An Audit Paper on Bore well Rescue Robot

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Abstract:- A Bore well rescue Robot System is a Project which target current situation in Manual and gives best results. Where in the previous years a number of child deaths have been reported falling in the bore well. A technique for rescue robot in bore well environment has been proposed. India is facing a distressed and cruel situation. An innovative concept proposed in this paper is to handle bore well rescue operation. Children often falls down in bore hole which is left uncovered and get trapped. We aid the child by continuous monitoring and supply of necessary items to survive using technical methods. In this project we uses various component which is very useful for saving the life of the child .This project used robotic arm and foldable seat is to hold the child which safely came out the child from the bore well. The design of the handling system is made in such a way that the child never gets hurt and the robot itself provide some pre-treatment to make the child survive till the end of operation. Our Robot design constitutes a best Ergonomics design and Perform safest rescue operation.

Keywords: Bore well Rescue, Distressed, Cruel, survive.

1. INTRODUCTION:

"Bore well rescue robot save the life of child"

"It is an economic to use"

In order to meet the ever increasing demand for water bore wells are dug. But these are usually left uncovered and children often fall down. Normal rescue operation strategy involves digging a parallel pit to achieve the child. But these are time consuming and high cost.

A multifunctional, reprogrammable and intelligent manipulator designed to perform a task is a 'robot'. Using a robotic structure it is possible to rescue a child within a short time. Robot for bore well rescue offers solution to this situation. It is fast, economical and safe. It has the facility to monitor trapped child, supply oxygen and provide a supporting platform to lift up the child. This system will attach a harness to child using foldable seat for picking up. It includes an ultrasonic sensor to calculate the distance to the child. A temperature sensor is used to measure temperature. An APR module is attached to robot for communicating with the child. The robotic arm has motor attached to it for picking and placing in the folded seat. The proposed system will easily rescue the child within short time without major injury. Visualizing the child is made possible with infrared waterproof cameras and a high resolution led monitor.

2. LITERATURE SURVEY:

B. Bharathi :

Describe the designing a robot for rescue a child from inside bore well, which is capable of moving inside the bore well, according to the human comment by PC and also pick and placing based on arm design. The robot is operated through PC using wireless Zigbee technology.

Ram Aacharya:

The primary use of robots includes searching for survivors, where unusual viewpoints can be perceived with better human-robot interaction. Usual method followed by the rescue team is first to find the depth of the child in the bore well by using rope. After finding the depth, a parallel pit is dug using Earthmoving vehicles. This method of rescuing has following difficulties; it takes up to 30 hours to dig the parallel pit, by that time the child would have died. Lack of oxygen inside the bore well.

2. What is bore well rescue robot?

A rescue robot is a robot that has been designed for the purpose of rescuing child. Common situations that employ rescue robot are mining accident, urban disasters, hostage situation, and explosion. The bore well rescue robot is capable of moving inside the same bore well where the child has been trapped and performs various action to save the child .The CCTV camera is used to continuously monitored the child's condition and also help to decide the action which have to be performed by the robot.

3. Review of bore well rescue in India:

In India, recently we have witnessed some of the most tragic but helpless incidents which touched us deeply and forced us to look after the matter seriously. As the statistics suggests in the consecutive years starting from 2006, still more than 30 deaths occurred while stuck in bore well. The most mournful fact in that figure is that 92% of that victim is under the age of 10. A lot of money is also spent in these missions. The rescue process to save the child from a bore well is long and complicated. The rescue team tries to approach the victim from a parallel well that take about 20-60 hours to dig. This complicated process makes 70% of the rescue operations fail. It's our agony that on April 7, 2007 in Village Adsar.

In Bikaner district (Rajasthan), we witnessed the death of a two year-old girl named Sarika who had fallen in a 155-feet deep open bore-well and on the same day, a two-year-old girl, Kinjal Man Singh Chauhan, fell in an open bore-well in village Madeli (Gujarat) and died. On February 6, 2007, a two-year-old boy Amit, fell in a 56-feet deep well in a village near Katni (MP) and died.

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No of Borewell Accidents : State-wise
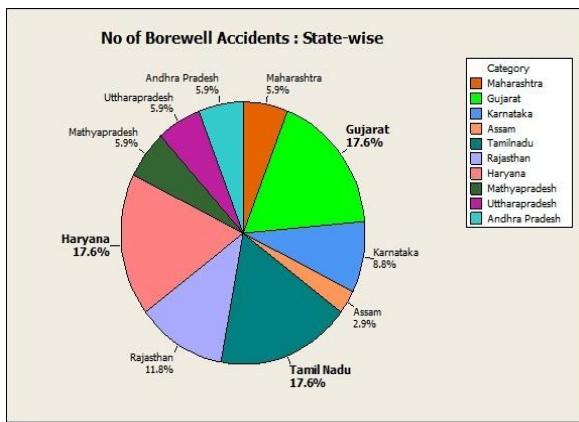
4. BLOCK DIAGRAM:
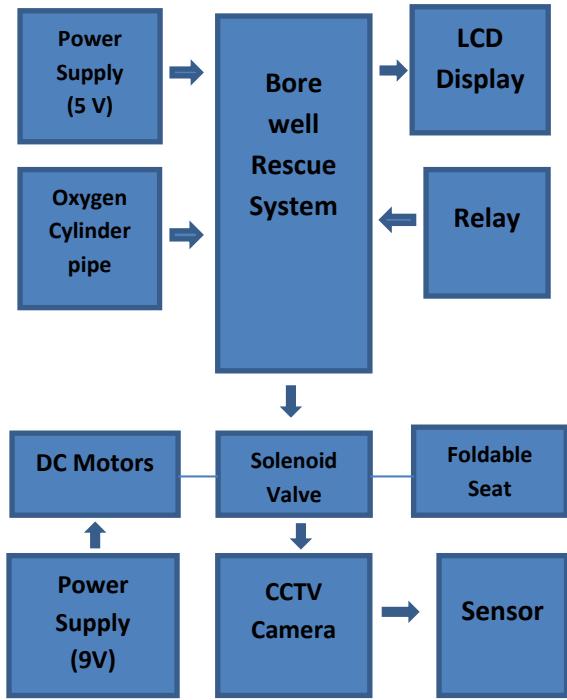
- **Robot Module:**

This unit comprises of 9V power supply, switch pad and gear motors, solenoid valve. In which connected Transmitter and receiver. These are control the motion and transmit the signals into action. The switch pad has four micro switches connected to the microcontroller I/O pins. One end of the switch is grounded and the other is connected to the microcontroller port. When any switch is pressed that particular port is grounded. The microcontroller is always monitored these switches, in real time.

- **DC Motor:**

A DC motor is used to convert electrical energy to mechanical energy, very typically through the interaction of magnetic field and current carrying conductors. DC Motors are the most simple motors to use they can reach a high rotational speed that is dependent on the input voltage. The reverse process producing electrical energy from mechanical energy is accomplished by an alternator, generator or dynamo. Many types of electric motors can be run as generators, and vice versa. The input of DC motor is current/voltage and its output is torque (speed). The DC motor has two basic parts the rotating part that is called the armature and the stationary part is called the stator and also rotates the gear box.

- **Solenoid Valve:**

A solenoid valve is an electro-mechanical device in which the solenoid uses an electric current to generate a magnetic field and thereby operate a mechanism which regulates the opening of fluids flow in a valve. In the case of a two-port valve the flow is switched on or off; in the case of a three-port valve, the outflow is switched between the two outlet ports.

Solenoid valves are the most frequently used control elements in fluidics. Their tasks are to shut off, release, dose, distribute or mix fluids. They are found in many application areas. Solenoids offer fast and safe switching, high reliability, long service life, good medium compatibility of the materials used, low control power and compact design.

- **Robotics Arms:**

A Robotics Arm is a type of mechanical arm, usually programmable, with similar functions to a human arm: the arm may be the sum total of the mechanism or may be part of a more complex robot. The robotics arms are designed around the AX DYNAMIXEL robot actuators and Robo controller. Robot Arms and Grippers are used to define stationary robots. In robot arms arm systems have earlier kinematic Calculations, both position and orientation controls are easier in these robots.

- **Foldable Seat:**

A foldable seat is used to carry the child safely the folded seat is goes downward when the robotic arm hold the child the folded seat is open and the child is carrying easily and came out . The entire system is control by the user. All the process is seen in the led with the help of camera.

- **Advanced Digital Oxygen Supply System:**

The respiration of human beings will difficult, if the percentage of oxygen in the air becomes less than 18%. So, we need a device to supply proper oxygen to the child in the rescue process. An oxygen concentrator is placed on the surface of the bore well. It will automatically sense the defect of oxygen at the rescue region and it supplies the required oxygen. For this purpose oxygen concentrator, an oxygen tube of 200 meters is placed on the surface. The tube is sent along with the robot to supply emergency oxygen to child.

- **Relay:**

A relay is an electrically operated switch. Many relays use an electromagnet to mechanically operate a switch, but other operating principles are also used, such as solid-state relays. Relays are used where it is necessary to control a circuit by a low-power signal (with complete electrical isolation between control and controlled circuits), or where

several circuits must be controlled by one signal. The first relays were used in long distance telegraph circuits as amplifier. Relays were used extensively in telephone exchanges and early computers to perform logical operations. In this project relay is used for controlling the motor, safety balloon, oxygen supply. Based on ON/OFF state it will work.

- *Controller Unit:*

The unit comprises of PIC 16F877A Microcontroller. This is a RISC (Reduced Instruction Set Computing) based Microcontroller having analog input channels, analog comparator and additional circuit. The Microcontroller stores the information captured by the robot and display it. The temperature sensed by the robot is firstly stored in Microcontroller and then get displayed on the LCD. The video captured by the CCTV camera is displayed on a PC The serial communication between microcontroller and PC is done through a MAX-232 interface.

- *Display Unit:*

For displaying the information like temperature and smoke values, LCD (16x2) is used on each line this dot matrix LCD display module holds 32 characters-16 on each line and has a green backlight with black text.

1. *Working:*
- Our project is fully controlled by the remote control system and the rack and pinion gear mechanism is used in this project.
- The structure of the robotic system is in circular shape and it is a folded type robotic system in the bore well.
- The all activity inside the bore well is seen in the monitor (LED) by the help of CCTV camera.
- The bore well rescue robot goes downward in the bore well the CCTV camera shown the position of child inside the bore well and the oxygen pipe supply the oxygen to the child this all activity are seen in the led. The temperature sensor is used to measure the temperature inside the bore well and the suitable temperature is given to the child. The liquid food is also supply to the child.
- This process of the robotic arm is control by the microcontroller the robotic arm (gripper) came up and down and set the position near the child the robotic arm is hold the body of the child and when the body is hold by the arm the folded seat is open and carry the child safely.
- The child came in upward direction the system control by microcontroller. Once is ensure that all the arrangement is pulled up using the pulley arrangement
- The 9V power is supply to DC motor and used to ULN circuit to 5V Power Supply.
- Relay are used to cut off the power supply and electrically operated switch.
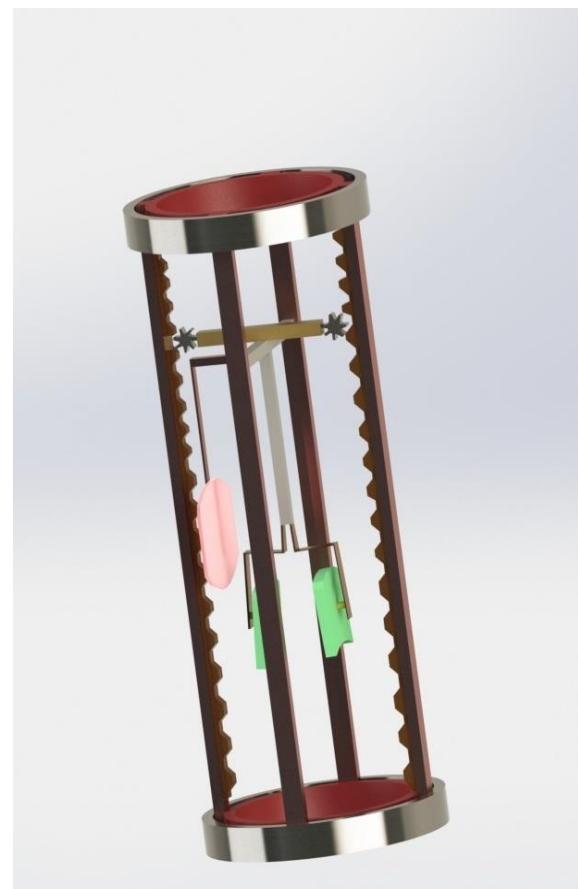
Model of bore well rescue robot

2. *Future Scope:*

In Future we can use this Project in Several applications by adding additional component to this project such as smoke sensor, airbag, mic is used to listen the voice of the child, leather arm, and small vacuum is used to absorb the water inside the bore well. Buzzer sensor is used outside the bore well which prevents the life of child. Our project is new in innovation in the market it will provide the entrepreneurs the much the new ideas and it gives benefits to the society.

3. CONCLUSION :

Our project is used to save the life of the child who are in the accidental situation in the bore well we deeply observing the incidents which happen with the child. This project is a technical development in which rescuing the child and it is an economic to use. We able to rescue this operation without any loss of life.

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