Smart Borewell Child Rescue System

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Abstract—**Water scarcity has recently been the main issue in India. People began digging bore wells as a solution to these problems. The vast majority of people in our country live an agrarian lifestyle. and their irrigation system is reliant on water. Children unintentionally fell into the bore well, which produced water and was left exposed. Saving the child who is trapped inside a borewell is a rather difficult task. Currently, the procedure for performing the rescue involves digging a parallel pit near to the bore well with the same depth as the child and creating a passage that connects the two wells. The new well is dug in a little over 30 hours. The infant would have died by then. It involves saving a system module. The safety device revolves around a robot device that can move inside a borehole while being supported by user instructions and outfitted with a robot arm. The child is saved by the robot arm. Robotic arms are used to take up and place children.**

Index Terms— **Unintentionally, Agrarian, Infant, Borehole.**

I. INTRODUCTION

Borewells are a common sight in rural areas and serve as a vital source of water and irrigation. However, they pose a significant danger to children who may accidentally fall into them. The rescue operation in such situations is often a challenging and time-consuming task, leading to many unfortunate incidents. To address this issue, innovative solutions such as the borewell child rescue system have been developed. This system is a specially designed robot equipped with cameras, sensors, and other essential tools to detect and rescue the child safely. The robot can navigate through narrow spaces and drill through hard surfaces to reach the child.

Overall, the borewell child rescue system and its smart variant are innovative solutions that can save countless lives and provide a safer and faster rescue operation.

II. LITERATURE SURVEY

1. Ali et al. [1] There is no need to construct a large trench parallel to the bore well up to the depth where the child is trapped in this method since it uses sophisticated and simple rescue equipment powered by an Arduino. This approach does not rely on a sizable workforce (military, paramedical, etc.) or heavy equipment (JCBs, tractors, etc.). As a result, the time it takes for this resource accumulation to complete may be sped up, increasing the likelihood that the child will survive.

2. Rao et al. [2] Two robotic hands, two gloves, Flex sensors, a microprocessor, and an SX1278 LORA wireless transmitter make up this system. Solid works is used for the robot's design. A supply pipe is attached to the rope to provide the victim with oxygen, and passive sensors are used to detect the radiations the victim's body emits to determine whether the child trapped in the bore well is still alive. A wireless night

vision camera is used to visualise the location of the child trapped in the bore well. They mostly employed ISO-standard rope and pulleys for the operation.

3. Agarwal et al. [3] There is no need to dig any parallel holes with this technology because it can obtain a picture inside the same borewell. The system is taken down into the borewell using a pulley and rope mechanism to reach the youngster, and the entire thing is controlled by two switches. A camera is used to catch the live action, and a microphone and an operational amplifier 7805 are used to communicate with the youngster.

4. Kavianand et al. [4] The system, according to the manufacturer, comprises of a raspberry pi controller, a PIR sensor, an alarm system, and a gsm module. The PIR sensor, which is located at the top of the borewell, is used to detect human movements close to the well regardless of the surrounding environment

III. OVERVIEW

The borewell child rescue system is a specially designed robot that is used to rescue children who fall into borewells. This system includes cameras, sensors, and other essential tools that allow the robot to navigate through narrow spaces and drill through hard surfaces to reach the child safely. The system also includes a communication system that allows rescuers to talk to the child and provide necessary aid.

The borewell child rescue system has proven to be an effective tool in rescuing children from borewells, reducing the risk of injury or death to the child. In recent years, advancements in technology have given rise to the smart borewell child rescue system. This system employs advanced technologies such as AI, machine learning, and the IoT to enhance the rescue operation's speed and accuracy.

Overall, the borewell child rescue system and its smart variant are innovative solutions that can potentially save many lives and provide a safer and faster rescue operation.

IV. EXISTING SYSTEM

The existing system for borewell child rescue involves a manual rescue operation, which can be time-consuming and pose a significant risk to the child. The conventional rescue operation involves digging a parallel hole to the borewell and manually reaching the child, which can take several hours or even days to complete. To improve the rescue operation's efficiency, several innovative solutions have been developed in recent years. The borewell child rescue system is a robot equipped with cameras, sensors, and other essential tools that allow it to navigate through narrow spaces and drill through hard surfaces to reach the child safely. The system also includes a communication system that allows rescuers to talk to the child and provide necessary aid. Overall, the existing system for borewell child rescue is manual and time-consuming, posing a significant risk to the child. The development of innovative solutions such as the borewell child rescue system and its smart variant can potentially save many lives and provide a safer and faster rescue operation.

V. PROPOSED SYSTEM

Borewell child rescue system is an integrated system which rescues child, little animals from bore well. This proposed system consists of Bluetooth technology. Bluetooth technology is a wireless transmission. By using Bluetooth, we can control robot and Arm movements and also the robot movements. Ultrasonic sensor will detect the baby.
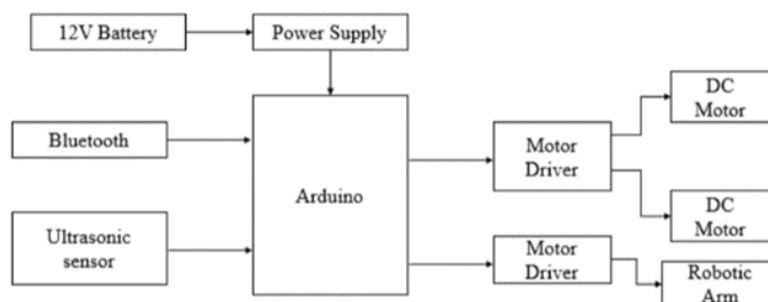
VI. BLOCK DIAGRAM

Fig 1: Block Diagram

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Arduino:An Arduino is a popular microcontroller board used in a variety of electronic projects. In the context of a borewell child rescue system, an Arduino can be used to control and coordinate the various components of the system. For example, it can be programmed to detect when a child falls into a borewell, activate a motor to lower a rescue device into the well, and control the movement of the device to lift the child to safety. The Arduino can also be used to interface with various sensors that are used in the system, such as pressure sensors to detect the presence of the child in the well, and temperature sensors to monitor the condition of the child during the rescue operation. In addition, the Arduino can be connected to communication devices such as GPS and GSM modules to track the location of the rescue operation and send alerts to emergency services. Overall, an Arduino is a flexible and powerful tool that can be used to control and coordinate the various components of a borewell child rescue system, helping to save lives in emergency situations.

Ultrasonic Sensor: The ultrasonic sensor is used to detect the presence of a child in the borewell. It sends out high-frequency sound waves and measures the time it takes for the sound waves to bounce back. If there is an object in the borewell, the sensor will detect it and send a signal to the Arduino.

Motor Drivers and DC Motors: The two motor drivers are used to control the two DC motors. One motor is used to move the robotic arm up and down, while the other is used to move the system horizontally. These motors are used to position the system above the child and move it closer to the child for rescue.

Robotic Arm: The robotic arm is used to lift the child out of the borewell. It is controlled by the Arduino and the DC motor connected to the motor driver.

Bluetooth Module: The Bluetooth module is used to communicate with a remote device, such as a smartphone or tablet. This allows the user to monitor the system and receive real-time updates on the rescue process.

VII. WORKING

First, connect the ultrasonic sensor to the Arduino. Connect the VCC and GND pins of the ultrasonic sensor to the 5V and GND pins of the Arduino, respectively. Connect the TRIG and ECHO pins of the ultrasonic sensor to any two digital pins of the Arduino. Connect the Bluetooth module to the Arduino. Connect the VCC and GND pins of the Bluetooth module to the 5V and GND pins of the Arduino, respectively. Connect the RX and TX pins of the Bluetooth module to any two digital pins of the Arduino. Connect the two motor drivers to the Arduino. Connect the VCC and GND pins of the motor drivers to the 12V battery. Connect the IN1, IN2, IN3, and IN4 pins of the motor drivers to any four digital pins of the Arduino. Connect the DC motor to one of the motor drivers. Connect the positive and negative terminals of the DC motor to the OUT1 and OUT2 pins of the motor driver, respectively. Connect the robotic arm to the other motor driver. Connect the positive and negative terminals of the robotic arm to the OUT3 and OUT4 pins of the motor driver, respectively. Finally, power up the system by connecting the 12V battery to the power supply connected to the Arduino.

Once the system is set up, it works as follows:

The ultrasonic sensor measures the distance to the bottom of the borewell. If the distance is less than a certain threshold (indicating that a child has fallen into the borewell), the Arduino sends a signal to the motor drivers. The motor drivers use the signal to control the DC motor and robotic arm. The DC motor lowers a rope with a loop at the end into the borewell. The robotic arm grabs the loop and pulls the child to safety. The system can also be controlled remotely using the Bluetooth module.

VIII. APPLICATIONS

Here are some possible applications of the borewell child rescue system:
1. Emergency Services: The primary application of the borewell child rescue system is in emergency situations where a child has fallen into a borewell.
2. Public and Private Sector: The borewell child rescue system can be used by both public and private sector organizations that deal with borewell drilling or maintenance.
3. Awareness Campaigns: The borewell child rescue system can be used as part of awareness campaigns to educate the public about the dangers of uncovered borewells and the importance of child safety.
4. Research and Development: The borewell child rescue system can be improved and developed further to make it more effective and efficient.
5. Quick Response: The borewell child rescue system can provide a quick response to rescue children who have fallen into borewells.

IX. CONCLUSION

The borewell child rescue system is a critical technology that has helped to save the lives of many children who have fallen into borewells. It is an innovative solution that utilizes advanced technology to locate and rescue children trapped in borewells, which can be challenging and time-consuming for rescue teams. The system comprises various components, including drilling machines, cameras, and sensors, which work together to locate and rescue the child safely.

The borewell child rescue system is a significant advancement in the field of rescue technology and has proven to be effective in several rescue operations. However, it is important to note that prevention is always better than cure, and efforts should be made to prevent such incidents from happening in the first place. Measures such as proper maintenance of borewells and adequate safety regulations can help to prevent such accidents.

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