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# Child rescue and life supporting system from borewell

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**ABSTRACT**: In bygone days, there have been a increasing number of cases where children have fell into the open bore wells and enormous rescue actions taken care by the department of Ground water/Public health/ Municipal corporation to save them have been undertaken.. A small delay in the rescue can cost the child his or her own life. By evolving a cost effective mechanized and computerized system and simple control will help rural people use it easily. In this project, we propose a child rescuing robot which would safely rescue the trapped child inside the well. Our main intention is to design and establish a portable, accurate, cost effective, and quick in action system. These systems is also capable of providing life supporting factors such as oxygen, light, water, communication and also measure the temperature of the child and the surroundings. The child is rescued safely without any major injuries. In the existing systems, a parallel pit is dug to take the child out. This system checks whether the child is alive. The bore well rescue system is capable of interpose inside the well and performs operations according to the user instructions through the arduino and deals with extreme safe handling of the victim.

**KEYWORDS:** Arduino, Microcontroller, L293D motor driver.

## I. INTRODUCTION

In India, recently we have observed some of the disastrous but vulnerable incidents which inspiring and forced us to look after the matter seriously. The most conflict is that 92% of that victim is under the age of 10. The children were playing around the bore well unconcerned of the fact that the bore well was opened and it's a death trap. After dropped in the noxious glutted pitch black environment they were waiting for help to come. But the inadequate of oxygen and dreadful atmosphere has taken their life slowly before the rescue team can reach them. Rather than the technical development we would be highly fulfilled and it is the most important aspect of the system, which is to save a life.

[1]. Every domain has been revolutionized with the help of technology. These improvements have made our living more comfortable and also have brought sensible technology to our reach. The scarcity of water has been one of the significant issues in many countries. Due to less rainfall these bore-wells dry out very fast. These dried out bore-wells have become accident prone areas. Once these bore wells run dry; ideally, they should be sealed. Due to the lack of awareness, some of these wells are not appropriately sealed, consequently leading the children falling in them unwittingly. The rescue of the child is greatly frustrated due to lack of knowledge of the child's condition. In-pipe robots are currently being used to inspect pipelines but they are still in the development stage. A specialized designed robot can be used to accurately find the child's status and hence save capital and manpower**.** The importance of the rescue depends on the condition of the child and it is paramount to have information regarding the child.

[2]. Due to the complexity and time taken by the rescue operation, in many cases the victim is not been rescued. Thus to decrease the time there should be an approach to directly make contact with the victim. The main important factor is to search for the victim and locate the victim's exact position. In the past decade many solutions have been proposed which have a rope, suspended, and a grasping mechanism at one of its end.

While during the rescue operation, it is difficult to mount and pass over any modules onto a rope using any mechanism. Also when certain amount of mass in attached to the end of the rope, even small disturbances at one end result in amplified disturbances at the free end. Thus, a robotic system would be a very dependable solution for accidents.

[3]. In our democracy, the extensive majority of the community are agrarian and they depend on the water for irrigation system. Children involuntarily fall into the bore well which yielded water and left revealed. The rescue process of saving the trapped child into bore well is relatively ambitious. Currently the rescuing effort is

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accomplished by the method for burrowing a parallel pit close to the bore well with the same depth of the child and makes a passage that interfaces with the two wells. It takes about 30 hours to burrow the well parallel to the bore well. By that period the child would have passed on some more distance inside the well. To overwhelm this situation, a diplomatic robot is designed in a unique way that it saves the child and also it observes the child carefully by using web cam within a short time span. It consists of two modules which are rescuing system and protection system.

[4]. The protection system includes life supporting factors such as light, food ,oxygen and also checks whether the child is alive or not. Touch circuit is used to check whether the child is alive. A Buzzer is connected with the circuit. If there is there are bio-potential electrodes in the child's body, the buzzer would ring and if there is no bio-potential in the child's body, There will not be any sound from the buzzer. The rescuing system consists of a robotic arm to take the tapped child out. We are using DC motors for front and back movement of the arm. Our nation is facing an anxious cruel situation where in the previous years a number of child deaths have been reported falling in the bore well.

## II. LITERATURE REVIEW

**1. Development of In-Pipe Robot for Assisting Bore well Rescue Operations**

An efficiently designed robot can be used to accurately determine the child's status and hence save capital and manpower. This work illustrates an innovative method to assess the condition of the victim by analyzing various details like the depth at which the child is stuck, detection of harmful gases present, temperature, humidity conditions and live feed of the victim using an in-pipe robot.

The robot has a variety of sensors to gather extensive information about the pipe in question. The controller runs a graphical user interface (GUI) for the user to communicate with it. The GUI has been developed on the Python platform. It is inherently divided into four parts i.e., live feed, data analysis, image processing and motor control. The live feed section allows the user to view surroundings of the pipe in real-time by way of camera. The data analysis section allows visualization of the data sent by the sensors through graphs. Various effects like brightness adjustment, contrast and image negativity are incorporated to make the image processing section. It is used to enhance viewing capability of the live feed. The robot's physical motion is controlled by the motor control section. It has buttons to instruct the robot to move up, down and stop.

**2. Bore well Child Fall Safeguarding Robot**

This child fall safeguarding system includes an infrared transmitter and receiver to calculate the distance to the child. A temperature sensor is used to measure temperature.

In this project to safeguard the child who has fallen into bore well, we have designed using the temperature and gas sensor to sense the temperature and gas leakage in the particular area. Liquid crystal Display is used to display the position of the child. Here we are using the Infrared transmitter and receiver is used to sense the distance of the rope. Keypad is used to give inputs to the microcontroller, by pressing the operations to do. According to the input the controller will feed the high signal to the relay driver circuit to move the roper up and down or the **ARM compression and expansion**. Here the air filter is used to given the $O_2$ air when the air is unavailable. The Robotic arm is used to safely bring the child out of the bore well. It acts as a very useful and time consumption less tool for bringing the child up with efficient speed and without any major injury. It mainly ensures the child safety and reduces the mortality rate of children dying in the bore well.

A great deal of lives has been lost because of falling in the bore well since it includes burrowing a pit close to a drag well which is a tedious procedure. The proposed framework is to conquer every one of these troubles by executing customizable distance across mechanical framework. It performs safeguard activities in less time when contrasted with customary techniques. By the fulfillment of this task in true we can spare the lives of child by saving them.

**3. An Approach towards Rescue Robotics In Bore Well Environment**

A mechanized system use pneumatic arms for grasping. A remotely coordinating framework will likewise be appended to the robot for speaking with the youngster. Proposed system consists of mainly two round plates. A mechanical framework will be connected to the higher plate which will attempt to deliver two straight activation units which will hold the robot in position by pushing the mass of the drag well. Another mechanical rigging framework will be connected which pivot the lower plate to get will position it in plane with the person in question. Two arms will be connected to the lower plate. Two high goal cameras will be connected downwards in the lower position of the lower plate. The high The high goal cameras will give the perspective on the well climate which will be profoundly useful in tele-working the two arms. As the drag well climate is a dim climate the robot

will have lights which will give enough lighting conditions to the activity of the robot. The pneumatic arms will have another two individual cameras for each arm which will distribute the perspective on the arms. A chest mount outfit will be connected with the robot which will be profoundly basic in getting the casualty from the drag well.

**4. A Novel Design of Robotic System for Rescue in Bore well Accidents**

A tale plan of salvage robot is proposed, which would develop according to the breadth of bore well and connect to the drag well by acclimating to the distance across while going up or down the drag well. It would contain two artificial arms, which would help in holding the infant with the visual assistance offered by camera and furthermore help in the endurance of the youngster. A model is made with assistance of 3D printing innovation and tried with essential loads.

First the robot will be brought into the drag well and it will consequently acclimate to the size of the drag well with the assistance of the rack and pinion equipped instrument. This is accomplished with the assistance of information got from the ultrasonic sensors. After firmly joining to the dividers of the drag well, it will cross down the drag well. On the off chance that the drag well is having tightened width, the ultrasonic sensors before the wheels will detect the separation and consequently change the wheels underneath it with the assistance of the rack and pinion instrument present in the middle square.

The model has been worked by utilizing 3D printing innovation. The parts displayed in strong works have been 3D printed and amassed. Material utilized in 3D printing the parts is ABS Plastic. Engines and other electronic parts have been bought independently and collected with the model .The grippers are likewise tried after gathering by keeping objects of various loads and making the model cross up the vanes. The camera module, miniature regulator and sensors are amassed to the model and adjusted. Despite the fact that the model is made of ABS Plastic utilizing 3D printing, it can snatch up to 5 kg of weight, with a volume of 2000 cubic centimeters and navigate in the drag well climate.

The mathematical model was created remembering the breadths of the drag wells. In India the normal scope of distances across is 8 to 18 inches. As there are chances that the drag well probably won't have dividers corresponding to one another. At times even tightened bore wells exist. Accordingly a component for the robot to self-acclimate to the variety in width was required. The rack and pinion instrument has been consolidated into the mechanical framework which unravels the issue.

In the past numerous component thoughts have been raised which would help in snatching the youngster. The vast majority of the cases had a regular artificial arm, which would help in getting the youngster generally at his head or his middle. The principle rules considered here was that by and large the youngster would be stuck inside the drag well with his middle incapable to move. The subsequent circumstance would be the place where the drag well measurement in bigger than the youngster width. In this manner the kid would be on the ground. In the first case just the upper portion of the kid would be considered for handle. Bones are the most grounded parts in our body. Shoulder bone is the effectively open bone and furthermore since our youth individuals lift us up by setting their hands close to the shoulder joint. Subsequently people have a solid shoulder bone which would even oppose power applied on the underarm. Thus, snatching a kid at the shoulder joint would be a decent decision.

**5. Real Time Implementation of Smart Child Rescue Robot from Bore well using Arm and Belt Mechanism**

Children automatically fall into the drag well which yielded water and left uncovered. The way toward sparing the caught youngster into bore well is generally testing. To defeat this worry, a very much arranged robot is planned in a novel manner, that it spares the stuck kid and furthermore it watches the kid cautiously by utilizing web cam inside a brief timeframe range. It comprises of two modules which are saving framework and assurance framework. The security framework is with the guide of setting an air sack at the base of the section and recuperates the kid at the base of the entry and recoups the youngster at any pace of gripper dissatisfaction. The defending instrument is about a robot contraption fit for moving underneath the drag very much reinforced with their client bearings, furnished with robot arm, unreasonable destinations modernized camera, high goal LED. The robot arm is used to fix the belt to the caught kids. The belt is snared with the dc metal rigging for lifting the kid from the drag well.

The primary target of the flow research is to build up a keen youngster salvage robot utilizing disentangled technique inside a limited ability to focus time. Presently a-days, different strategies were received for sparing the held youngster from the drag well. Here we propose a model which is

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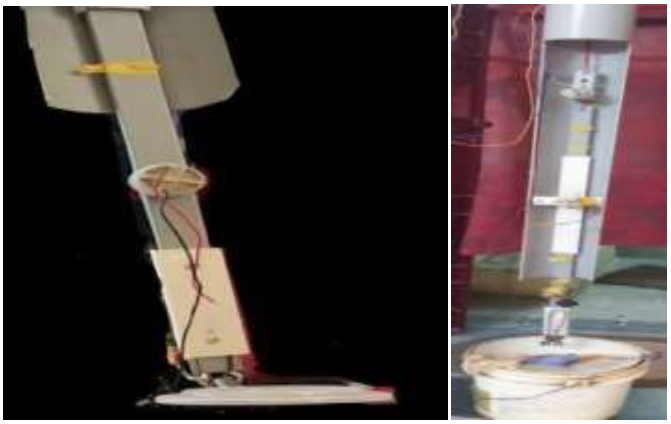
exceptionally interesting in its structure and furthermore lifting component.

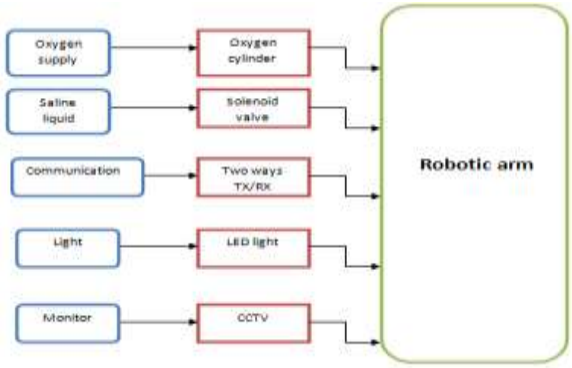
## III. PROPOSED CHILD RESCUE SYSTEM



Our proposed system aims at rescuing the trapped child safely from the bore well without major injuries and also provides life supporting systems such as water, light, communication and also measure the temperature of the child and the surroundings. To check whether the child is alive inside the well, we have made use of the touch circuit which is connected with a buzzer. If there is bio-potential in the child's body, the buzzer would ring and it indicates that the child is alive. If there is no bio-potential in the child's body, then the buzzer will not ring and this indicates that the child is not alive. In this project, to safeguard the child who has fallen into bore well, we have designed using the temperature and gas sensor to sense the temperature and gas leakage in the particular area.

Checks whether the child is alive and also provides life supporting factors such as light, temperature, water and also measures the temperature of the child and the surroundings. It is a controlling to takeoff the child inside the bore well, which is controlled by the person from outside. The main principle of the current research is to build a smart child rescue robot utilizing improved technique within a limited time period. Here we have proposed a mechanism which is very special in its structure and also lifting mechanism.

In the proposed model the existing difficulties were overwhelmed by introducing a special gripping mechanism which has the ability to hold the child tightly and rescue safely in less time. These kind of robotic systems are designed to work in bore well rescue operations and also to detect defects inside the pipeline. The robot has mechanized arms in its front to pick and place the objects.




**Architecture diagram of the proposed system**

## IV. EXPERIMENTATION

Our intention is achieved by controlling a mechanism to take of the child inside the bore well which is operated by the person from outside. The mechanical architecture is done by using only two DC motors. The whole operation will take about the

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minimum time to complete the action. One set of DC motor is used for the horizontal and vertical movement and the set of DC motor is used for the open and close movement of the rescue unit. It boosts the incoming 5V into 12V. Motor Driver (L293D) and ARDUINO UNO R3 are used to drive 2 DC motors. The forward and reverse motion is done using DC motors. Due to the dark light condition inside the bore well, our system provides the lighting things inside. The whole scenario will be feed live through the communication module which will publish the images from the cameras of the robot. The persons who are outside the bore well also can able to see the condition of the child via live feed. Here this robotic mechanism plays a vital role in rescuing operation and supportive to rescuers during the disasters.

This mechanism useful for the other applications includes Rescuing the trapped child safely from the bore well and also checks whether the child is alive by using touch circuit. It saves time with this system to rescue the child, manually monitoring also available with the help of CCTV camera system. It's also providing life supporting factors to the child.


**TOUCH CIRCUIT TO DETECT THE CHILD LIVE**

Using the properties of capacitors, touch can be used as an extremely effective method of input and control. It allows the human body to be sensed are the conductive electrolytes that it contains, which allows charge to be held and transferred. A parallel-plate capacitor consists of two conductive layers of material with an insulating material called the dielectric in between them. The detection of this capacitance is the main operating principle in capacitive touch sensing.

Here, touch sensor is used to check whether the child is alive inside the bore well. Once the touch circuit touches the child's body, we can hear a beep sound from the buzzer we have connected if the child is alive or else we can't hear anything indicating that the child is no more alive.

**SOURCE CODE FOR THE MICROPROCESSOR:**

```
const int pwm = 2 ;
const int in_1 = 8 ;
const int in_2 = 9 ;
void setup()
{
pinMode(pwm,OUTPUT) ;
pinMode(in_1,OUTPUT) ;
pinMode(in_2,OUTPUT) ;
}
void loop()
{
digitalWrite(in_1,HIGH) ;
digitalWrite(in_2,LOW) ;
analogWrite(pwm,255) ;
```

```
delay(3000) ;
digitalWrite(in_1,HIGH) ;
digitalWrite(in_2,HIGH) ;
delay (1000) ;
}
```

## V. CONCLUSION

Human life is precious. Our bore well child rescue system is a significant attempt to save the life of the victim of bore well accidents. In the past decades, lots of lives had been lost by falling into the bore well because digging a pit beside the bore well is a very tedious and time consuming process. Our project not only saves the life of the victim, but also provides many life supporting factors. Deeply observing those incidents and looking at the current circumstances we feel that we need to develop such framework for saving those innocent lives. In addition there is a whole new research area waiting ahead us which deals with lots of challenges relating to mapping in unknown environment, real-time teleportation in low lighting conditions, arm manipulation system. Rather than the technical development we would be highly satisfied if it can fulfil the most important aspect of the project, which is to save a life. We would conclude that the proposed system will retain the lives of many children who fall into the bore well and the child will be rescued without any damage.

**SOME OF THE ADVANAGES FROM THE ABOVE RESULTS**

a) Ensures safe handling of the victim
b) Provides life supporting factors such as light, food, oxygen and also the victim liveliness.
c) Rescues the trapped child without major injuries as there is a harness connected with the robotic arm mechanism.

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