

Implementation of Child Rescue from Borewell Section Using IOT Module

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Abstract - This paper introduces a ground-breaking Smart Bore well Child Rescue System, a comprehensive solution designed to tackle the growing concerns surrounding bore well related accidents involving children. The system integrates advanced hardware, wireless monitoring technologies to offer a proactive and intelligent approach to bore well safety. Employing a network of strategically placed sensors and wireless communication protocols, the hardware architecture enables real-time data processing at a central control unit. The incorporation Remote monitoring enhances the system's intelligence, allowing it to discern between routine activities and emergencies by analysing sensor data patterns. This intelligent approach minimizes false alarms and ensures timely responses to critical situations. Notably, the system not only focuses on monitoring but actively assists in rescue operations, providing real-time data on the child's location within the bore well. This information aids rescue teams in optimizing efforts, reducing response times, and increasing the likelihood of successful rescue missions. The paper underscores the significance of technology-driven solutions in proactively addressing child safety, showcasing the transformative power of innovation in tackling societal challenges. The Smart Bore well Child Rescue System not only sets a benchmark for bore well safety but also exemplifies a commitment to leveraging technology for the greater good.

Keywords: Bore well Safety, Wireless Monitoring, Child Rescue System, Remote Monitoring, etc.

I. INTRODUCTION

India is an agricultural country and many farmers depend upon ground water to yield the crop. Due to the enormous amount of increase in population, the crop which is growing is not sufficient to satisfy the hunger of all the people because of scarcity of water and these results in digging of borewells which are burrowed for ground water deliberation. After obtaining water from the borewells, they are not closed properly and kept uncovered. In the current scenario, falling

inside the borewells has been abundantly increasing and this is occurring in many of the towns and cities all over the country.

The main reason for these incidents is by the reason of in attentiveness or bouncy actions of the child. To overcome all these problems, a smart and safe child rescuing solution is to be provided and this is where the need of IoT comes into the picture. IoT is a classification of unified computing devices of powered and numerical machineries where the persons are as long as with the exclusive identifiers and also it has a capacity to handover the data over a system which does not require person-to-person or human to computer collaboration. IoT is a self-motivated world-wide structure with self-operating abilities that is constructed on the typical and interoperable statement protocols in which the physical and computer-generated aspects have their own characteristics. IoT permits the things to be protected and it should be monitored remotely across there maining network set-up, forming the chances for the extra direct incorporation among the physical world and also in computer built systems that raises to an extensive diversity of strategies such as heart nursing implants, plug-in calms in sea side regions along with the built-in-sensors.

This can be obtained for gathering the beneficial information with the assistance of different prevailing machineries and then the unconventional movement the data among other devices takes place. This results in the generation to the concept of smart and safe child rescue system where technical and scientific knowledge has been applied to understand, plan, execute and to monitor all the needs.

II. LITERATURE REVIEW

Borehole Robot for Rescue of a Child, in this paper author proposes a robot which involves three rolls which consists of a rubber grip to which engines are linked and measured by using MATLAB and these wheels are provided with the spring suspension through which the wheels will exactly fit to the walls of the hole which helps the robot to go within the hole without lacking any issues in the system and the robot comprises of an arm that is utilized to élite the child that is present inside the borehole. [1]

Rescue Child from Borewell Using Embedded System, in this paper author proposes a robot system in which the sensors are interfaced with the ARM8 processor and a camera laterally with the LED light is used to see the prey and also assists to activate the system by the controller unit. The vacuume is used to adjust child's position and the arm movement of the robot is controlled by stepper motor and when the child is brought up by the robot, then the BLDC motor is utilized to bring up the child from the borewell and zigbee has a vital character of data transporting among the object that is present within the borewell and also the retrieval team in the global surface. [2]

Smart Borewell Child Rescue System, in this paper author proposes a smart method to save the child and the device consists of the 12volts battery of salvage vehicle and the remotely measured robot is made to go inside the borewell to complete all the procedures and the system which contains the robot along with the balloon to grab the child. The controller will be communicated by the PC through ZIGBEE which is interfaced by the PC via level converter(RS232) and various commands are on condition that is given by the PC to the robot which is moving forward and backward directions and it also monitors the arm to revitalization of the child. [3]

PC based child rescue system from borewell, in this paper author proposes a computer controlled motor to save the child from borewell with a camera fixed to it through which the current position of the child can be viewed. The remotely precise robot is provided and it has to go down into the borewell and it should to complete all the actions, By using this phenomenon, the child can be protected in the interior over a quick period of time without facing any issues. Along with this the engine is precise and there will not be any harm to the child by the machine. [4]

Arduino Based Child Rescue System from Borewells, in this paper author proposes a motorized system that contains the extremely progressive microcontroller and a fine established correct hand gripping machine and a pictorial response system which consists of a high determination camera. The gripper mechanism is functioned by means of switches so as to replace the arm and all the actions are achieved conferring to the instructions specified by the operator and the hardware is interfaced to the PC and the Arduino is used to governor the mechanical setup. [5]

Smart Child Borewell Robot Rescue System, in this author advises a model of robotic system which will get attached to a harness to the child by way of air-filled arms for thrilling up. A teleconferencing system is also being attached into the robot which supports in collaborating with the child along with Bluetooth joining and through which the mechanical system goes inside the borewell. With the

manipulator advice given to the Arduino, the automatic setup of the system will also get measured. The hardware will be devoted to the PC that aids in the incentive of dc motor and such kind of system can grab out the imprisoned child in the borewell carefully with a lesser amount of time. [6]

Smart and Safe Child Rescue System, in this paper author proposes a clipper system to safeguard the child. Here the device consists of the clipper which is used to pick the child with the help of the remote controller. Temperature sensor(LM35), Gas sensor(MQ4), oxygen tube, web camera and the clipper are used as the major components. The sensors are under the control of atmel microcontroller and they are connected to the clipper and the clipper is controlled by dc motor. The hands of the clipper is tied up with the rope of 90cm and it is inserted into the hole manually and a web camera of 5mp is fixed in the arm facing the ground which we can see in PC through which the status of the child can be known. Though it is not a night vision camera along with the LED is fixed with it. Once it is inserted the temperature sensor senses the temperature of the environment and shows the result on LCD and within second gas sensors detects the gas and displays the result on LCD. [7]

Child Rescue System against Open Borewell, in this paper author proposes the ability to display the entombed child which delivers a backup podium to boost up the child driven by many electric motors. Here, the motor-power is placed at the up stage and a gear instrument along with the IR sensors which helps in the movement of three chunks and it is organized and committed at 120 degrees from each other in the direction towards the adjacent of the borewell. The second motor is positioned underneath the plot which turns the bottommost shaft by 360 degrees that benefits to trace the hole. [8]

III. PROBLEM STATEMENT

With the tremendous increase in population, the foremost issue which is faced by the society is water scarcity that primes to huge quantity of bore wells are being ruined and because of this when children are playing near the bore wells they fell into it which results in loss of many innocent kids. The Regular action is to release the child is to pit a crack closer to the bore well, but this reason is tough and also it is dangerous to save a caught child in the bore well and this takes addition al period to pick the child from the bore well.

To avoid all these things, the bore wells has to be properly managed and monitored on regular basis. Currently, there are many ways to rescue the child through digging by using bulldozers and JCB's, but these large vehicles consume a lot of fuel, time and work.

To overcome all these issues, we are going to implement a Child Rescue System.

IV. OBJECTIVES

- The main objective of this project is to design and construct a portable system which is cost effective, quick in action and accurate.
- The Bore well Rescue System is capable of moving inside the well and performs operations according to the user commands.
- Once the system has reached proximity of child, it is stopped immediately and is given the commands by the controlling device to perform the closing of the systemic arms.
- This system consists of gas sensor, which is capable of sensing any gas near the child.
- Manually monitoring the child with the help of camera and controlling unit of system.

V. METHODOLOGY

In current framework, growing water scarcity is the major problem which people come across in day-to-day life. Small children without spotting the hole dug for the bore-well slip in and get trapped. These accidents are mainly happened due to inattention or playful activities of the child.

The occurrence of latest technique provides pragmatic opportunity for new robot power and awareness of new methods of control theory. If the child fall into open bore-wells and rescue operations was almost end with failure. We are developing a machine that can take out the trapped body in a systematic way. It will be a light weight machine that will be setup easily into bore-well and hold the trapped body systematically.

In this technology, there will be no requirement of digging any whole parallel to the bore well. With this machine, we can save the child within less time compare to convectional method and this system named as “Child Rescue System”.

The methodology is divided into three parts.

The first part is on the design structure, followed by hardware description and the finally on the programming design.

All these three parts were assembled together and experiments were then performed.

This device can be advertised amongst the overall audience as it is very affordable and anybody from distinct backgrounds and tradition can manage to pay for it.

VI. SYSTEM DESIGN

In order to overcome the drawbacks of the existing system, a new system is proposed which rescues the child from the bore well.

The Smart and Safe Child Rescue System consists of Temperature sensor (DHT11), Gas sensor (CO2), PIR Sensor, Limit Switch, LCD, IOT, GSM module, Buzzer, dc motor and the Gripper.

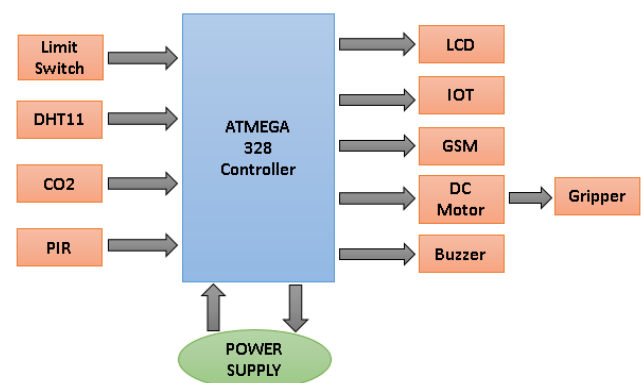


Figure 1: Block Diagram

The sensors are under the control of ATMEGA 328 microcontroller and are attached with the Gripper. The Gripper is controlled by the DC motor. Once PIR sensor detects motion, DC motor will stop.

Once it is inserted the temperature sensor senses the temperature of the environment and shows the result in the LCD and then within a second the gas sensor detects the gas and displays the result in LCD.

Using a block diagram and fundamental components, we gather the components and assemble the circuit in the process. We are currently developing software to run or create a complete program to create a complete model.

VII. RESULT AND DISCUSSIONS

This project presents Child Rescue System from Borewell and it is designed and implemented with ATMEGA 328 Microcontroller in embedded system domain.

Experimental work has been carried out carefully. The result shows that higher efficiency is indeed achieved using the embedded system.

All the objectives had been fulfilled successfully and thus we are able to design a child rescue system to save live. child rescue system is designed with two arms, integrated camera, LED lights, audio and video. The system is capable of moving inside the Borewells from the same hole and perform the

rescue operation. The digitally integrated camera helps to view the position of the child.

Thus, the designed system is helpful in saving the child trapped inside Borewells. It can replace all the old existing technology as it is safer and takes very less time. Saving a life is a big task and we have

All data taken from the sensors will be stored in cloud and analyzed at regular intervals and notification about the events and the view images captured are uploaded to cloud server. The temperature value, gas displayed on 16x2 LCD display. The System also displays the message on LCD.

The Following figure shows the hardware setup of the proposed system:

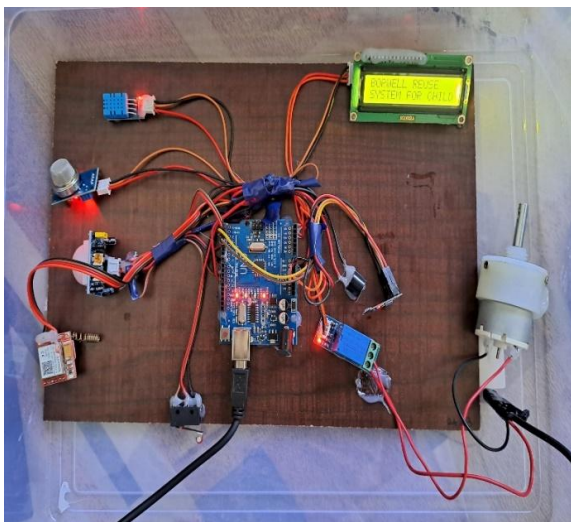


Figure 2: Result of Hardware

VIII. CONCLUSION

In the model we have implemented various types of sensors which brings the automation to child rescue system. This is prototype for rescue operation who are falling in bore well. This is mostly useful technology used in our project with easy rescue operation. This is less time consuming and safe for all human being during such rescue operation. Human life is precious. Our bore well child rescue system is a significant attempt to save the life of the victim of bore well accidents.

Besides this, the unique capability of climbing through vertical and inclined pipes makes wide scope of application for this machine in manufacturing industries and other relevant fields. In the current design of bore well child saver machine has been made to suit every possible situation may occur in rescuing operation. Further, we would like to conclude that with the help of our project, we would be able to rescue the child safely within short period of time.

REFERENCES

- [1] Satyaprasad Tadavarthy, Tarun Chowdary, Naga Sushma Yalamanchali, Yammanuru Jahnvi Reddy, "Borehole Robot for Rescue of a Child" in International Journal of Computer Science and Mobile Computing (IJSCMC), volume 3, Issue 11, November 2014, pp.183-193.
- [2] S.Gopinath, T.Devika, L.Manivannan, Dr.N.Suthanthira Vanitha, "Rescue Child from Borewell using Embedded System" in International Research Journal of Engineering and Technology(IRJET), volume:2 Issue:03 June-2015.
- [3] S.Prakash, K. Narmada Devi, J.Naveetha, V.Vasanth, V.Vishnushree, "Smart Borewell Child Rescue System" in International Research Journal of Engineering and Technology(IRJET), volume:4 Issue:03 March-2017.
- [4] Channabasavaraj B D, Banu Prakash H R, Amar Y N, Benson P Varghese, "PC Based Child Rescue System from Borewell" in International Journal of Latest Engineering Research and Applications (IJLERA), ISSN:2455-7137, volume 2, Issue-5, may-2017, PP-104-112.
- [5] A Sumalatha, M Pradeepika, M Srinivasa Rao, M Ramya, "Arduino Based Child Rescue System from Borewells" in International Journal of Engineering and Technology(IJERT), volumae:7 Issue 2, February-2018.
- [6] M R Chaithra, Monika P, Sanjana M, ShobhaSindhe S R, Manjula G, "Smart Child Borewell Robot Rescue System" in International Journal of Engineering Research and Technology(IJERT), ISSN:2278-0181, May-2018.
- [7] P Sumathy, A. Monika, R. Dhanashree, "Smart and Safe Child Rescue System" in International Journal of Pure and Applied Mathematics, volume 119 No.15 2018, 861-865.
- [8] Prof. Chandrakumar H S, Ashwani L, Lakshmi M S, Shilpa Mandal S, "Child Rescue System Against Open Borewell" in International Journal of Scientific Research and Review(IJSRR), volume 7, Issue 5, May-2019.
- [9] Jayasudha.M, M.Saravanan, "Real Time Implementation of Smart Child Rescue Robot from Borewell using Arm and Belt Mechanism" in International Journal of Innovative Technology and Exploring Engineering (IJITEE), ISSN:2278- 3075, volume-8, Issue-12, October-2019.
- [10] Surya Saravana Pandian, Karthikeyan Sundaraswamy, "Multipurpose Prosthetic Borewell Rescue Robot System", in IAETSD Journal for Advanced Research In Applied Sciences.

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