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A Systematic Approach To Rescue A Child From Bore Well Using Leap Motion Controller

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Abstract: ***In present world robotics is the trending field. Various types of robot are used such as rescue robots, agriculture robot, humanoid robot etc., but there is a larger demand for the rescue robots. Bore well robots, fire fighting robots, bomb detection robot are different types of rescue robot. Here Bore well are used to demonstrate to recover the child fallen in to well. Many number of bore well are opened so children playing nearby places who accidently fallen in to the well. To adjust the position of the child safety balloon is used. The robot is controlled by the leap motion controller. The data are transmitted through Zigbee module. The main help is to recover the children from the bore well without any threat.***

Keywords: ***Leap Motion Controller (LMC), ZIGBEE, PIC 16, High power LED***

I. INTRODUCTION

Rescue child from a bore well is the risky job. It takes more additional time to rescue a child under the bore well depth [1]. More number of small child lives is caused due to carelessness of their parents and playful behaviour of the child. Lives of the child lead to death because of this human error. More number of bore wells is opened without the proper closing of the wells and also due to drought. Nowadays human work is controlled by automated machines. An embedded system is used to design the real computing task. It always consists of hardware and mechanical parts. At present embedded system control many devices.

II. RESCUE ROBOT

Without any help of the end users robot can be automated this automation saves the lives of the military and Para medical people [3]. When there is small or larger duration delay it may decrease the chances of the lives of the child. Saving the child needs lot of energy and expensive materials are needed. If military people work under bore well to save the child the possibilities of injuries to the body will occur. Some child is later died in the hospital due to lack of medical aid during the rescue operation.

Fig 2.1Bore well depth

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III. METHODOLOGY

EXISTING SYSTEM

When a child under the bore well depth the people mostly use hooks to hold and bind the cloth and body, this may cause wounds to the body. The rescuers people dug the hole up to the bore well next to save the child. The presence of child is not identified by the rescuers people sometimes. This may lead to death of the child. The presence of oxygen is low under the bore well. It is a time taking and risky process to save the child from the bore well.

Fig 3.1 Existing system

PROPOSED SYSTEM

To overcome the above situation automation is used. The total system is controlled by the PIC 16 microcontroller and the leap motion controller. To recover the child without any injury safety balloon is used [6]. The PC used to measure the sensors such as the temperature, pressure and smoke. The movement of the robot is controlled by the dc motor. The whole part is controlled by the display system PC. Zigbee signals are used to control the unit. These processes are seen through the camera part. The Leap Motion Controller is shown in the figure 3.1. It contains 2 IR cameras and three IR emitters. The hand gesture is recognized above the Second IR emitter.

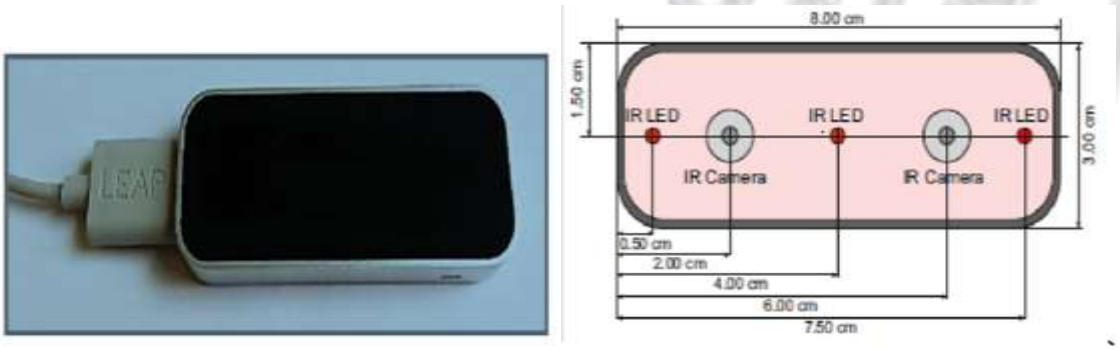

Fig 3.1 Leap motion controller

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IV. RESCUE ROBOT SYSTEM MODEL

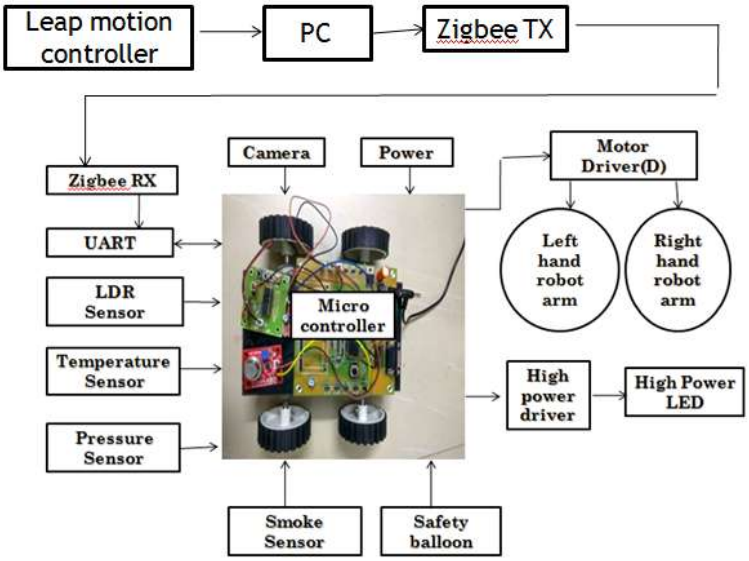

Fig 4.1 Block diagram of Robot

V. WORKING

The system consists of transmitter and receiver unit. The transmitter part if full of controller and the receiver part id full of robot. Inside the bore well part is controlled by the leap motion controller. The robot signal is transmitted through zigbee. It can transmit up to 1000 meters. The temperature is sensed by the thermistor and to measure the pressure transducer is used. If there are any poisonous gases present inside the bore well is identified by the smoke sensor is used. These valued and data are shown by the PC. The robot setup is send to the bore well till the child injured is found [7] [2]. Then the sensors are used sense the related parameters under the depth. Using Zigbee the signals are transmitted to the system setup. High power LED attached with camera to search the baby [8]. Finally the total process is seen through the PC. The gestures recognition is shown in the figure 5.1. It is separated in to two different gestures such as left and right hand gesture recognition. From left hand gesture it can move forward, left, right, backward. In right hand gesture it can move swipe up, clock wise, anti-clock wise swipe down are used.

Gesture Recognition

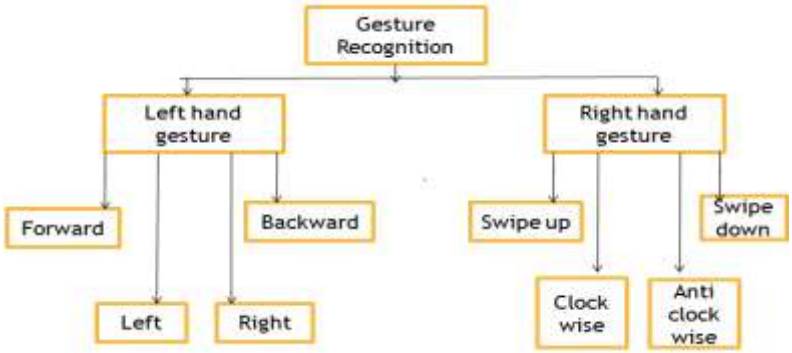

Fig 5.1 Gesture recognition

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Classification of gesture types

The variety of gestures is classified as pointing, semaphoric, pantomimic, iconic, and manipulation are shown in the figure 5.2. The pointing indicates pointing one person representation. The semaphoric gesture is further separated in to static, dynamic, and stroke. Where static shows symbol representation, dynamic shows the hand movement, and stroke movements.

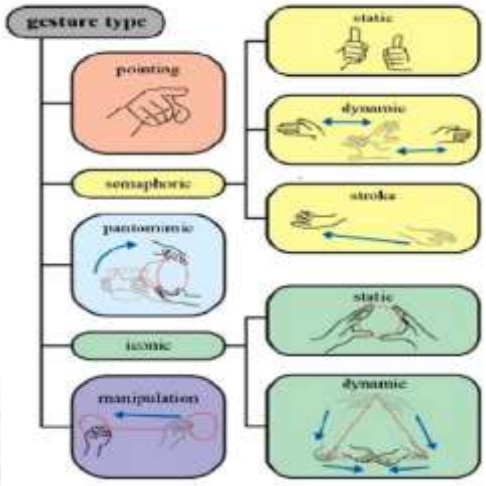

Fig 5.2 Classification of gesture types

Leap motion SDK Field of view and tracking system

Leap motion controller is connecting to the pc through the USB device. It is the small device placed in the computer system. Advantages of using leap sensor are highly sensitive to small motion, capable of mapping motion and recognize the hand motion. It is the non contact type techniques. Where contact type include data gloves. It tracks the exoskeleton system. but the leap motion track the hand and the finger.

Fig 5.3 Leap motion field of view

Rescue Operations

The Rescue operations include if baby fallen in to bore well the robot moves inside it [4]. After collecting all the data of the baby safety balloon is used to lift the child from the bore well [9]. In Sankaran koil a boy trapped inside the bore well using of bore well robot rescue a child from the depth is shown in the figure 5.4.

Fig 5.4 Rescue operations

VI. RESULT

Using this sort of technology is very safe and takes minimum time to complete the whole process. Highly advanced type of controllers is used with the help of expanding technology. The proposed system consists of leap motion controller (LMC); zigbee and PIC16 are used to perform their action. The proposed system preserves many lives of the child who fell in the bore well.

VII. FUTURE ENHANCEMENT

In the current design of bore well child saver machine is made to suit every possible situation may occur in rescuing operation such as Bomb disposal, Physiotherapy patients having upper limb impairments

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