types of innovations can help the human being not to spread the viruses from one to another. The main objective of an author, is to fabricate quality products with a low range of cost and also to promote the local made. The quality of product with average cost helps the people to purchase these devices easily without thinking twice. In the age of globalization with the rapid growth of technologies, where everyone wants to own luxury but with an affordable price.

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