CHAPTER 1

Introduction

In this chapter we are going to study about requirement of this project, drawbacks of the existing system, use of the project for the current scenario. Borewell Rescue Robot is designed to rescue the children who get trapped inside the open borewells unknowingly. Borewell Rescue robot can be used to rescue the child successfully along with performing life saving actions.

1.1 Introduction

Children fall in the borewell due to the carelessness nature of the people in society. Due to this many children are becoming the victims. The currently available systems are less effective and costly too. Thus the society is in need of a new technique which is more efficient and effective. The objective of the project is to construct and design a borewell rescue robot which can overcome the negatives of the existing systems. Borewell rescue Robot aims in rescuing child trapped in a borewell. The Robot is capable of moving inside the hole according to the commands given by the personal computer. CCTV camera is used to continuously monitor the child's condition and also help to decide the actions which have to be performed by the robot. This robot has a high power LED which acts as a light source since light intensity inside the hole will be less. The advancement in the field of automation along with the mechanical design has a great impact on the society. This project includes series of process development from hand drawn sketches to computer generated design. The modern equipments are implemented for various parts of the robot, since the robot performs a life rescuing activity. The light weight servo motors are implemented for the robot's operations. A safety airbag is introduced in order to prevent the further falling down of child during rescue operation. A wide range CCTV camera is placed to find the child's position. An additional robotic arm system is included for the perfect positioning. Borewell rescue Robot is a human controlled computerized Robotic system embedded with additional safety devices.

1.2 Motivation

Today's major problem faced by human society is water scarcity, which leads to a large number of borewells being dug. These Borewells in turn have started to take many

innocent lives. Borewells which yielded water and subsequently got depleted are left uncovered. Small children without noticing the hole dug will slip inside and get trapped. There is no proper technique to rescue victims of such accidents. In most cases reported so far, a parallel hole is dug and then horizontal path is made to reach the child. 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 and it needs big space around the trapped bore so that a hole can be dug, parallel to borewell where the child has been trapped. These ad-hoc approaches involve heavy risks, including the possibility of causing injuries to the body of the child during the rescue operation. In most cases, we rely on some make shift arrangements. This does not assure any long term solution. In such methods some kind of hooks are employed to hold the sufferers clothes and body. This may cause wounds on the body of the subject. After studying all the cases it is found that it has got a serious issue to do and make a robot which can go through the same trapped borewell and grasp the trapped child providing facilities of supplying oxygen, safety airbag to form horizontal platform without causing damage to the child's body.

1.3 Objective

The main objective of the project is to rescue the children who have fallen inside the Borewell with the help of robotic arms and safety airbag. CCTV camera plays a very important role of continuous monitoring of the child's position. The myDAQ which is the controlling device located at the ground level controls all the actions of the robot. The Borewell Rescue Robot can replace the currently available techniques. It can also be used to lift the heavy weights in industry and in mining areas. Rescue Robot mainly focuses on these things,

a) **High level safety:** It is very important to have a system which can ensure a maximum level of safety of the trapped child. While pulling the child up, care has to be taken so that no rupture is caused to the child.
b) **Fast rescue:** The child who has fallen inside the Borewell suffers from trauma and as the time passes the availability of oxygen goes on decreasing. Hence there is a need for performing the rescue actions with minimal time. This project ensures this objective.

c) **Performs life saving action:** With the passage of time, the availability of oxygen decreases. Due to this the child may become unconscious or even lose its life. Here the Rescue Robot provides the child with appropriate oxygen supply.

d) **Cost effective:** The proposed method is economical and requires less cost to rescue the child when compared to the existing systems.

The objectives of this project include

1. Manually monitoring the child with the help of camera and controlling unit of robot.
2. Communicating with the robot by sending appropriate commands to it and activate the suitable motors.
3. Length of the rope can be determined roughly with the help of IR sensors. Once the robot has reached proximity of child, it is stopped immediately and is given the commands by the controlling device to perform the closing of the robotic arms.
4. Oxygen supply is activated immediately to overcome its scarcity and entire arrangement is pulled up.

Organization of the Report

The report is organised as follows:

- The Chapter 1 gives an introduction of Borewell Rescue Robot, Motivation, Objectives of the Project.
- The Chapter 2 explains about Background Theory and the Existing Systems available currently to tackle the Borewell accidents.
- The Chapter 3 discusses about the Functional Block Diagram and the Description of the Flow Charts.
- The Chapter 4 gives the Description of various hardware components used in the implementation of the project.
- The Chapter 5 gives the Result Analysis and the details of the various trials taken during the analysis of the project.
- The Chapter 6 gives the Future Enhancement and Conclusion of the project.