BOREWELL RESCUE ROBOT

PROJECT REPORT

By:

PROJECT GUIDE

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ABSTARCT

Many child deaths are reported in the past due to bore well accidents. During bore well accident an immediate rescue operation is required and it is quiet challenging to perform a rescue operation as the environment inside the borewell is highly unpredictable. Developing low cost robotic system and simple control will help rural people use it easily. In this paper, we propose a novel design of rescue robot which would enlarge as per the diameter of bore well and attach to the bore-well by adjusting to the diameter while travelling up or down the bore-well. It would contain two artificial arms, which would help in holding the baby with the visual help offered by camera and also aid in the survival of the child. A prototype is made with help of 3D printing technology and tested with basic weights.

INTRODUCTION:

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 and

FACTS ABOUT FALLEN OF CHILD

In 2018, an average of 40-50 child are fallen in borewell.

adjacent holes are made to walls of bore well. But these are time consuming and may cost life. 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.

On March 25, 2008 a three-year-old girl, Vandana, fell in a 160-feet-deep open bore-well in village Tehra near Agra.2-year old Sonu fell in 150 feet deep bore well pit in the northern state of Uttar Pradesh. He was brought out dead after four days of rescue operation in 2009, Kirtan Pranami, an 11-year-old boy from Palanpur in Gujarat died after he fell into a 100ft (30m) bore-well. Within months, two-year-old Darawath Mahesh fell into a 35ft (10m) bore-well in Warangal in Andhra Pradesh and died. Five-year-old child who fell into a 250-feet deep bore-well in Jaipur in 2009 was also saved. Four-year-old Anju Gujjar was rescued also from a 50-foot deep open bore-well in Rajasthan.

Classification of Borewell Robots

Generally, in borewell robots configured into the following six types:

i. Wheeled type: This type of robot will appear just like a regular robot. They can only use for borewells with horizontal sections.

ii. Caterpillar type: This type of robot will provide more gripping nature to the interior of the as compared to that of a standard wheeled type borewell robots. They are used in places where we require large grip with the borewell walls.

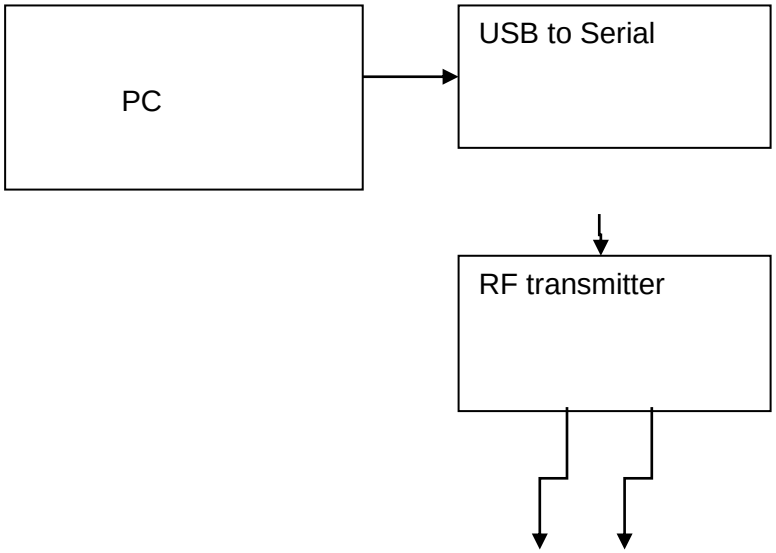
iii. Wall-pressed type: Wall pressed type of borewell cleaning and inspection robots were very useful for the locomotion in the vertical borewells. This type of robot contains flexible links that can provide sufficient amount of force which will help the body to move in vertical borewells without slipping.

iv. Walking type: Walking type borewell robots are rarely used in the industries due to its mechanical complexity. Its design is very sophisticated so it can't be used in all the time unless the situation demands.

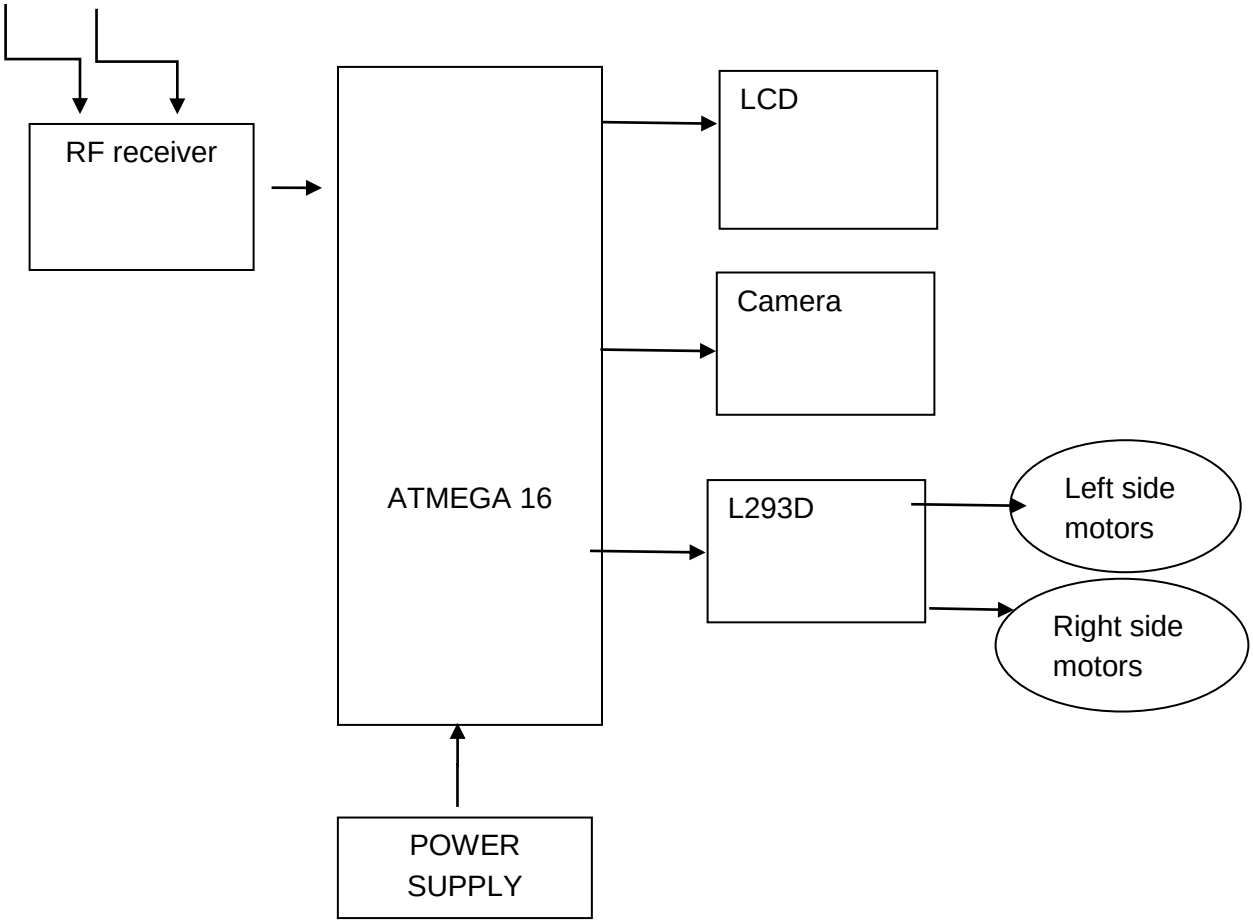
We are using a hybrid combination of wheel type and caterpillar type of borewell robot.

BLOCK DIAGRAM

Transmitter



Receiver



Block Diagram Description:

RF module:

RF transmitter, the mode of communication for wireless technologies is connected to PC via USB to serial communication.

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).

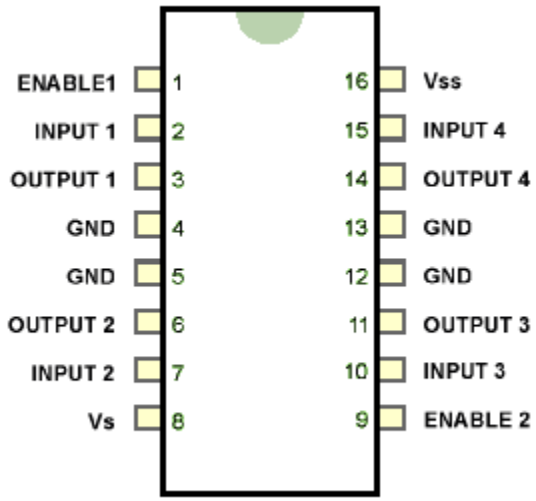
RF receiver, the data is received by the RF receiver from the antenna pin and this data is available on the data pins. Two Data pins are provided in the receiver module. Thus, this data can be used for further applications.

ATMEGA 16:

This unit comprises of ATMEGA 16 microcontroller. This is RISC (Reduced Instruction Set Computing) based microcontroller having analog input channels, analog comparators and additional timer circuits. The microcontroller stores the information captured by the robot and display it. The video captured by the mobile camera is displayed on laptop.

L293D (motor driver IC):

L293D is a typical Motor driver or Motor Driver IC which allows DC motor to drive on either directions. L293D is a 16-pin IC which can control a set of two DC motors simultaneously in any direction. It means that you can control two DC motor with a single L293D IC. Dual H-bridge Motor Driver integrated circuit (IC).



Pin Diagram of L293D

LIQUID CRYSTAL DISPLAY (LCD):

- LCD is used in a project to visualize the output of the application.
- We have used 16x2 LCD which indicates 16 columns and 2 rows. So, we can write 16 characters in each line. So, total 32 characters we can display on 16x2 LCD.
- LCD can also used in a project to check the output of different modules interfaced with the microcontroller. Thus LCD plays a vital role in a project to see the output and to debug the system module wise in case of system failure in order to rectify the problem.

MOTOR:

- Power of motor = 6.5 N- m /s
- Rpm of motor = 150 rpm
- load on motor = 2 kg = 2 x 9.81 = 19.62N

WIRELESS CAMERA:

Camera of mobile phone is used to get the potage with good frame rates, 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.

APPLICATIONS

- Large industries: In large industries we can use bore well rescue robots for the control of units, continuous inspection, maintenance, cleaning and repairing of pipes and other underground inspections.
- Fire service: In various situations of catching fire the firemen can use this type of robot for fast recovery from fire and for rescuing the victims without any harm.
- Underground storage: In this type of application, the rescue robot can be perfectly used for the usage of transferring and shifting of hazardous material with minimum human intervention and danger.

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