Jurnal Mantik, 5 (4) (2022) 2656-2659

Published by:Institute of Computer Science (IOCS)

Jurnal Mantik

Journal homepage: www.iocscience.org/ejournal/index.php/mantik/index

Water Control System at Water Depot With Water Flow Sensor

M. Bachrul Ulum Firmansyah[1], Muhammad Imam Ghozali[2], Wibowo Harry Sugiharto[3]

[123]Informatics Engineering Study Program, Faculty of Engineering,
[123]Muria Kudus University Jl. North Ring, Kayuapu Kulon, Gondangmanis, Kec. Bae, Kudus Regency, Central Java 59327, Indonesia

Email: bachrul.ulum2013@gmail.com[1], imam.ghozali@umk.ac.id[2], wibowo.harrys@umk.ac.id[3]

A R T I C L E I N F O

Article history:

Received: Des 17, 2021
Revised: Jan 16, 2022
Accepted: Feb 20, 2022

Keywords:

Water Depot,
Arduino,
Flow Meter Sensor,
Solenoid Valve,
Water Usage Control Device.

A B S T R A C T

Water is an important component for living on Earth, the presence of fresh water on land makes humans think long term to anticipate the worst possibility in the future, drought. Freshwater currently available has several uses, such as for toilets and kitchen needs, specifically for kitchen needs, the water consumed must be processed, so that the microorganisms contained in the water die, so that they are not dangerous when consumed. One of the steps for treating raw freshwater is so that the consumption screen can do it in one way, filtering. In most water depots currently using this method, the process includes water from a holding tank at the pump and then temporarily stored in a settling tank that has been pressurized O3 (Ozone), then the water enters a filtering tank containing a filter to prevent foreign substances from entering carried away by water, the last water will flow through an ultraviolet light filter to kill microorganisms and in the final stage, the water is ready for consumption. The use of water flow sensors and Arduino microcontrollers at this water depot is to control the use of water per gallon, thereby reducing wasted water when the gallon is slightly tilted.

1. Introduction

Water is a source of life, without which no living creature can survive long on earth, water is also limited and non-renewable, because of its nature the ability to meet and handle human needs is needed. as a source of supply, water conservation must be maintained so that it can be utilized as much as possible to support human life (Article 33 of the 1945 Constitution). According to Nurhasanah et al (2011), the average drinking water consumption in big cities for simple houses ranges from 135-145 liters/person/day, and medium-sized houses between 146-155 liters/person/day, and luxury homes between 156-245 liters/person/per day. Water depot is an alternative to obtain drinking water ready for consumption.

The above problems certainly greatly affect the costs incurred to serve customers, with the advancement of current technology, the author tries to make a tool that automates the machine, using the main device is Arduino, with this device it is expected to reduce unexpected expenses while the machine is operating. So in this paper the author raises the title Water Control System At Water Depots With Water Flow Sensors.

2. Method

2.1 System planning

The research method is the method and stages used by researchers to conduct research starting from the formulation of the problem to finding a solution to the problem according to the desired goal. With clear, interrelated and systematic stages. The research flow can be seen in Figure 2

Accredited "Rank 4"(Sinta 4), DIKTI, No. 36/E/KPT/2019, December 13th 2019.

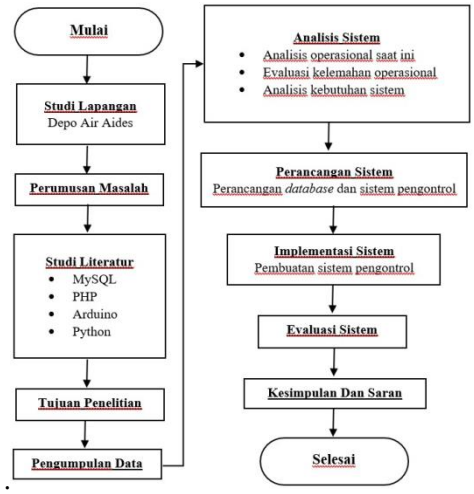

Fig 1. Research Flow

The design of the system in the research there is 1 part, namely hardware design and software design. Hardware design aims to analyze, prepare requirements, and design them before entering the system creation stage. While software design aims to prepare software requirements before being implemented with hardware.

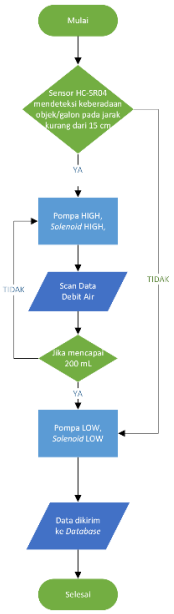

Fig 2. Flow chartControl

Based on Figure 2 above, it can be explained that the flowchart design begins by bringing the gallons closer to a distance of less than 15 cm, when the ultrasonic sensor detects gallons at that distance, then the pump and solenoid will be in the HIGH position, as long as the amount of discharge has not been reached the pump will continue to run.

If the flow sensor data reading has reached the desired total water flow rate, then the pump and solenoid will be in the LOW position, once all processes are complete, the total water flow value data that has been read by the flow sensor will be sent to the database for storage.

Accredited "Rank 4"(Sinta 4), DIKTI, No. 36/E/KPT/2019, December 13th 2019.

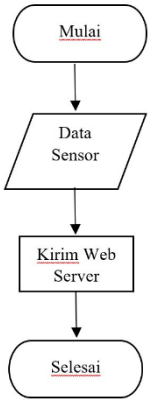

Fig 3. System Monitoring

The flow of Figure 3 starts from the water flow sensor as input data. The data value from the water flow sensor is then sent directly to the Web Server and then displayed on the website page.

3. Result and Analysis

This stage is the stage where the results of the software design are integrated with the results of the hardware design. Figure 3 shows when the HC-SR04 sensor or ultrasonic sensor detects gallons, the Arduino will command the solenoid valve and pump through the relay to turn on or be in the HIGH position, and will continue to turn on as long as the specified water discharge has not been met, the calculation of the amount of water discharge is carried out by water flow sensors. After filling the gallon is complete, the amount of water discharge that has been read by the water flow sensor will be sent to the Web Server which is then displayed on the web display on the browser according to the flowchart in Figure 4.

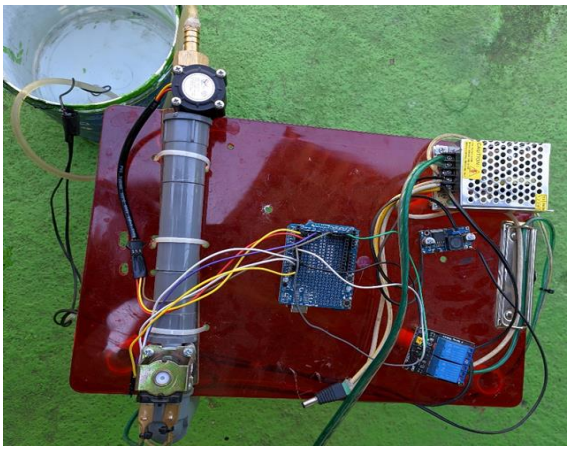

Fig 4. Hardware Implementation

After the design phase, the implementation of hardware and software is complete, then the testing phase is carried out. The table for the accuracy of the water flow sensor is as follows:

Table 1.
Water flow sensor accuracy

Test to-	Calibration Value	Debit Value	Glass Value	Sensor Value	Error
1	18.5	200mL	166	265	63%
2	18	200mL	132	211.4	62%
3	18	300mL	238	327.8	73%
4	19.5	300mL	260	328	79%
5	21	200mL	194	228.8	85%

Accredited "Rank 4"(Sinta 4), DIKTI, No. 36/E/KPT/2019, December 13th 2019.

Fig 5. Monitoring Web Display

4. Conclusion

Based on the analysis and problems that occurred in the above cases, there are several conclusions that can be drawn, among others:

a. The results of the research and discussion conducted by the author, it can be concluded.
b. In this study the author has succeeded in making a water control system at a water depot.
c. With this control system, the owner of the water depot will be able to monitor the use of water for his business.
d. With this water control system, it can increase efficiency in terms of time and water.
e. With this water control system, water depot owners can save money on buying water.

Referencess

[1] Arsada, B. (2017). Aplikasi Sensor Ultrasonik Untuk Deteksi Posisi Jarak Pada Ruang Menggunakan Arduino Uno. Jurnal Teknik Elektro, 6(2), 1–8.
[2] Kurniawan, N., Benino, N., & Sinuraya, E. W. (2015). Membaca Dan Mengirim Data Melalui Protokol Http Menggunakan Library Webclient Arduino. Transmisi, 17(2), 59–62.
[3] Laudon, K. C., & Laudon, J. P. (n.d.). Management Information Systems THIRTEENTH EDITION GLOBAL EDITION.
[4] Mulyana, I. E., & Kharisman, R. (2015). Perancangan Alat Peringatan Dini Bahaya Banjir dengan Mikrokontroler Arduino Uno R3. Creative Information Technology Journal, 1(3), 171.
[5] Riupassa, R. D., & Raflis, H. (n.d.). Optimasi Nilai Konstanta Kalibrasi Pada Water Flow Sensor Yf-S201. 2–6.
[6] Solenoid Valve Definition. (n.d.). Retrieved June 17, 2021, from http://www.solenoid-valve-info.com/solenoid-valve-definition.html
[7] Suprapto, Yuwono K.T, Sukardiyono T., D. A. (2008). Bahasa Pemrograman untuk Sekolah Menengah Kejuruan. (Suprapto, Yuwono K.T, Sukardiyono T., 2008)
[8] Anonim. 2021. Solenoid Valve Definition. (n.d.). http://www.solenoid-valve-info.com/solenoid-valve-definition.html. Diakses 17 Juni 2021 jam 18.15
[9] Python Software Foundation. (2021), General Python FAQ — Python 3.9.6 documentation. https://docs.python.org/3/faq/general.html#what-is-python. Diakses pada tanggal 11 Juli 2021 jam 11.12.
[10] Anonim. 2021. Proto Shield Rev3 (Uno Size) | Arduino Official Store. (n.d.). https://store.arduino.cc/usa/proto-shield-rev3-uno-size. Diakses 17 Juni 2021 jam 18.05.

Accredited "Rank 4"(Sinta 4), DIKTI, No. 36/E/KPT/2019, December 13th 2019.