BORE WELL RESCUE ROBOT

B.Venkata Sathish Kumar[1], Puttu Gowri [2]
[1]*Assistant Professor, M.Tech, MISTE, Vasireddy Venkatadri Institute of Technology, Nambur, Guntur, A.P-522 508, India*
[2] *M.Tech, Computer Science Engineering*

Abstract - The proposed system is to save life from the bore wells. Small children without noticing the hole dug for the bore well slip in and get trapped. Since the holes are dug too deep it is quite impossible to save life. The fire force and medical team find it difficult to rescue children due to unknown levels of humidity, temperature and oxygen in the depths of the bore well. Rescue work can be a long drawn affair lasting close to thirty hours. The time taken is long enough to kill a precious life. Even if rescued the child may die due to injuries sustained. This has created an open challenge to the field of medicine, rescue and the whole human society. To aid in such rescue we have proposed a system that will easily rescue within two hours of time without any major injury. By that a precious life can be saved.

Index Terms: Geared Motors, RF Module, Camera, Encoder, Decoder, Transmitter, & Receiver

I. INTRODUCTION

In the present era, there has been a rapidly growing and wide spread interest in robots, mechanical manipulators and hands, mobile platforms, walking machines, and many other so called robotic devices and 'intelligent' systems. these robotic technologies combined with rapid advances in electronics, controls, vision and other forms of sensing, and computing have been widely recognized for their potential applications in almost all areas where machines enter our society. The objective of the project was to construct and design of bore well rescue robot (i:e to rescue a trapped baby from bore well). This project is a human controlled robot that gives an insight view of rescuing the baby safely and steps taken to achieve this.

It is a robot with 2 fingered gripper to grab and airbag to support from beneath the baby and blocking from further falling down. The robot is driven by dc geared motors controlled by microcontroller units and manual operations are also provided for precious operation. Webcam is used to view and monitor the baby.

II. COMPONENTS

Geared Motors-3, RF Module(Transmitter & Receiver), Whells-6, Springs, LM293 Drivers-3, Wireless Camera, Pipe-5ft, Metal sheet, Nuts & Bolts, Holes & Shafts, Batteries-3, Single lead wire.

A. Geared Motors

Gears have existed before the invention of rotating machinery. Early gears were made from wood with cylindrical pegs for cogs and were often lubricated with animal fat grease. Because of their force multiplying properties, gears were used for hoisting heavy loads, such as ship anchor hoist, catapult Pre–tensioning, wind and water wheel machinery. The industrial revolution in Britain in the eighteenth century saw an explosion in the use of metal gearing. A science of gear design and manufacturing rapidly developed through the nineteenth century. Today, modern metallurgy has added signification developments to gearing used in machines.

There are several gear types, each with their respective advantages and limitations. Amongst the list are worm, spur and helical gears. Worm gears are relatively inexpensive and are available in high ratios in single gear set up to 100:1, also available in right angle configurations. They will tolerate high shock loads, and are quiet. However they are less efficient than other forms of gearing. Spur gears are produced by many manufactures and therefore are easy to locate. They are compact, efficient, and are available in a parallel shaft arrangement. They are available in 10:1 ratio per gear stage. The mutations are that spur gears are slightly more expensive, are more likely to produce noise and have less shock capability (compared to worm gears).

B. RF Module

RF refers to radio frequency, the mode of communication for wireless technologies of all kinds, including cordless phones, radar, ham radio, GPS and radio and television broadcasts. RF is a term that refers to alternating current (AC) having characteristics such that, if the current is input to an antenna, an electromagnetic (EM) field is generated suitable for wireless broadcasting and/or communications. These frequencies cover a significant portion of the electromagnetic radiation spectrum, extending from nine kilohertz (9 kHz),the lowest allocated wireless communications frequency (it's within the range of human hearing), to thousands of gigahertz(GHz).

Main requirements for the communication using RF?

- RF Transmitter
- RF Receiver
- Encoder and Decoder

1) RF Transmitter STT-433MHz

The STT-433 is 433.92 MHz Frequency, ideal for remote control applications where low cost and longer range is required.

Fig. 1 STT-433 MHz Transmitter

The transmitter operates from a1.5-12V supply, making it ideal for battery-powered applications. The manufacturing-friendly SIP style package and low-cost make the STT-433 suitable for high volume applications.

2) RF RECEIVER STR-433 MHz

The data is received by the RF receiver from the antenna pin and this data is available on the data pins. Two Data pins are provided in the receiver module. Thus, this data can be used for further applications.

Fig. 2 STT-433 MHz Receiver

3) ENCODER & DECODER

ENCODER:

The 318 (3 power of 18) series of encoder begins a three-word transmission cycle upon receipt of a transmission enable (TE for the HT600/HT640/HT680 or D12~D17 for the HT6187/HT6207/HT6247, active high). This cycle will repeat itself as long as the transmission enable (TE or D12~D17) is held high. Once the transmission enable falls low, the encoder output completes its final cycle and then stops.

DECODER:

The 3^18 decoders are a series of CMOS LSIs for remote control system applications. They are paired with the 3^18 series of encoders. For proper operation, a pair of encoder/decoder pair with the same number of address and data format should be selected. The 3^18 series of decoders receives serial address and data from that series of encoders that are transmitted by a carrier using an RF medium. A signal on the DIN pin then activates the oscillator which in turns decodes the incoming address and data. It then compares the serial input data twice continuously with its local address. If no errors or unmatched codes are encountered, the input data codes are decoded and then transferred to the output pins.

C. WIRELESS CAMERA

A night vision camera is installed on section-3 of robotic arm. It has working capacity of working under dim or very low light availability, which is always there inside the bore well. Camera is also capable of getting audio sound from inside the bore well. It is connected with Aux cables and wires are used to connect the Camera with display and power supply for working of camera. A output display is also used to see the actual on time location of the child every time. It is a must requirement item in rescue of child trapped inside the bore well.

III. WORKING MODEL

The project completely serves as a search and rescue design to search and sort out the objects in a very easy method.

The design uses RF technology to implement the application in a most efficient way.

The transmitter section has the switch controls with it with each switch with a different frequency. The objects which are of most important and to be safe are attached with the receiver unit. Whenever the user presses a button from the keyboard of the remote, the data related to that particular button is sent through RF module interfaced to remote. This data will be received by the RF module in the robot which judges the relevant task to the information received and acts accordingly on the robot and arm movement.

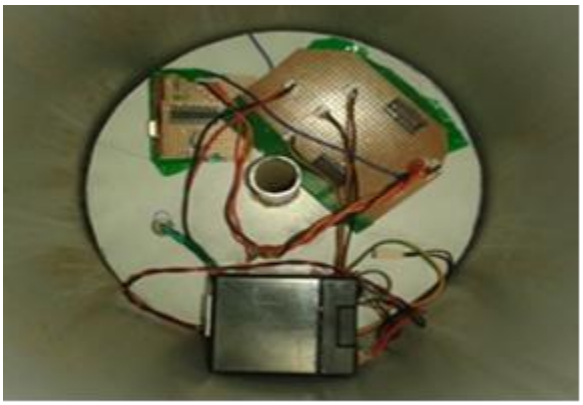

Fig. 3 Bore well rescue Robot Front side

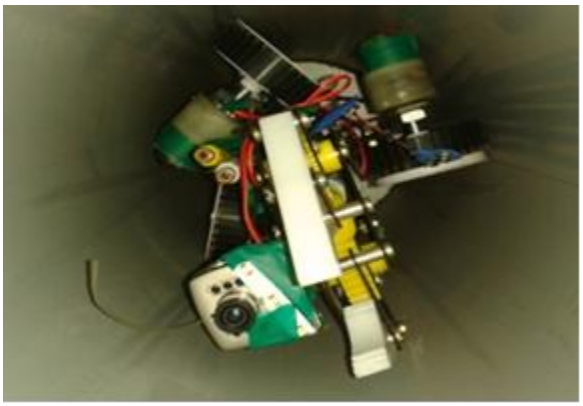

Fig. 4 Bore well rescue Robot Back side

IV. CONCLUSION

Working of Bore Well Rescue Robot has been successfully tested. Need more modification for better pressure control, i.e. a better quality pressure controller is needed. More improvement can be made on Robotic hand fingers by providing more cushioning system to grip the child trapped inside Bore Well. Lesscostlier than other method (like digging a parallel bore to bore well where child is trapped) of rescuing child from Bore Well.

V. FUTURE SCORE

The live images from the camera in the robot system can be sent to TV through AV transmitter system then immediately activates the load. Air bags can be used as a base below the Robotic hand fingers in order to lift the child from bore with more safety. This project is very useful in developing a further advanced system which will result in rescuing a child from bore well.