WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

CHILD RESCUE SYSTEM FROM BOREWELL USING ARDUINO MICRO-CONTROLLER AND IOT

M.G. Hari Darshan[1], S. Hari Priya[1], K.Haripriya[1], P.Subha Sundari[2]

[1]Muthayammal Engineering College, Rasipuram, India. haridarshanmg@gmail.com,
[2]Assistant Professor Dept of Electronics and Communication Engineering,Muthayammal Engineering College, Rasipuram, India. subhasundhariece@gmail.com

ABSTRACT

Water is an essential component in every living being's life and it is mainly used for agricultural purposes. Since India is an agricultural country, our farmers rely primarily on groundwater for irrigation. With increasing population, the demand for water too increased thus deeper borewells are being dug to extract groundwater. When a borewell dries up, then it will be unfit for any kind of usage. Those unused borewells are mostly not closed which turns to be very danger for the animals and children as there might be chances for them to fall down into the borewell dig. There is no proper system to rescue the fallen victim safely A small delay in rescuing the victim may cause death or health issues to them. In order to overcome this problem we have designed our project child rescue system from borewell using IOT. This prototype has a control module which consists of LCD display, motor driver IC, Arduino microcontroller, control switches, buttons and power supply unit. Our paper presents a precautionary step which help usto prevent the victim from falling into the borewell. This is a simple project which helps usto reduce the risk in saving the life of the fallen victim.

1. INTRODUCTION

India is facing water crisis constantly. India makes up 16% of the world's population, but has only4% of the world's fresh water resources. The country,which pumps more ground water than any other country, has reached a water supply bill that could threaten political and economic stability and long- term public health.

Bore wells are being dug to meet the ever- increasing demand for water for industrial, agricultural and commercial purposes. This increases the number of bore wells that extract water from theaquifer on the underside of the surface .Most bore wells that are built to extract pure water are located in areas of human activity, and some do not supply groundwater.

With a significant increase in activity, groundwater is no longer available everywhere. These wells often remain open, which are known to be life-threatening. There is no suitable technique to rescue the victims of borewell accidents. With existing methods, If there is a little bit delay in rescuing the child, the life of child might be lost.

In most cases, rescue efforts did not produce satisfactory results. In such cases, if the area adjacent to the bore hole contains rock below a certain depth, itis very unlikely that the child will be rescued alive. Lack of oxygen and light sources in the borehole poses the greatest difficulty in rescue operations Due to the very long rescue operations and traditional techniques, the child could not be saved.

Our system provides a solution to this issue by preventing the child from falling into the borewell. Thus making this issue more easier to get solved and there is no more need of recue operations for rescuing the child fallen into the borewell as there is no chance for the child to fall into the borewell when we use this system.

Our system gives an alarming sound when somebody is approaching near the borewell , if the person approaching fails to hear the alarming sound and moving very nearer to the borewell then the borewell would be automatically closed with the help of our system. The implementation diagram for proposed system is shown in figure 1**.**

A. RELATED WORKS

Rescue a child trapped from a well is a very dangerous and difficult operation compared to other accidents. With existing methods, it takes more than a day to save a child. There are so many remedies, but most fail. Over the past few days, parallel holes have been dug to rescue fallen victims, a long process. Recently, handheld robots have been developed to save children, but they also have some drawbacks. It cannot hold the complete body while lifting up..

Figure 1: Diagram of Existing System

B. PROPOSED SYSTEM

This proposed system aims to provide a better and more reliable solution for this problem. This rescue system uses a high-tech electronic automation system. An ultrasonic sensor is placed near 100 feet from the borewell. If any movement is detected near the bore well, the ultrasonic sensor will send information to the Arduino Uno controller.The controller will send the alert message through the IoTmodule to the authorized person and display the samemessage on the LCD. Here IR infrared sensor is placed 10 feet near the open bore-well. If any victim comes near the borewell, using an IR sensor it will close the borewell with the help of a CD drive.

The Various hardware components usedfor the design of this system are Arduino UNO, LCD display, and various types of sensors are used for measuring the parameters. Figure 2 shows the architecture of the proposed system.

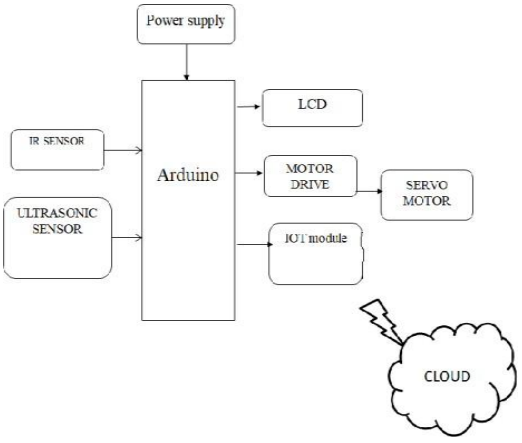

Figure 2: Implementation Diagram

C. HARDWARE COMPONENTS

a) Arduino

Arduino is an open source tool for creating programs that are far superior to desktop computers. The physical world can be sensed and controlled by sensors programmed using Arduino programming. It can be powered by a USB cable oran external 9 volt battery, but accepts a voltage of 7to 20 volts. This open-source computing platform isbased on a simple micro-controller board, and a development environment for implementingsoftware on the board. The Arduino UNO's pindiagram is shown in figure 3.

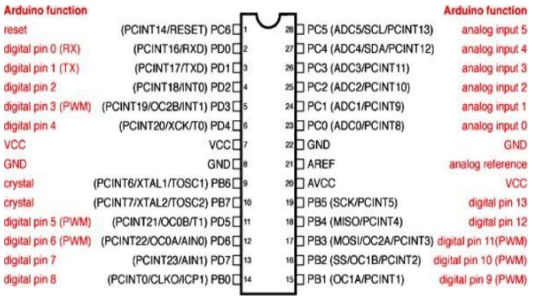

Figure 3: Pin Diagram of Arduino UNO

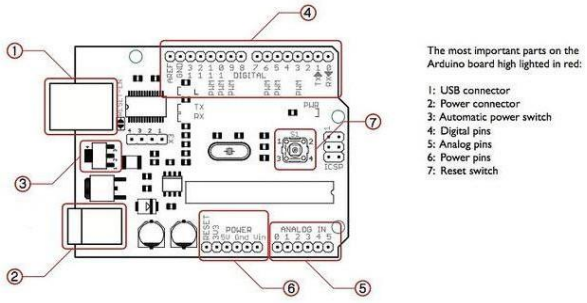

Figure 4: Parts in Arduino Board

b) Ultrasonic Sensor

Ultrasonic sensors (also known as transceivers for both transmission and reception) operate on a similar principle to radar and sonar, assessing the attributes of a target by interpreting radio or sonic echoes. The ultrasonic sensor produces high frequency sound waves and evaluates the echo received from the sensor. To calculate the distance between a sensor and an object, the sensor measures the time elapsed from the emission of sound from the transmitter to the contact with the receiver.

Figure 5: Ultrasonic Sensor

Figure 8: RelayE.Relay

c) Tranducer

Ultrasonic transducers are devices that convert energy beyond the human audible range into ultrasonic waves or sound waves. Dog whistle are technically ultrasonic transducers that convert mechanical energy into ultrasonic waves in the form of pneumatic pressure However, the term more generally refers to piezoelectric transducers that convert electrical energy into sound. Piezoelectric crystals have the property of changing size when a voltage is applied, and when alternating current (AC) is applied, they vibrate at terribly high frequencies and generate sound waves at terribly high frequencies.

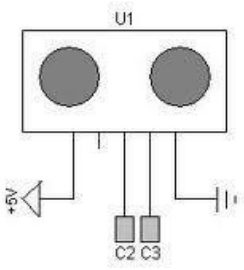

Figure 6: Transducer

d) IR sensor

Infrared (IR) sensors are electronicdevices that measure and detect infrared rays in the environment. IR is invisible to the human eye (but within the same electromagnetic spectrum) because its wavelength is longer than visible light. Anything that emits heat (Kelvin above about 5 degrees) emits infrared light. Infrared sensors are classified intotwo types, active and passive. An active infrared sensor emits and detects infrared rays. The passive infrared sensor (PIR) only detects infrared rays and does not emit them from the LEDs.

Figure 7: Infrared Sensor

The relay is an electric switch. Many relays use electromagnets to mechanically actuate the switching mechanism, but other operating principles are also used. Relays are used when you need to control a circuit with a low power signal (when the control circuit and the control circuit are completely galvanic isolated), or when you need to control multiple circuits with a single signal.

D. SOFTWARE SPECIFICATION

a) Proteus

The Proteus Design Suite is a proprietary software tool suite primarily used for electronic design automation. This software is primarily used by electrical device designers and engineers to create schematics and electronic prints for PCB manufacturing. The micro-controller simulation inProteus works via way of means of making use of both a hex record or a debug record to themicrocontroller component at the schematic. It isthen co-simulated at the side of any analog and virtual electronics related to it.

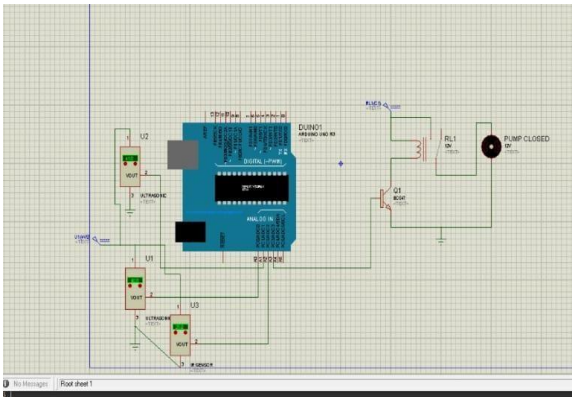

Figure 9: Simulation diagram

The figure 9 represented aboverepresents the simulation diagram produced using the Proteus design suite.

E. IMPLEMETATION DETAILS

a) Flow chart

The flow chart for the child rescue systemis as follows:

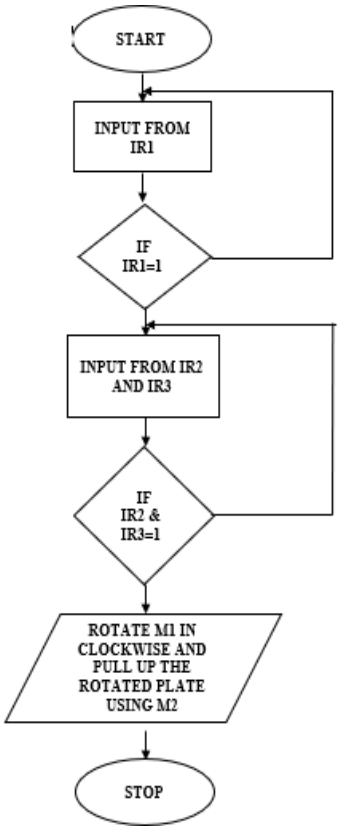

Figure 10: Flow Diagram

b) Steps to implement

1. This system starts working from the Infrared sensor 1, which is placed near the borewell.
2. When there is any motion near the borewell, the IR sensor close to the borewell detects and sends the information to the Arduino Uno controller.
3. Then the controller will send the information to the authorized person who is in charge of rescuing the child through IOT . Thus the life of a child can be saved before falling into the borewell.
4. If this operation fails then the infrared sensors IR2and IR3 placed inside the borewell will activate the dc motor driver by sensing the movements of the child falling and produce a long buzzer.
5. This dc motor driver controls two motors M1 and M2.
6. M1 rotates the vertical plate into a horizontalposition for catching the child.
7. M2 is used to pull the rotated plate upwards along with the child.
8. After saving the child successfully, reset button is provided in order to reset the system to its original position.

9. This system requires the 5 volt AC voltage supply. 10.That we are providing with the help of adaptor which converts 230 volt AC supply into 5 volt dc voltage.

2. RESULT

The output for the child rescue system isobtained from the following hardware connection.

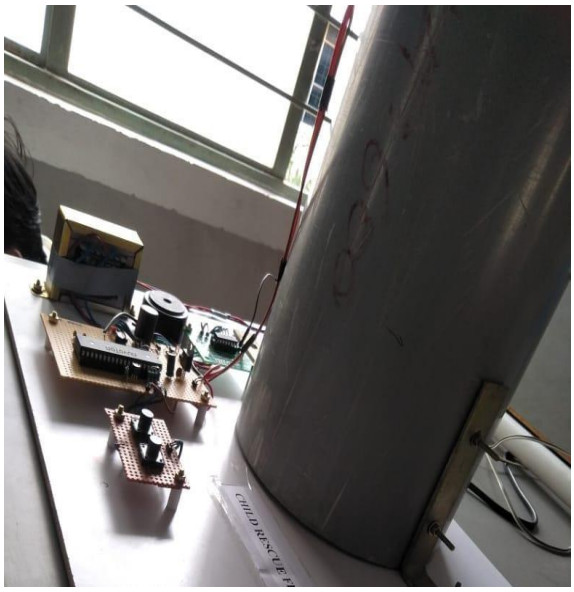

Figure 11: Hardware Connection

3. CONCLUSION

The low-cost and reliable monitoring system to prevent the child from falling into the borewell is going to be designed with the help of Arduino Uno micro controller and various types of sensors. The results obtained suggest that this system can be done efficiently in real-time and at low cost. The data stored in the cloud using IOT can be used for future reference and to get data statistics. This device can be used without GSM module in order to have no signal problem while transferring the alert message to the authorized person. The risk in saving the life of a person can be overcome by using this system. This allows users to use our system efficiently.

4. ACKNOWLEDGEMENT

First and foremost we thank the almighty, the greatest Electronics and Communication Engineers of the universe for giving us such a speculate years. This is the time to express foremost thanks and gratitude to the honorable **Shri. R. KANDASAMY**, Chairman of Muthayammal Educational Trust and Research Foundation for providing the excellent infrastructure to carry out this project.

We wish to express our heartfelt gratitude and hearted thanks to our Secretary **Dr. K. GUNASEKARAN, M.E., Ph.D., F.I.E,**

Muthayammal Educational Trust and Research Foundation, for the motivation, esteemed co- operation and encouragement throughout this work. We express our sincere thanks and profound gratitude to the principal **Dr. M. MADHESWARAN, M.E., Ph.D., MBA,**

Muthayammal Engineering College, for granting permission to undertake this project.

We have immense pleasure in expressing our sincere gratitude to our Dean of Product and Consultancy **Dr. B. GOPI, M.E., Ph.D.,** for his meticulous guidance which was an inspiration to us.

Perhaps our deepest thanks go to **Dr. U. SARAVANAKUMAR, M.E., Ph.D.,** Head of the

Department, Department of Electronics and Communication Engineering, for his stimulating comments, which helped us in bringing things in our way.

We also express gratitude and heart full thanks to our project coordinator **Dr. R. PRAVEENA M.E., Ph.D.,** Assistant professor, who has motivated us in the completion of the project.

We are very thankful to **Mrs. P.SUBHA SUNDARIM.E.,** Supervisor, who has constantly motivated and inspired us in rending to completion of the project. We also express our gratefulness to ourparents, our faculty members and friends for their affectionate blessings and loving co-operation at all stages of this academic venture.

REFERENCE

[1] Peter Racioppo, Pinhas Ben-Tzv," Design and control of a cable-driven articulated modular snake robot", in IEEE/ASMEtransactions on mechatronics, VOL. 24, no.3, June 2019.

[2] Palwinder kaur, Ravinder kaur, Gurpreetsingh "Pipeline Inspection and bore well Research Robot" International Journal of Research in Engineering and Technology (IJRET) volume April 2014.

[3] S.Arthika, S.Chidammbara Eswari, R. Prathipa And. Devasena "Borewell Child Fall Safeguarding Robot," 2018International ConferenceOnCommunication And Signal Processing(Iccsp) , November 2018.

[4] Zhang, Peng & Zhang, Junjie & Chen, Minpeng, "Economic Impacts of Climate Change on Agriculture: The Importance of Additional Climatic Variables Other than Temperature and Precipitation," *Journal ofEnvironmental Economicsand Management*. pp. 8-31, Dec. 2016.

[5] Kenjiro Tadakuma Osaka,"Omnidirectional driving gears and theirinput mechanism with passive rollers" in Intelligent Robots and Systems (IROS), 2012 IEEE/RSJ International Conferenceon 7-12 Oct. 2015.

[6] Shukla, Jainendra, Jitendra Kumar Pal,Faimy Q. Ansari, Gora Chand Nandi, and Pavan Chakraborty. "SMART-A Social Mobile Advanced Robot Test Bed for Humanoid Robot Researchers." inContemporary Computing, pp. 463-470. Springer Berlin Heidelberg, 2012.

[7] Fynn Schwiegelshohn Florian Kästner Michael Hübner, "Enabling Dynamic Reconfiguration of Numerical Methods for the Robotic Motion Control Task" in Parallel and Distributed Processing Symposium Workshops, 2016 IEEEInternational 23-27 May 2013.