Automated Child Rescue Robot using Embedded System

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Abstract— Now a day's child often falls down in the borehole which is left uncovered and gets trapped. It is very difficult and also risky to rescue the trapped children. A small delay in the rescue can lost the child his or her life. The objective of the paper is to construct and design a bore well rescue robot (i: e to rescue a trapped baby from bore well). This helps to controlled human robot that gives an insight view of rescuing the baby safely and steps taken to achieve this. This paper aims to design "Robot to rescue of a child in a bore well" which is capable of moving inside the pit. It is an innovative idea to rescue the children fallen into the bore well. This rescue operation is performed by combining motors, relays, sensors, micro controllers and camera to form a robot. The robot has an arm that possess a special gripping mechanism to rescue the child; in addition to that the position of the child can be observed with the help of the camera integrated with a light attached to it. In order to make the robot go inside the pit, a pulley control module is utilized which is integrated with the sensors. The robot consists of several motors to perform the necessary tasks. All the motors and sensors are interfaced by a PIC micro controller along with the LCD display from which the inside view can be seen through it.

Key words: Relays, Sensor, DC Motor, Robot

I. INTRODUCTION

The advent of new high-speed technology and the growing computer capacity provided realistic opportunity for new robot controls and realization of new methods of control theory. Robotics is one field within artificial intelligence. It involves mechanical, usually computer-controlled, devices to perform tasks that require extreme precision or tedious or hazardous work by people. The field of search and rescue robotics, while growing rapidly in this decade, is still relatively new. Robots have been very successful at manipulation in simulation and controlled environments. Outside of controlled environments, robots have only performed sophisticated manipulation tasks when operated by a human [1]. This technical improvement together with the need for high performance robots created faster, more accurate and more intelligent robots using new robots control devices, new drivers and advanced control algorithms. This paper describes a new economical solution of robot control systems.

Recently, many accident reports of children (and even adults) falling in open bore-wells have appeared in the print and the electronic media. Very few of the victims have been saved in such accidents. To overcome such problems of these rescue operations, we have an alternative (feasible) proposal. We are developing a robot machine that can take out the trapped body in systematic way. It will also perform various life-saving operations for the sufferers such as oxygen supply.

In this alternative scenario, there will be no requirement of digging any hole parallel to the bore-well.

The remotely controlled robot will go down the bore well and perform the action. A lot of other hassles will also be avoided by this alternative technique

II. WHAT IS THE PROBLEM AND HOW BIG IT IS?

When the accident reports of children (and even adults) falling in open bore-wells has appeared there is no proper technique to rescue victims of such accidents. When the make shift local arrangements do not work, Army is called in. In most cases reported so far, a parallel hole is dug up and then a horizontal path is made to reach to the subject's body .It is not only a time taking process, but also risky in various ways. Moreover it involves a lot of energy and expensive resources which are not easily available everywhere. This ad -hoc approaches involve heavy risks including the possibility of injuries to the body of subject during the rescue operations. Also, the body may trap further in the debris even more.

Fig. 1: Robot inside the pit

III. EXPERIMENTAL SETUP

It consists of two hands with gripper to grab the child, driven by DC motors Controlled by PIC Microcontroller operated manually. The suffocation is reduced by providing oxygen artificially. To make the robot to go inside the pit a pulley control module is used which is embedded with a human sensor, a supporting structure, two pulleys and a first motor. The supporting structure is a metal stand where a rope is tied at one end. The other end is tied and rolled with the motor through the two pulleys. One is at the top of robot and other is on the supporting structure. Webcam with LED is used to view and monitor the baby which is buffered on a television.

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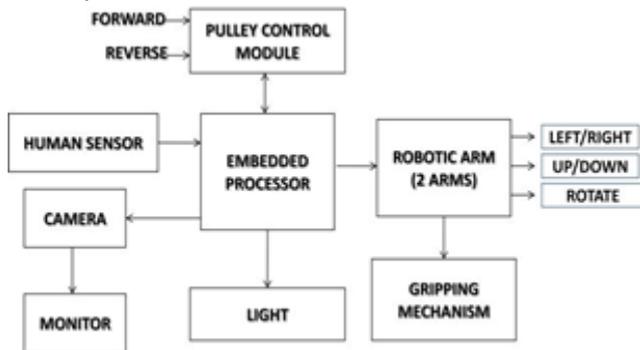

Fig. 2: Experimental setup of rescue Robot and pit inspection

The third motor placed below the plate turns the bottom shaft by 360 degrees. This is done with the help of a wireless camera. Once the gap has been located, the fourth motor adjusts the radial distance of the lifting arms. The fifth motor helps to make the arm to position the robot. The sixth and seventh motors help to hold the child. Eighth motor is for the external protection of the child.

Once the child is safely, the second motor is then reversely operated so as to unclamp the system. Simultaneously it is lifted out of the well using a rope. This is an efficient way to safely rescue the child from the pit with inculcating vital necessities i.e. artificial oxygen supply and safer operation by means of safety cage. The overall time period of rescue operation is quite less when compared to other conventional techniques.

A. Motor Position

A DC motor uses electrical energy to produce mechanical energy, very typically through the interaction of magnetic fields and current-carrying conductors. The reverse process, producing electrical energy from mechanical energy, is accomplished by an alternator, generator or dynamo. Seven motors are used for the control of robotic arms.

- First motor: controls the pulley.
- Second motor: placed at the top, turns a gear mechanism which in turn, pushes the blocks towards the side of the bore well which clamps the whole system to the wall of the bore well.
- Third motor: motor placed below the plate turns the bottom shaft by 360 degrees.
- Fourth motor: adjusts the radial distance of the lifting arms.
- Fifth motor: make the arm to position the robot.
- Sixth motor and Seventh motor: It helps to hold the child.
- Eighth motor: For the external protection of the child.

IV. RESULTS, CONCLUSION AND FUTURE SCOPE

This paper "AUTOMATED CHILD RESCUE ROBOT USING EMBEDDED SYSTEM" was designed to construct a Robot which is capable of climbing the pit. The robot was operated using combination of motors, relays, sensors, micro controllers and camera to form a robot. The robot has an arm that possess a special gripping mechanism to rescue the child; in addition to that the position of the child can be observed with the help of the camera integrated with a light attached to it.

V. CONCLUSION

Integrating features of all the hardware components used have been developed in it. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. Secondly, with the help of growing technology, the project has been successfully implemented. Thus the project has been successfully designed.

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