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SMART CHILD RESCUE SYSTEM FROM OPEN BOREWELL USING ARDUINO

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ABSTRACT

In India, there have been several accidents of children falling into abandoned borewellswhich are left uncovered. In present time, children fall in the Borewell due to the carelessness nature of the people in society. The currently available systems to save the child are less effective and costly too. Thus the society is in need of a new technique which is more efficient and effective. In most cases reported so far, a parallel hole is dug and then horizontal path is made to reach the child. It is not only a time taking process, but also risky in various ways. Children with less awareness of their surroundings get trapped by the bore wells, accidentally. Although the rescue operation is ongoing, many factors, such as lack of sufficient oxygen, rising temperature, cause another risk for child in such depth. Rescuing children from such situations is a challenging task. Without major risks, the proposed system rescues the child.

This project proposes an efficient system which helps in rescuing a trapped victim from borewell. This system consists of DC motor assembly which is automatically controlled by motor driver to slide a plate mechanism such that the child will not go to the bottom of the borewell. The falling of the child into the borewell is sensed through the PIR/IR sensors and automatically the plate driven by the motor is operated to close the borewell and stop the child falling below. And it automatically transmits the same information along with the location details to the concern authorities or departments in the form of SMS through the GSM interfaced to the system. Thus the rescue operations can be further processed with minimum time lapse.

The advancement in the field of automation along with the mechanical design has a great impact on the society. This project includes series of process development from hand drawn sketches to computer generated design. The modern equipments are implemented for various parts of the system, since the system performs a life rescuing activity. The light weightmotor is implemented for the system's operations.

Keywords; GSM, Arduino.

I. INTRODUCTION

In present scenario there have been several incidents reported on abandoned borewells which are turning in to death wells. Many innocent children are being trapped into these borewells and losing their lives. The actual purpose of borewells is to save lives, but these borewells in turn have started taking many innocent lives. In several cases the rescue operations are done by big machines and lot of man power involvement. Usually these rescue operation are very lengthy, complicated and very time taking processes.

This project presents a simple and effective method to rescue the child from the borewell. The traditional way to rescue the child is to dig a parallel pit to adjacent to the bore well. This method is difficult, lengthy and also risky to rescue the trapped child. In the proposed methodmechanical system moves inside the borewell channel like a lid that slides and stops the child falling deep into the borewell. As the project is designed as automatic, the falling of the child is sensed through the IR sensors and operates the lid to catch the child falling deep into the borewell. Simultaneously the information along with location details will be sent to the authorized mobile number in the form of SMS through GSM that is interfaced to the control system. The hardware is interfaced to the control system that is designed using arduino setup is used to control the mechanical set up and the entire operation.

The bore wells are sometimes left open without any proper covering. The rescue operations in many cases are more risky even to the rescue team members. A small delay in this whole process may reduce the chances of saving the child. If the area near the bore hole contains rocks below certain depth, chances of saving the child becomes very less. Whatever may be the case the rate of success depends on lot of factors like time taken for transportation of machinery to the situation, human resources and mainly the response time of various government organizations. At present there is no proper method for dealing with this problem. The holes drugged for the bore wells are around 700 ft deep.

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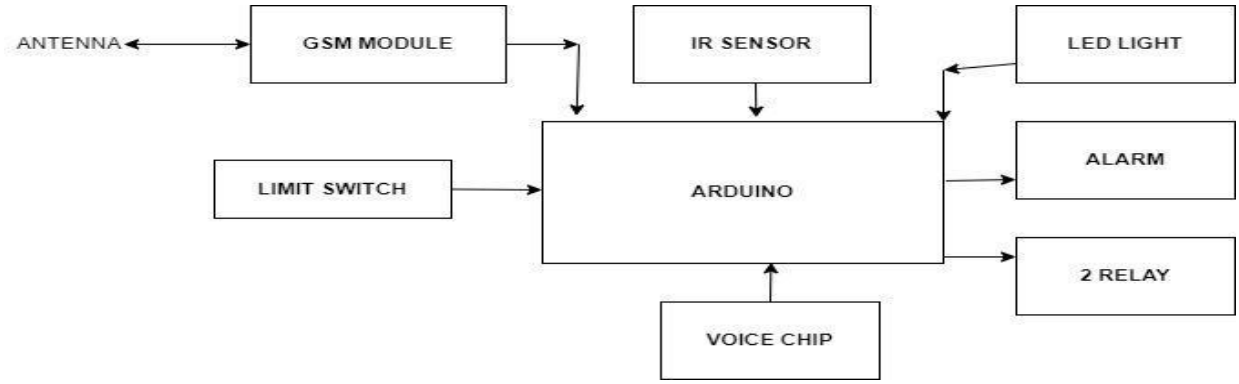
II. WORKING

This paper deals with the design and implementation of Smart child rescue system from open borewell using Arduino. The Obstacle Sensing circuit Designed with IR Sensors that are arranged in the borewell for identifying the child fall into the borewell. The obstacle-sensing block is designed with LM567 IC, this is a tone decoder IC, and also it generates tone frequency. For identifying the obstacles, a set of sensors are used with a 567 IC. The obstacle sensing block is designed with infrared sensors; a set of IR sensors are used as IR signal transmitting LED and IR signal receiving LED. These sensors are arranged side by side and are mounted inside the borewell at certain depth. Both the sensors are wired with IC 567, this is a tone frequency generator cum decoder IC, means this IC can produce a tone frequency of up to 20 KHz, and the same IC also can decode the frequency. Since this IC can perform two different functions, the IR signal transmitting LED is connected at the output of tone signal generating part of IC, similarly the IR signal receiving LED is connected at the output of tone signal decoding part of IC.

The tone signal generating part is configured as free running oscillator, with the help of a resistor and capacitor connected externally to this oscillator frequency can be adjusted. When the circuit is energized it starts producing a continuous chain of square pulses. The output of this oscillator is amplified and fed to IR LED. This LED radiates the signal in to air and depending up on the signal strength or radiating power, the range can be increased. The IR signal delivered from the IR LED transmitted in a line like a laser beam, this beam is invisible and harmless. When the transmitted laser beam interrupted by any obstacle, this beam will be disturbed by the object and some of the signal will be reflected, this reflected signal will be received by the receiver infrared LED. The output of IR-Receiver is (proportional to reflected wave) found for matching (comparing) with that of transmitted wave, and then the output of the IC will becomes low automatically (If both are equal then output of this IC becomes low). The output of this tone decoder IC is fed to microcontroller. The following is the diagram of sensing circuit.

BLOCK DIAGRAM



MODULES OF THE PROJECT

1.ARDUINO UNO

The Uno is a huge option for your initial Arduino. This Arduino board depends on an ATmega328P based microcontroller. As compared with other types of Arduino boards, it is very simple to use like the Arduino Mega type board. .It consists of 14-digital I/O pins, where 6-pins can be used as PWM outputs), 6-analog inputs, a reset button, a power jack, a USB connection, an In-Circuit Serial Programming header (ICSP), etc.

2.GSM MODULE

GSM is known as Global System for Mobile Communication. A technology developed in 1985 by a French company known as Group Special Mobile. In fact this communication system is designed for personal communications, but today this technology has been in use for many applications. The only one technology, which doesn't have any range restriction in wireless communications, any device which is controlled or monitored can be operated anywhere fromthe world.

3.LM567 IC

The LM567 IC is a general-purpose tone decoder designed to provide a saturated transistor switch to ground

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when an input signal is present within the pass band. The circuit consists oftwo-phase detectors i.e., Q and I detector that are driven by a voltage-controlled oscillator, which determines the center frequency of the decoder. External components are used to independently set center frequency, bandwidth, and output delay.

4.RELAY

A relay is an electromechanical switch. It is electrically operated. When current is sent througha coil, a magnetic field is created. That magnetic field turns the relays steel core into a magnetthat closes a set ofcontacts. Relays have four pins. Two are for the coil that operates the electricswitch and the other two are the contacts of the switch. This project needs relays because the motor used exceed the current limits ofthe controlling transistors. To turn the motor on, a signalis sent to a transistor that closes the circuit containing the relay's coil, that closes the contacts of the relay and hereby illuminating the motor.

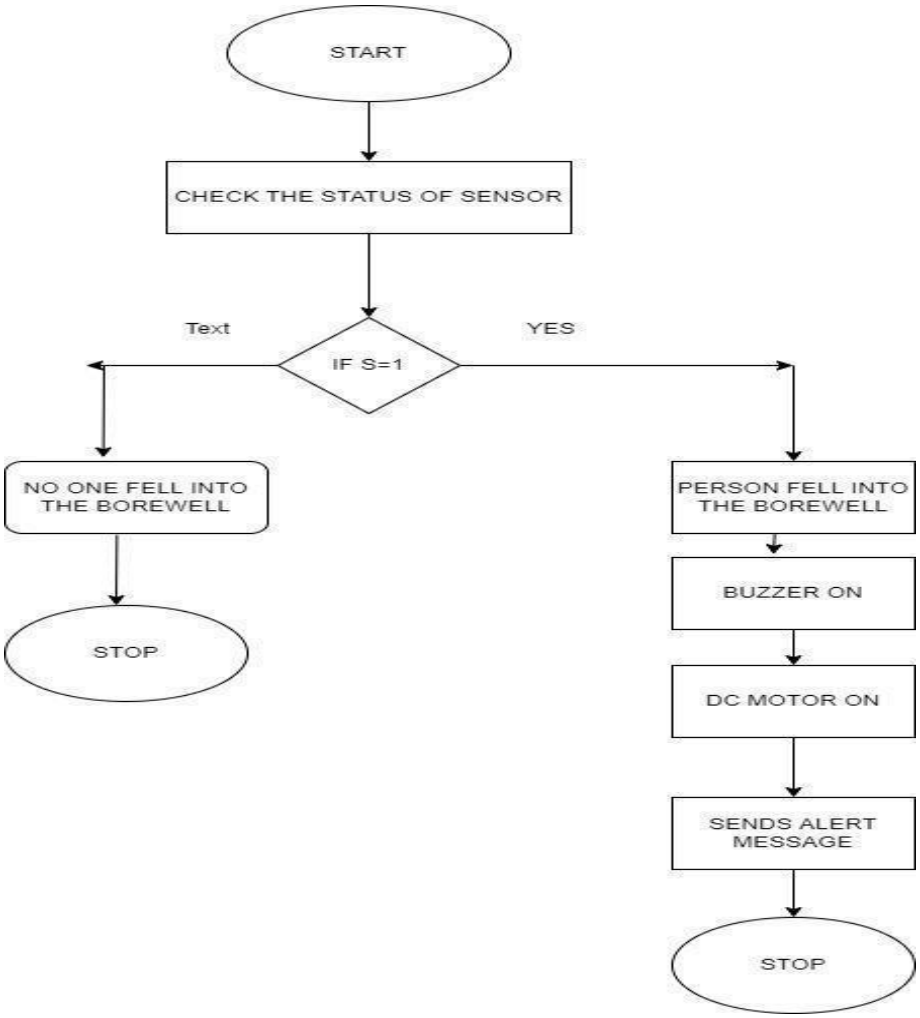
5.DC MOTOR

DC motors are widely used, inexpensive, small and powerful for their size. They are most easyto control. One DC motor requires only two signals for its operation. They are non-polarized, means you can reverse the voltage without any damage to motor. DC motors have +ve and – ve leads. Connecting them to a DC voltage source moves motor in one direction (clockwise) and by reversing the polarity, the DC motor will move in opposite direction (counter clockwise). The maximum speed of DC motor is specified in rpm (rotation per minute). It has two rpms: no load and loaded. The rpm is reduces when moving a load or decreases when loadincreases.

6.IR SENSOR

An infrared (IR) sensor is an electronic device that measures and detects infrared radiation inits surrounding environment.

FLOW CHART OF THE PROJECT



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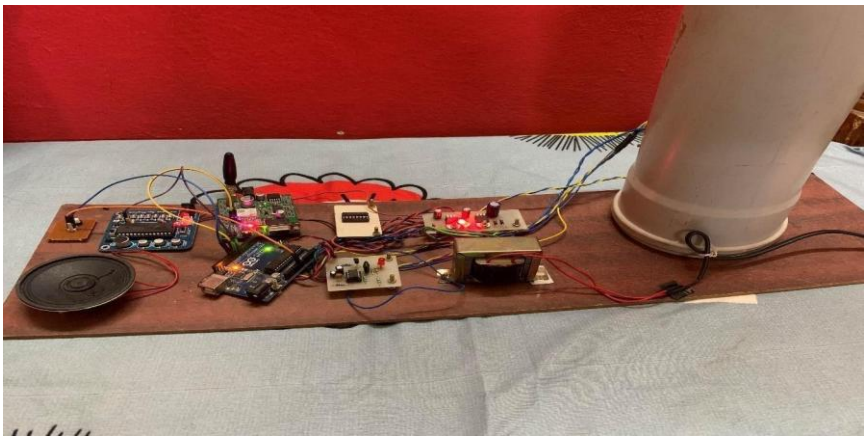
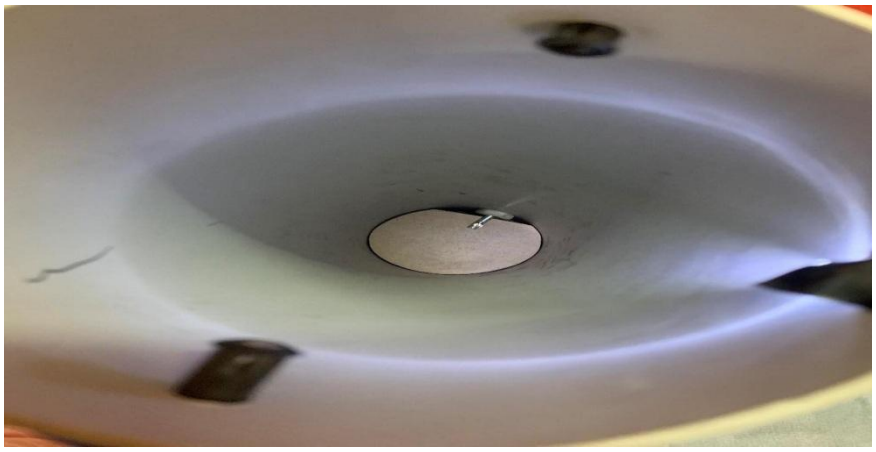
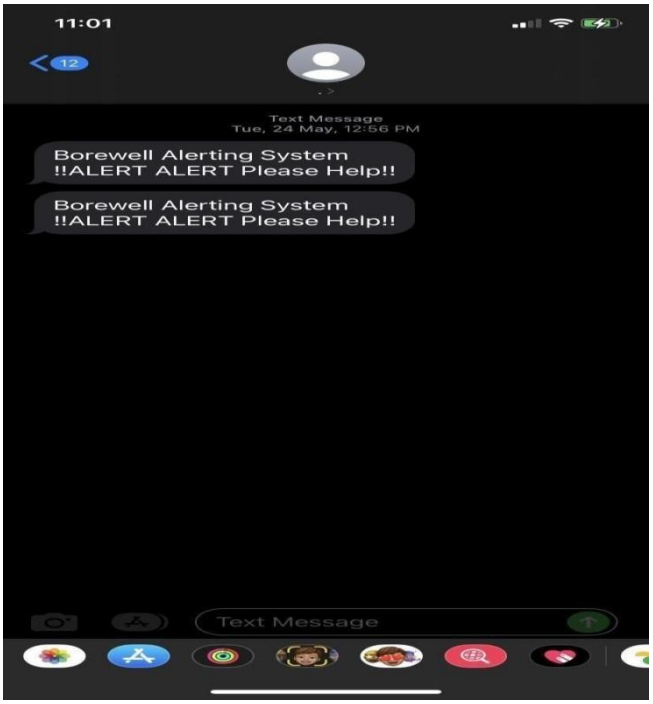
RESULT



MODULE OF THE PROJECT



THE POSITION OF THE LID IN THE BOREWELL WHEN CHILD FELL INTO WELL



ALERT MESSAGE WHEN CHILD FELL INTO THE BOREWELL

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III. CONCLUSION

Human life is precious. Our bore well child recue system is a significant attempt to savethe life of the victim of bore well accidents. In the current design of bore well child saver machine has been made to suit every possible situation may occur in rescuing operation. Theproject 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 very tedious and time consuming process. By using bigger motors, arms and advanced technology this project can be 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 in short time.

The project work **"Smart child rescue system from borewell"** is designed and developed successfully. For the demonstration purpose, a prototype module is constructed; andthe results are found to be satisfactory. Since it is a prototype module, a simple module is constructed, which can be used save lives ofthe children falling into the borewell in quick time.

IV. ACKNOWLEGMENT

We are grateful to our guide Associate Prof. Mr. A.RAJESH for this continuous support andguidance. Through his guidance, we were able to successfully complete our project. Our sincere thanks go to Dr. P. SATISH KUMAR, Head of the Department of Electronics and Communication Engineering at ACE Engineering College, for his support and time.

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