Child Rescue System From Open Borewell

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Abstract: *The Child Rescue System using ESP 32 Camera and Motor Drivers is an advanced safety mechanism designed to assist in the rapid and safe rescue of children trapped in confined or hazardous spaces, such as bore wells or tunnels. The system is equipped with a 32-camera module array for comprehensive 360-degree real-time visual monitoring, enabling rescuers to assess the situation with high precision. The cameras are integrated with a microcontroller-based system that processes the feed and relays it to a control center for live supervision.*

To perform physical rescue operations, the system includes motor drivers and mechanical arms controlled via remote interface. These arms can be maneuverer to carefully lift or provide life-support tools (like oxygen masks) to the child without causing harm. The motor drivers ensure smooth vertical and angular movements of the rescue unit within the confined space.

The child who is stuck inside the hole is to be saved by the clipper which pick and place the child with the help of remote controller. The clipper is left inside manually by the rope tied up at its hands. In this alternative scenario there will not be any requirements of digging hole parallel to the bore well. It also consists of camera which is affixed to the clipper which is used for monitoring the child. By this camera we get the visuals of the child and their condition.

Keywords: *Child Rescue System*

I. INTRODUCTION

In recent times, the issue of children accidentally falling into open borewells has become an alarming concern, especially in rural and underdeveloped areas. These incidents are often life- threatening due to the depth and narrow diameter of the borewells, making traditional rescue operations extremely challenging, time consuming, and risky. The need for a fast, safe, and efficient rescue system has led to the development of a Child Rescue System for Open Borewells using modern electronic and robotic technologies Our proposed system focuses on designing a robotic rescue device that can reach the trapped child, monitor their condition, and safely extract them without causing injury. This system is built using key components such as the ESP32 microcontroller, DC motors, motor drivers, and various sensors and cameras.

ESP32 serves as the brain of the system, offering powerful processing capabilities along with built- in Wi-Fi and Bluetooth for wireless control and monitoring.

DC motors, controlled via motor drivers, are used to precisely move the robotic arms and other mechanical parts to reach and securely hold the child.

High-resolution cameras are mounted to provide a real-time video feed, allowing rescuers above ground to see and control the operations remotely.

Oxygen supply systems are also integrated to ensure that the child can breathe comfortably during the rescue process.

Additional sensors like temperature, humidity, and gas sensors are deployed to monitor the bore well environment and ensure safe conditions throughout the operation.

The robotic arms are designed to be soft-gripped and flexible to safely secure the child without applying excessive force. Using wireless communication via the ESP32 module, rescuers can control the robot's movements accurately even from a distance.

By combining mechanical design with embedded electronics, the Child Rescue System for Open Borewells dramatically reduces the time and risk involved in rescue operations. It represents a cost-effective, reliable, and efficient solution to save lives and respond quickly during such critical emergencies

Block Diagram
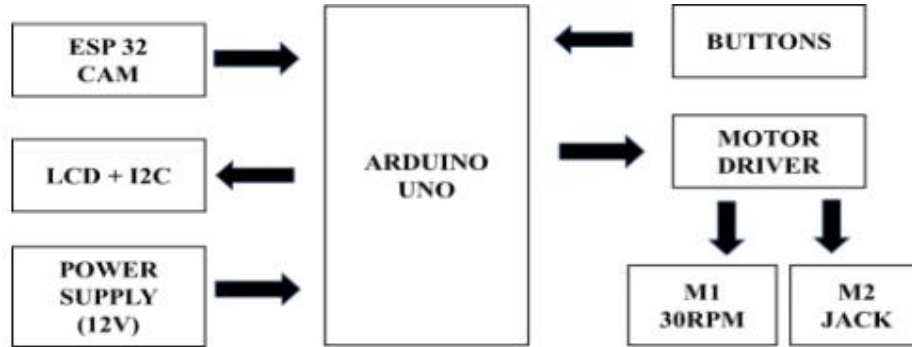
II. LITERATURE SURVEY

In addition to books and websites, we have studied the research papers listed below in order to finalise the goal of our project, "Child Rescue System from Open Borewells." The majority of the articles having to do with the technology that we used in this project.1. Pandit Sumit The explanation revolves on saving babies that had fallen into a borewell. There have been several reports of kid deaths so far. Owing to the low water level, bore wells are dug deeper. The baby's rescue is the project's main goal. Digging a parallel trench to carry out the rescue takes more than a day, and so far there has been no real progress.

The project's main accomplishment is that the youngster will be saved before it descends too far since it uses infrared signals for communication. An alarm bell on a mobile phone sounds when the infrared signal breaks two inches diametrically under the bore- well's ground surface because of an obstruction. To stop the babies from falling further into the well, a stake that is maintained a few feet lower in the bore-well shuts the bore. A large number of these incidents occur in agricultural bore wells. 2. Professor Chandra Kumar H S, describe the several incidents in which kids have fallen into an exposed, abandoned bore-well and became imprisoned. For kids, abandoned bore wells seem to be death traps. Due to these bore-wells, several innocent lives have begun to be lost. In these situations, rescuing children from boreholes often involves a labour- intensive, large-scale machinery procedure.

The purpose of this study is to rescue children who fall into bore wells. To this end, a novel design is proposed, in which a sensor is placed above the bore well hole to aid detect when a kid goes inside. The automated horizontal closure, which is maintained at around a 3-foot depth, shuts automatically if the device detects a kid, keeping them from plunging below. It has the ability to keep an eye on the kid who is stuck and provide a platform for lifting them up using motors. Three blocks that are positioned at a 120- degree angle to one another are pushed towards the side of the bore hole by the gear mechanism that is turned by the motor at the top

III. EXISTING SYSTEM

The traditional approach to rescuing a child stuck in a bore well involves digging a parallel pit and creating a horizontal tunnel to reach the child, which is time-consuming, labour- intensive, and potentially dangerous. New systems aim to overcome these limitations by using robotic arms, video surveillance, and other technologies to rescue the child directly within the borewell.

In many parts of the world, especially in countries like India, child safety continues to be a major concern due to incidents such as children falling into open borewells, getting lost, or becoming victims of trafficking. Several systems currently exist to respond to these issues, each with its own approach, tools, and limitations

IV. PROPOSED SYSTEM

The bore wells, which successfully hit the water does not pose threat because those are completely sealed with casing after installing the motors. Bore-wells which are not successfully hit the water at maximum depths, they are left uncovered and abounded. Such bore wells are called dry or dead borewell, these uncapped bore-wells become threat to the children. There are many incidents filed against bore-well death of children are rising day by day. Up to now the methods used to save the child, fallen in the bore-well is manual rescue method. In which a big hole is dug beside the bore well up to the depth where the child is stuck. During this process a huge number of human resources (military, Paramedical, etc.), machinery (JCBs, Tractors, etc.) is used. A small delay in these resource accumulations may reduce chances of saving child alive. If the area beside the bore hole contains rocks below certain depth, this situation becomes very worse if the size of the rock is very big in such cases the whole process is to here initiated again from new place. In such cases the chances of saving child alive is very low. Whatever may be the case the success ratio depends on lots of factors like availability of machinery, time taken for transportation of machinery to the situation, availability of human resources and mainly the response time of various government organizations. In India according to the NCRB report of 2011 there are 5 average deaths per day due to the abandon bore wells.

Here in this project, the child who is stuck inside the hole is to be saved by the clipper which pick and place the child with the help of remote controller. The clipper is left inside manually by the rope tied up at its hands. In this alternative scenario there will not be any requirements of digging hole parallel to the bore well. It also consists of camera which is affixed to the clipper which is used for monitoring the child. By this camera we get the visuals of the child and their conditions.

V. RESULTS AND DISCUSSIONS

The implementation of the Child Rescue System has led to significant improvements in identifying and rescuing missing or trafficked children. By using technologies such as GPS tracking, sensors, and real-time alert mechanisms, the system is able to monitor child movements, detect suspicious situations, and instantly notify authorities or guardians. This reduces the response time for rescue operations and increases the chances of safely recovering the child. Additionally, the system enhances coordination between law enforcement agencies, transport departments, and child welfare organizations. Overall, the system plays a crucial role in improving child safety, preventing trafficking, and ensuring timely intervention during emergencies.

VI. CONCLUSION

"Smart and Safe child rescue system" is mainly designed to save many lives of children who fall inside the bore well. In the past 10 years, lots of lives had been lost by falling in to the bore well because digging a pit beside the bore well is too long and time consuming process. By using proper motors, arms and advanced technology this project is implemented successfully. This can be concluded that the proposed system can retain the lives of many children who fall into the bore well in future.

The Child Rescue System represents a significant advancement in child safety, leveraging modern technologies such as GPS tracking, facial recognition, and real-time alert systems to ensure timely identification and rescue of missing or trafficked children. By improving the coordination between law enforcement agencies, child protection organizations, and transport authorities, the system reduces response time and enhances overall safety. Its successful implementation in public spaces, schools, and transportation hubs demonstrates its potential to protect children from harm. Ultimately, the Child Rescue System plays a crucial role in preventing child abduction and trafficking, ensuring a safer environment for children everywhere.

VII. FUTURE SCOPE

In future this project will be used in several applications by adding additional components to this project.

1. This proposed system can send these robots to dangerous zones by connecting smoke sensor to the robot we can get the information related concentration of smoke or gases in respective fields and sensor will detect the poisonous gas and it gives information to the Microcontroller and microcontroller gives the information to the transceiver from that we can get the data on the PC side.

2. The future upgrade of our task is to incorporate Gas sensor which is utilized to check any lethal gas present inside the bore well. Although this, an oxygen test can be associated which is utilized to supply oxygen to the kid. 3. Then the potentiometer is get replaced by hand gesture mechanism to increase the rescuing time from the bore well.

The Child Rescue System has great potential for future development. It can be enhanced by using artificial intelligence for accurate child identification, integrating wearable devices for real-time tracking, and connecting with national databases for faster detection of missing children.

Expanding the system to more public places and transport systems will further improve its effectiveness in ensuring child safety.

• AI & Facial Recognition: Integration of AI for identifying missing children through surveillance and public cameras

• IoT & Wearables: Use of GPS-enabled smart bands or wearables for real-time child tracking and alerts.

• Block chain for Records: Secure and tamper-proof storage of child data and case histories for transparency.

• Data Analytics: Predictive analytics to identify high-risk zones and patterns in child abduction or trafficking.

• Mobile Apps & Chatbots: User-friendly reporting tools and chat bots for faster public and police communication.

• National & Global Integration: Creating unified national and international databases for cross-border tracking.

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