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Arduino Based Smart Water Purifier

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ABSTRACT: This article is aimed at designing an intelligent Arduino based smart water purifier. Contamination has been a long-standing problem in the country. The older method was unable to monitor the water quality in real time. So, it is necessary to develop a real time water quality monitoring system which gives effective result and save the precious health of human being by alerting them in real time. The existing system has a mechanism which are semi-automated or manually controlled devices which are to be handled by a person responsible for monitoring the water quality. The portable and automatic Arduino based smart water purifier for quality monitoring system saves time and human resources. In order to stay with our original motivations for this article, we had to avoid the complex of drinking water.

KEYWORDS: Arduino Uno R3 Microcontroller, LCD, IOT Module, Water Pump, Voltage Regulator, USB to Serial Converter.

I.INTRODUCTION

Arduino based smart water purifier article the first thing that comes to our mind is the quality of drinking water including a rich minerals. Some minerals present in the water and it is a good idea to consume such purified water. The Quality of Fresh Water is characterized by “chemical, physical and biological” content. Monitoring the water quality helps in detecting the pollution in water, toxic chemical and contamination. The traditional method still in vogue entails collection of water samples, analyzing it in lab and advice for any water treatment and so forth. This paper is considered beneficial for the development of water quality maintaining devices for the measurement and analysis of water used for living things, for example, human beings. All of us consume water every day, so it is indispensable for us. Therefore, water should be checked in real time. ARDUINO UNO is used as core controller and various sensors to monitor the water Quality. The block diagram of the proposed system is shown in Figure 1. Arduino OS run on the Arduino to manage various types of equipment including sensors and so on. Different sensors are connected to Arduino to monitor the conditions of water.

The Arduino will access the data from different sensors and then processes the data. The sensor data can be viewed on the LCD and cloud. The older method was unable to monitor the water quality in real time and notify the users about the contamination. So, it is necessary to develop a real time water quality monitoring and a notification system which gives effective result and save the precious health of human being by alerting them in real time. Water quality depends on ph, turbidity, temperature along with some other factors are significant. A traditional method consists of collecting water sample manually and then sends to laboratory for testing. It takes so much time without providing result in real-time. The existing system has a mechanism which are semi-automated or manually controlled devices which are to be handled by a person responsible for monitoring the water quality.

The objective of this system is to develop a real time system for assessment of fully automated portable water quality. It reduces human effort, covers a large area efficiently. This system consists of different type of sensors, notification module consists of LCD display, WI-FI device and Arduino. The portable and automatic water quality monitoring and notification system saves time and human resources. The notification will be sent to the authorized person when sensor will detect bad water quality and if any user wants to know the current status of the water.

II. PROPOSED SYSTEM

. In this proposed system the water quality is monitored by the use of Arduino based smart water purifier. Arduino board is connected and executes the operation when the condition provided by the users to the microcontroller in the Arduino board satisfied. We can use the normal water purifier instead of smart water purifier both are do the purification of water more in accuracy.

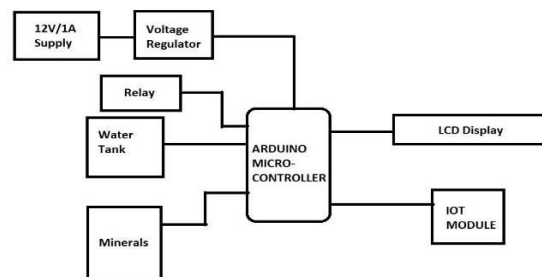


Figure 1: Block Diagram of Proposed System

The Arduino Uno R3 is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. The recommended power supply range is 7 to 12 volts. The regulated power supply used to power the microcontroller and other components on the board.

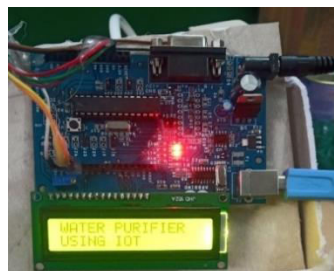


Figure 2: Function of Arduino Uno R3

USB to Serial Converter - CP2102 or CH340G

Incorporated into each Node MCU is a USB to Serial Converter. The official design is based on the CP2102 chipset and offers the best compatibility. Genuine boards use the CP2102 chipset including the officially licensed Amica Node MCU modules. The other common USB to Serial Converter used is the CH340G which is common on the lower-priced modules including the LoLin units.

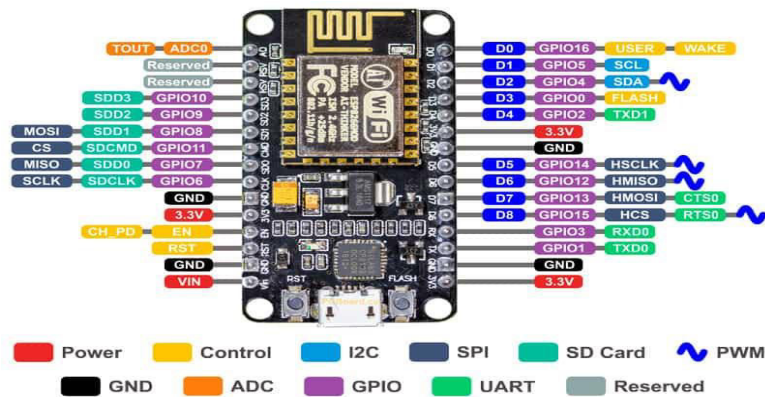


Figure 3: USB to Serial Converter

ACCELEROMETER (ADXL 335)

The ADXL335 is a small, thin, low power, complete 3-axis accelerometer with signal conditioned voltage outputs. The product measures acceleration with a minimum full-scale range of ± 3 g. It can measure the static acceleration of gravity in tilt-sensing applications, as well as dynamic acceleration resulting from motion, shock, or vibration. The user selects the bandwidth of the accelerometer using the CX, CY, and CZ capacitors at the XOUT, YOUT, and ZOUT pins. Bandwidths can be selected to suit the application, with a range of 0.5 Hz to 1600 Hz for the X and Y axes, and a range of 0.5 Hz to 550 Hz for the Z axis. The ADXL335 is available in a small, low profile, 4 mm \times 4 mm \times 1.45 mm, 16-lead, plastic lead frame chip scale package (LFCSP_LQ).

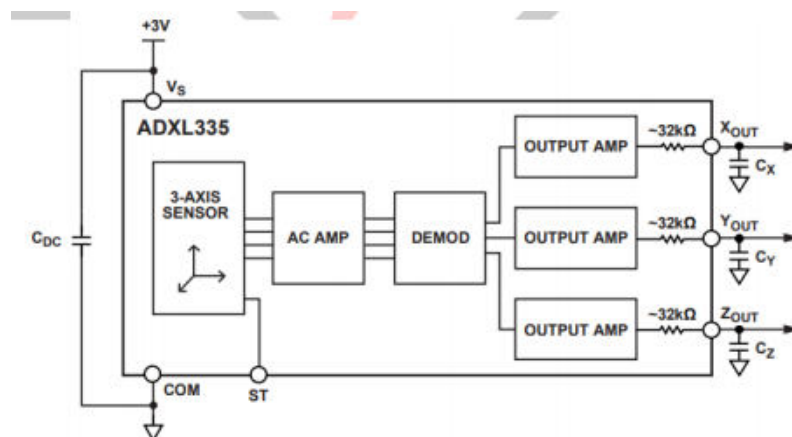


Figure 4: Accelerometer (ADXL 335)

III. SOFTWARE DESCRIPTION

In the software sector, Proteus turns out to be one of the most acclaimed electronic design programs by engineering students and electronics professionals, capable of offering us an advanced simulation of electronic circuits and microprocessors. It's one of the most complete electronic tool packs on the market as in its version 8.5 (the newest of them all), it allows us to create from our PC all the sorts of PCBs or printed circuit boards using almost 800 different microprocessors, and simulate their real-life functioning straight from circuit's schematics. And as couldn't be otherwise taking into account modern times, it integrates tools with which we can design and simulate within the Arduino environment, one of the most popular boards at present. The main components of Proteus Design Suite. This

software includes two main components around which the program's entire functioning revolves :ISIS: the acronym of Intelligent Schematic Input System. The program allows us to carry out the electric design of the circuit, including all sorts of components such as resistors, coils, capacitors, power supplies, and even microprocessors.

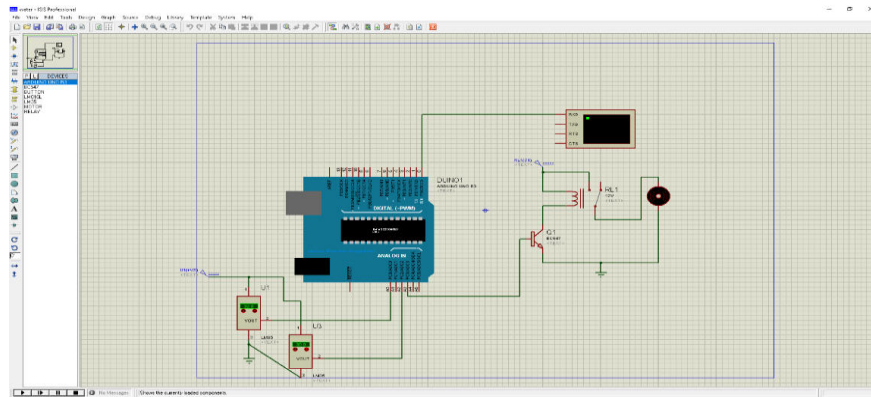


Figure 5(a): All components are connected in the database

The water pump is connected with the Arduino and resistor. The resistor is connected with the ground. This is the starting position of the pump.

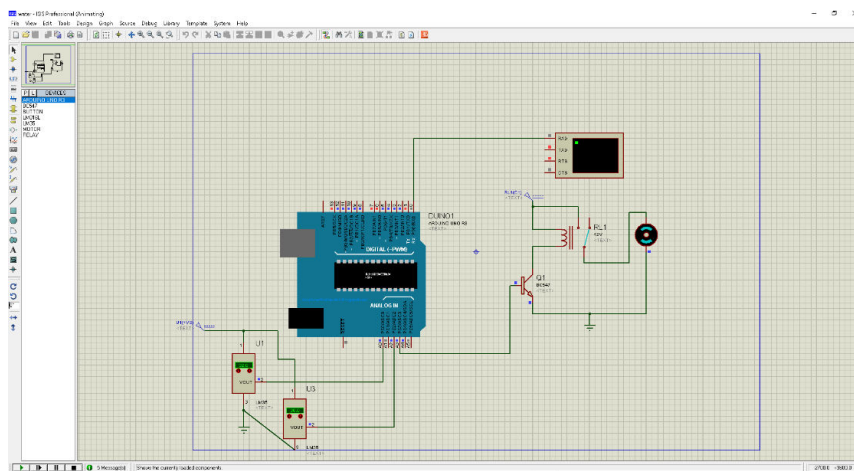


Figure 5(b): Working of Arduino Based Smart Water Purifier

When a pump reaches the system update the Water and Minerals are mixed together and stored in the container.

IV.HARDWARE IMPLEMENTATION

It is a device that can be operated automatically. The idea of automatic controlling involves designing a control system to function with minimal or no human interference.

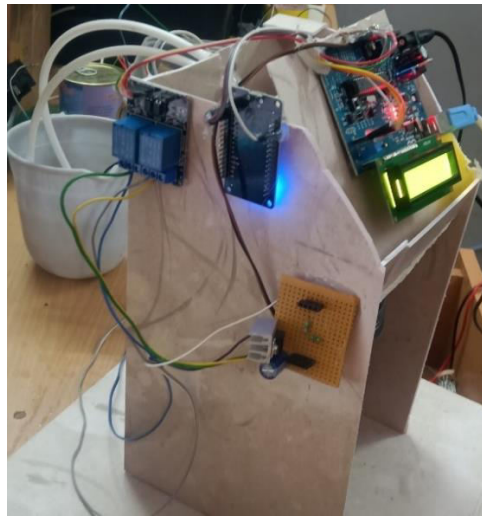


Figure 6(a): Arduino Based Smart Water purifier

Arduino based smart water purifier is an innovative system which is the patient having insufficient minerals. So we check the insufficient minerals through the blood test then adding the values to the application. It mixing the minerals able to drinking water. Due to this type of special arrangement the device can be operated without any interruption. The Hardware prototype shows the entire working process of the Arduino based Smart water purifier in innovative methods.

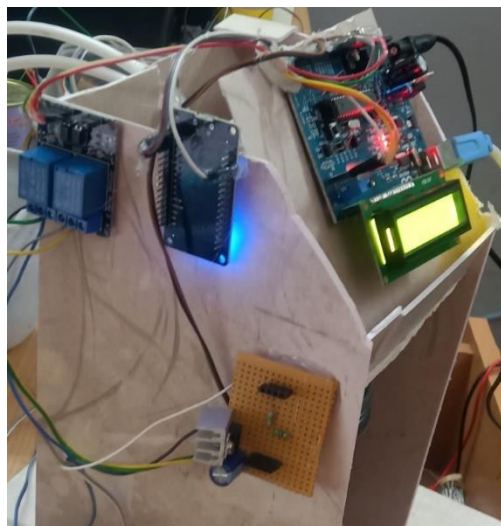


Figure 6(b): Hardware Prototype

V. RESULT AND DISCUSSION

In the software sector, Proteus turns out to be one of the most acclaimed electronic design programs by engineering students and electronics professionals, capable of offering us an advanced simulation of electronic circuits and microprocessors. It's one of the most complete electronic tool packs on the market as in its version 8.5 (the newest of them all), it allows us to create from our PC all sorts of PCBs or printed circuit boards using almost 800 different microprocessors, and simulate their real-life functioning straight from the circuit's schematics. And as couldn't be otherwise taking into account modern times, it integrates tools with which we can design and simulate within the Arduino environment, one of the most popular boards at present. The main components of Proteus Design Suite.

VI.CONCLUSION

Checking from claiming ph from claiming Water utilization relating sensor. Those frameworks might screen water personal satisfaction automatically, furthermore it sends notice with commissioned individual and doesn't require kins on obligation alternately physical participation. There abouts those water nature trying need with be additional economical, helpful and quick. Those frameworks need useful adaptability toward swapping those relating sensors and evolving the pertinent projects. This framework camwood be used to screen other water caliber parameters such as turbidity, temperature, broken down oxygen levels. This project will stretch out to figure the temperature of the water and the turbidity of the water (how clean the water is) and also the ph levels of the Water.

REFERENCES

1. Piyush R. Panditrao and et al. "Cost Effective Automated Water Filtration and Recycling System". International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering Vol. 3, Issue 1, January 2014.
2. S.S.Phuse, R.S.Shelke. "Water Purification System For Remote Areas Using Photovoltaics". International Journal of Engineering Research and Applications (IJERA) . Vol. 2, Issue4, July-August 2012.
3. Niel Andre Cloete, Reza Malekian, (Member, IEEE), and Lakshmi Nair, (Member, IEEE), "Design of Smart Sensors for Real-Time Water Quality Monitoring", published in July19, 2016
4. Thamarai Selvi D, "Potable Water Quality Monitoring and Automatic Billing System", International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, 2015, April 2015, ISSN : 2320 – 3765, Volume 4, Pages 2376-2383
5. O.A.Masia and L.Erasmus, "A study into the implementation of Water Conservation/Water Demand Management in Gautengmunicipalities," 2013 Proceedings of PICMET '13: Technology Management in the IT-Driven Services (PICMET), San Jose, CA, 2013, pp. 2660-2673.
6. Sunil J. Wimalawansa", "Purification of Contaminated Water with Reverse Osmosis: Effective Solution of Providing Clean Water for Human Needs in Developing Countries", International Journal of Emerging Technology and Advanced Engineering, 2013, December 2013
7. Muñoz, M.; Gil, J.D.; Roca, L.; Rodríguez, F.; Berenguel, M. An IoT Architecture for Water Resource Management in Agroindustrial Environments: A Case Study in Almería (Spain). Sensors 2020, 20, 596. [CrossRef] [PubMed]
8. Adham SS et al. (2015). Rejection of MS-2 virus by RO membranes. Journal of the American Water Works Association, 90(9):130–135.
9. Clark RM, Read EJ, Hoff JC (2013). Analysis of inactivation of Giardia lamblia by chlorine. Journal of Environmental Engineering, 115(1):80–90
10. Fitzpatrick JA, Spielman LA (1973). Filtration of aqueous latex suspensions through beds of glass spheres. Journal of Colloid and Interface Science, 43:350–369. Flemming HC (1987). Microbial growth on ion exchangers. Water Research, 21:745–756
11. V. Priyadharshini, V. Vijayalakshmi , S. Vidhyashri , G.Nandakumar, G.Nagarajan, S.Saravanan ,” Design and Development of Garbage Collector Robot”, International Journal of Innovative Research in Science, Engineering and Technology, Vol.10, Issue.10, Pp.13855- 13862, 2021
12. R.Thiruvarasu, V.Vallarasu, V.Vignesh, R.Sundar, R.Vinoth, T.Divya, S.Saravanan,” Smart Safety Monitoring System for Sewage Workers using Arduino”, International Journal of Innovative Research in Science, Engineering and Technology, Vol.10, Issue.10, Pp.13863-13868, 2021
13. K.Perumal, M.Venkatesh, R.Parthasarathi, G.Srinivasan, A.Gukulraj, S.Saravanan,” International Journal of Innovative Research in Science, Engineering and Technology, Vol.10, Issue.10, Pp.13884-13889, 2021
14. A.Ramana Kishor, S.Saravanan, G.Sasikumar, C.Ramkumar, P.Sakthiilakkiya, A.Senthilkumar, S.Saravanan,” Smart Pollution Monitoring in Vehicle Using Arduino”, International Journal of Innovative Research in Science, Engineering and Technology, Vol.10, Issue.10, Pp.13890-13896, 2021
15. P.Selvappriya, V.Shalini, M.Uma Maheswari, R.Punitha, S.Saravanan,” Cultivation of Cash Crops under Automated Greenhouse using Internet of Things”, International Journal of Innovative Research in Science, Engineering and Technology, Vol.10, Issue.10, Pp.13897-13905, 2021



16. A.C.KVigneshkumar, N.Tamilselvan, S.Vishva, C.S.Satheesh, G.Dineshkumar, S.Saravanan, "Wireless Power Transmission Using Class C Power Amplifier from Solar Input", International Journal of Innovative Research in Science, Engineering and Technology, Vol.10, Issue.10, Pp.13906-13912, 2021
17. J.Vinoth, T.Muthukumar, M.Murugagndam and S.Saravanan," Efficiency Improvement of Partially Shaded PV System, International Journal of Innovative Research in Science, Engineering and Technology, Vol.4, Special issue 6, pp.1502-1510, 2015
18. M.B.Malayandi, Dr.S.Saravanan, Dr. M.Muruganandam, "A Single Phase Bridgeless Boost Converter for Power Factor Correction on Three State Switching Cells", International Journal of Innovative Research in Science, Engineering and Technology, Vol. 4, Special Issue 6, pp. 1560-1566, May 2015.
19. A.Sasipriya, T.Malathi, and S.Saravanan, "Analysis of Peak to Average Power Ratio Reduction Techniques in SFBC OFDM System" IOSR Journal of Electronics and Communication Engineering (IOSR-JECE), Vol. 7, No.5, 2013.
20. P.Ranjitha, V.Dhinesh, M.Muruganandam, S.Saravanan, "Implementation of Soft Switching with Cascaded Transformers to drive the PMDC Motor", International Journal of Innovative Research in Science, Engineering and Technology, Vol. 4, Special Issue 6, pp. 1411-1418, May 2015.



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