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Smart Rescue Robot for Open Bore wells

Avinash J[1], Meghana C[2], Nandini N[3], Nischitha V[4] and Nithyashree S[5]

[1,2,3,4] Students, B.E, Electronics and Communication Engineering, Dr. Ambedkar Institute of Technology, Bengaluru, Karnataka - 560056

[5]Assistant Professor, B.E, Electronics and Communication Engineering, Dr. Ambedkar Institute of Technology, Bengaluru, Karnataka - 560056

[1]avinashgowdastu@gmail.com, [2]meghanachandra10799@gmail.com, [3]nandinigowda8@gmail.com, [4]nischithav99@gmail.com, [5]nithyashree@gmail.com

ABSTRACT

The existing state of affair is that several incidents have been reported regarding turning out of abandoned borewells into death wells. Many innocent children are losing their lives by being trapped in these open borewells. Routinely the rescue operations are carried out by involvement of huge machines and lots of man power. Typically,these rescue operations are very lengthy, time consuming and complicated process. The child who is trapped in these death wells is to be rescued using a computer controller motor with camera to monitor posture, position of child and action of robotic arm inside well. In the second method there is no requirement for digging a parallel hole to borewell. The remotely controlled robotic arm will reach down to victim and perform rescue action. Other hassles can be avoided too. The victim can be saved within accurate period without any difficulties.

Keywords – Blynk application, Integrated camera, Robotic arm, Surveillance

INTRODUCTION

Water is an essential requirement in everyday life. Water scarcity, on the other hand, is a major issue in our country. To address this issue, individuals began pumping groundwater by digging borewells, which were eventually drained and left uncovered. As a result, there were more child accidents. Some children, unaware of the exposed borewells, fall inside and become imprisoned. The existing rescue mission to save the child is a failure. As a result, there were more child accidents. Some children, unaware of the exposed borewells, fall inside and become imprisoned. The current rescue mission to save the child is a failure. It's a risky, complicated, time-consuming process that also necessitates a lot of human effort. To address all of these concerns, we propose a solution that is less time consuming, requires less manpower, and allows the child to be saved alive without causing harm to the victim.

Fig1: Borewell mishaps

S.N	NAME OF THE CHILD	AGE	PLACE OF INCIDENT
1	Ms. R Madhumitha	3	Tamilnadu, villapuram
2	Mr. Radheshyam	2.5	Churu Dist, Jaipur
3	Mr. chotu	9	KarauliDist,Rajastan

4	Ms. thanu	4	Palwal, Haryana
5	Ms. Muthulakshmi	7	Suryapalli,thamilnadu
6	Mr. ajith	5	Karim,andrapradesh
7	Ms. Mahi	5	Gurgaon
8	Mr. Ankith	4	Raimalpurakochi
9	Mr. Tirumalesh	1	MahbubnagAndrapradesh
10	Ms. Asmita	1	Rajkot,Gujarat
11	Mr. Om santhosh	1.5	Nashik,maharastra

1.1NEED OF PROPOSED WORK

Our research's major goal is to save a life, perform rescue operations safely, and increase the success rate of rescue operations. The following are some of the drawbacks of the current method:

- Digging a parallel pit of around 110 feet can take up to 30 hours, by which time the infant within would have died.
- Inside the borewell, there is a lack of oxygen.
- The lack of surveillance makes rescue operations extremely challenging (visualization).
- There is no communication between parents and children to guarantee that the youngster is safe.
- People's carelessness in society while youngsters are playing.
- The existing methods and systems are both costly and ineffective.

We have outlined and proposed solutions to all of these flaws as our “smart rescue system”. The following features are included in the B.E project. Benefit to our project:

- The system has the ability to enter the same borewell that the victim has fallen into. As a result, there is no need to dig a parallel hole.
- It takes less time and saves the victim's life.
- The victim is not harmed by the system.

1.2 OBJECTIVE OF RESEARCH WORK

The following are the goals of our B.Tech. final year project, "Smart Rescue System":

- Manually watching the young one with the use of a camera inside the borewell and the system's control unit communicating with the system by sending appropriate commands to it and activate the suitable motors.
- Communicating with the system by transmitting commands and activating the necessary motors.
- When the system gets close enough to the youngster, it activates. The action is immediately performed, and the systemic plates are closed by supplying commands.
- Operating a system that allows a person from the outside to take the victim out of the bore well.

1.3 LITERATURE REVIEW

For finalizing objective of our project work we have reviewed following research papers majorly being related with the technology which we have used in our project work “**Rescue System from Open Borewells**”, apart from books and websites.

N. Bourbakis and I. PapadakisKtistakis [4] describes design of two complementary role to existing larger systemic structures, which mainly perform different rescue tasks. Here the micro- system, called This as, is under developmentby a research team consisted of researchers from the ATRC-WSU

(micro design, software), the Ohio State University (micro antennas). acro-systemic structures in an effort for assisting the detection of human under debris and rescue them. These microstructures will play.

K. P. Sridhar C. R. Hema S. Deepa [5] described a wireless sensor fusion system in the mechanical gripper systemic arm to assist the rescue operation and paramedical team effectively. Multiple sensors are interfaced to the wireless sensor fusion system to acquire the important parameters such as humidity, temperature, CO, and other gaseous levels from the bore well to monitor the condition of the child inside the bore well. In this system picmicrocontroller is used which has low speed operation than Arm.

PreedipatSattayasoonthornand JackritSuthakorn[6] described a battery management for rescue system battery management for rescue systems is summarized in this paper as aguideline for new developers. This paper covers the topics of power consumption, battery selection, battery charging/ discharging and battery maintenance but this system requires more hardware and also its design is complicated so this system is costly.

Wang Chuanjiang [7] Described the framework of rescue system is just, it is composed of rescue mechanism, anchorage set, hoist set, manipulator, frame work, control and communication system. The system can undertake the rescue tasks
for small calibre wells, whose diameters can change from 1m to 0.3m by replacing some mechanisms. This system can be used for small calibre well rescue system. It requires more hardware.

B. Bharathi, B. Suchitha Samuel [10] have done a wirelessly controlled system using Zigbee technology and dc motor-based gripper operation for systemic arm. This prototype uses PIC 16F877A microcontroller in the operation of rescuing the child. The system is operated through PC using wireless Zigbee technology and using wireless camera we can view both audio and video on the TV.

2. METHODLOGY

2.1 BLOCK DIAGRAM

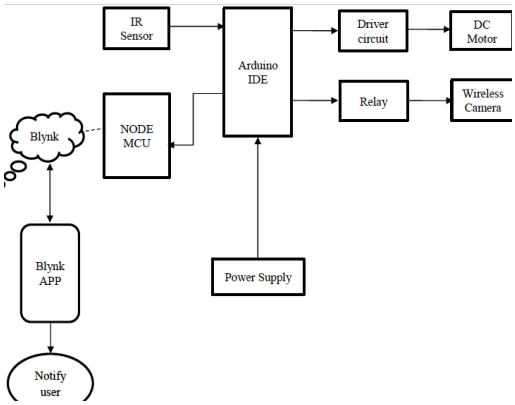
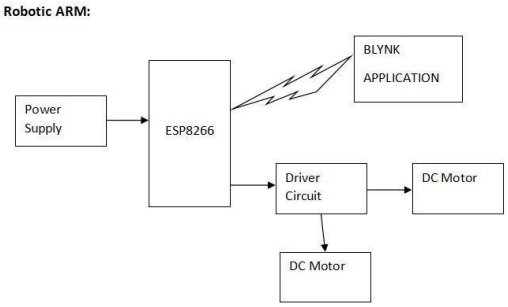


Figure 1.1: Proposed Diagram

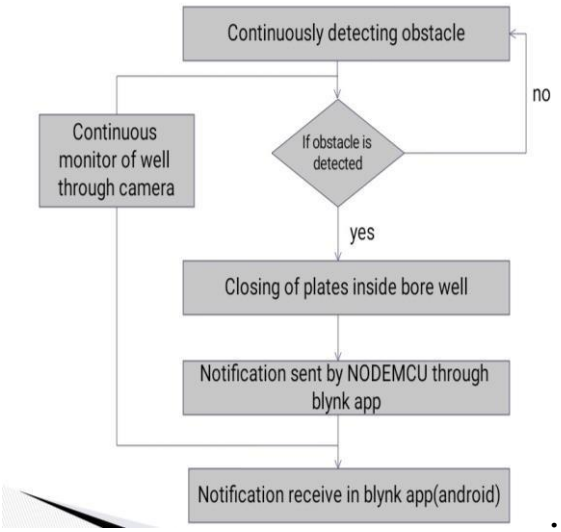
The technique proposed in this paper prevents the child deaths in the bore wells, as the technique stops the child at a certain depth in the bore well and prevents from falling in to deeper in the bore well. In the proposed technique IR technology is efficiently used to identify the child fall in the bore wells. Here we used a 38 KHz PWM sine wave to drive the IR LED to beam a continuous signal, which directly falls on the IR receiver. The output of the IR receiver is high when the IR signal transmitted by the IR transmitter falls on the IR receiver. Whenever the IR beam breaks during the child fall the output of the IR Receiver is low. Which drives a sensing circuit to close the metal stake, these all done before the child reaches the 5 feet depth below the ground level.

2.2 ROBOTIV ARM



All the parts of the system are controlled manually outside the borewell using Switches (1 for rotating DC motor clockwise and anticlockwise, 2 for the opening and closing of the claws). System is taken inside the borewell using pulley and rope mechanism to reach up to the child by visualizing through camera output. Child live position is captured through camera and notification is sent through the blynk application. The harness of the system used in two arms is very soft so that it does not hurt the child while gripping. The system is rotated using DC motor according to the child position. The child is gripped from suitable position and then the system is taken out from the borewell by pulling the rope. Hence, the child can be safely taken out from the borewell using this mechanism.

2.2 WORKFLOW



3. ADVANTAGES

- Since the child is rescued from the existing hole itself, the rescue time will be much lesser than the conventional time so that there is no need of digging the parallel hole beside the existing hole.
- Reliability is high.
- Also, there is Automatic closing bore wall tunnel.

3.1 APPLICATION

- This Proposed rescue system also used in mining field too for rescuing the workers from accidents in mining field and it can reduce the chances of death rate of miners in work related accidents.
- Manhole risks and manual labouring can be avoided easily.

4. CONCLUSION

Human life is extremely valuable. Our smart rescue system project is an important step toward saving the life of a borewell accident victim. The goal of the project was to design a robotic arm and a fall control mechanism for use within the borewell. We installed a fall control equipment that detects the victim and closes the borewell tube, and stops victim from dropping deeper inside borewell and prevents additional injury. Machine has been made to suit every possible situation may occur in rescuing operation. We like to conclude with the help of our project, we able to rescue without any damage. Our prototype has worked satisfactorily and this robotic arm of rescue system must be implemented at panchayath level. It requires one time installation effort and can be benefited for a long time.

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Project Application