Child Rescue From Borewell Using Robotic System

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Abstract - With this project child is rescued from the borewell in a better and safe way. This system consisting of an robotic arm system and Velcro structure to rescue child from the borewell and with this it is also consisting of temperature sensor, gas sensor and camera to monitor the child. The microcontroller helps in controlling all the units in this system which acts as a brain to this system. The data from the temperature and gas sensor are monitored with the help of LCD and the visual inside the borewell is monitored with an help of display.
Index Terms: Microcontroller, Gas Sensor, Temperature Sensor, Robotic Arm, Camera and LCD.

I. INTRODUCTION

In general, water scarcity is the major problem all over the world, need for water borewells are crated in various places which helps in taking water from the ground. But sometimes water may not be present in the borewell on that time borewell are not closed properly.In such cases it is a great danger to the child who go around that area, which may lead into accidents where child could feel into it and could cause a great danger to the child life and till now there is no proper technique to rescue child from the borewell, to help in this case Child Rescue from borewell using robotic arm is introduced. This system helps in taking child from the borewell in the safe and fastest way. This proposed system could monitor and rescue the child from the borewell which helps in saving a child life which could bring end to the borewell accidents.

II. SYSTEM DESCRIPTION

This Proposed system consists of the robotic arm,holding mechanism and Velcro structure for rescuing child from the borewell. This system also consisting of temperature and gas sensor which measures the temperature and gas inside the borewell. Initially the wiper motor is connected to the rescuing system at the top. Then the system moves inside the borewell with the help of the wiper motor by using a rope/chain.

This system consists of a holding mechanism where after reaching the child stuck area two electric drive moves the actuators on its both side which give an support to this system. It gives better positioning for the robotic arm and for the Velcro structure.

Then the robotic arm catches the child with the help of the electromagnet present in the edge of the robotic arm it gives a better gripping for rescuing child from the borewell and Velcro structure attaches to the child and child is taken safely from the borewell. Along with this Temperature and Gas sensor is given in the system which helps in finding the temperature around the child and also helps in knowing the presence of toxic gases present around the child with that oxygen could be supplied to the child. These data could be monitored with the help of Liquid Crystal Display Present in the system. In addition to this a camera unit is given in the system which helps in knowing the

current status inside the borewell where the child stuck and it could be seen with the help of display. Figure 1 Represents the proposed block diagram.

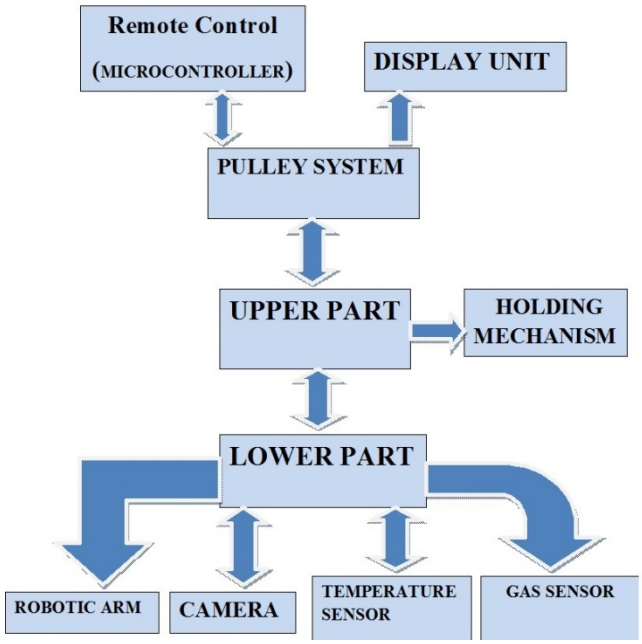

Figure 1 Block Diagram of Proposed System

III. FUNCTIONAL ELEMENTS IN THE PROPOSED SYSTEM

The functions of the various components are given below:

A. Arduino

[1] Arduino is an open source software and hardware company designed and made for digital devices in an single board microcontrollers. Arduino boards come with digital and analog input / output packages. [2] Arduino serves as the Child Rescue Robot controller and controls the entire system giving instructions to the robot to run. This Ardunio board consists of SRAM Memory and EEPROM Storage in it.

B. Robotic Arm

Figure 2. ROBOTIC ARM

Most of the world's robots are designed for heavy, repetitive fabrication work. We perform things that human beings find difficult, dangerous or boring.

The robotic arm is the most popular fabrication robot.. A typical robotic arm consists of seven metal segments which are connected by six joints. The machine controls the robot by spinning individual phase motors attached to each joint (hydraulics or pneumatics are used by some bigger arms). Unlike ordinary engines, phase motors work in

specific increments.A typical robotic arm consists of seven metal segments which are connected by six joints. The machine controls the robot by spinning individual phase motors attached to each joint (hydraulics or pneumatics are used by some bigger arms). Unlike ordinary engines, phase motors work in specific increments.The shoulder is usually fixed to a stationary base plate, rather than a revolving body. This robot form has six degrees of freedom which means it can rotate in six different ways. By contrast, one human arm has seven degrees of freedom. Figure 2 represents the robotic arm.

C. RELAY

Figure 3 Relay

To monitor high-voltage or high-power circuits with an Arduino you must isolate them with a relay from the Arduino.An Arduino can not directly control circuits operating at high voltages or at high currents.A relay consists of an electromagnet, which allows a switch to close or open when energized. Relays provide full electrical insulation between the control circuit and the controlled circuit.

D. Wiper Motor

A permanent magnetic field can be produced in this motor with the permanent magnets which communicate through the perpendicular field stimulated by the flow of currents within the windings of the rotor; therefore a mechanical torque can be developed.

When the rotor rotates in response to the torque produced, the position between the stator as well as the rotor fields can be decreased and the torque in a 90-degree rotation would be reversed. PMDC motors include a commutator, connected to rotor shaft, to keep the torque working on the rotor.

E. Servo

Servo Motor help in controlling the robotic arm in this system which gives the movement which we need to control the robotic arm. A servo is composed of an engine (DC or AC), a potentiometer, gear assembly, and a control circuit. First of all we use gear assembly to lower RPM and increase motor torque. Say the location of the potentiometer knob at the initial position of the servo motor shaft is such that there is no electrical signal produced at the potential meter's output port.An electrical signal is now provided to another Error Detector Verstärker input terminal. Now the difference between these two signals, one coming from the potentiometer and another coming from another source, will be processed in feedback mechanism and output will be transmitted in terms of error signal. This error signal serves as motor and motor feedback begins to rotate.Now the motor shaft is attached to the potentiometer and it will produce a signal as the motor rotates so the potentiometer can. So as the angular location of the potentiometer shifts, the feedback signal for the output changes. After sometime the potentiometer location reaches at a place where the potentiometer output is the same as the external signal received.There will be no output signal from the amplifier to the motor input in this case, as there is no difference between the externally applied signal and the signal produced at the potentiometer, and motor stops spinning in this situation.

IV. CONCLUSION

This Concept of Child rescue from the bore well is by drilling hole in side of bore well or using Balloon to rescue child or using robotic arm to rescue the child from the bore well. These techniques are the normal existing work to rescue child from the bore well, but sometimes it takes more time and risk to rescue child from the bore well. Many

other techniques were developed to rescue child from the bore well, but this proposed system could be an alternate for this existing systems.

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