Real Time Implementation of An Advanced Child Rescue System from Open Bore Well Based on ZigBee Application

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Abstract: In recent years, many cases have been reported of children getting trapped in bore wells which take life of the children and are a nightmare for parents. There is a definite need for developing a security and rescue system for children to rescue from bore well. The current rescue systems are time takingand are not at all accurate as involve manual help where there are many chances of human error. The bore well cases have taken many lives of innocent children while playing in that area. The process is very complicated and may be if someone is stuck a notification is also not received. In this paper, a new child rescue system is proposed, in which use of sensors and microcontrollers for rescue improves the efficiency of the system. Using surveillance camera, the child can be rescued by a hand gripper with utmost safety. This helps in the rescue of child from bore wells and also gives real time data of sensors and camera on phone and a LCD module of the system through communication withZigbee.

Keywords: Rescue; Gripper; Microcontroller; PC; LCD; Zigbee

INTRODUCTION

India is an agriculture-based country, ranchers or farmers basically rely generally upon groundwater for their basic water framework requirements. Now for the growing populace, lesser land-based assets and the advancement of urbanization of the very progressively significant requirement of the bore wells are usually tunneled for the groundwater pondering requirement. Subsequent to the basic requirement yielding of the water, the bore wells would have generally left revealed. So that, most by far of kids coincidentally moves toward the well and falls into it, which is the main purpose for these distress disasters by and by.The bore wells are some of the time left open with no legitimate covering. The rescue activities as a rule are less secure even to the rescue colleagues. A little postponement in this entire procedure may diminish the odds of sparing the kid. In the event that the zone close to the bore opening contains shakes beneath certain profundity, odds of sparing the kid turns out to be exceptionally less. Whatever might be the situation the pace of accomplishment relies upon part of elements like time taken for transportation of apparatus to the   circumstance, HR and chiefly the reaction time of different government associations. At present there is no legitimate strategy for managing this issue. At the point when the wells are burrowed, it isn't appropriately shut. the little kids accidentally will in general fall into the bore wells. safeguarding the kid is an another tumultuous errand. safeguarding the youngster with less time frame contrasted with all the basics of other existing strategies is a definitive point of this paper. Presently a-days, we regularly listen regarding the kid tumbling or getting stuck under the bore wells and this is being an issue over both urban, sub-urban and the small towns. The repeat from asserting such new sisexten ding bit by bit. Most by far of the youngsters accidentally moves toward the wells and falls into it. In the wake of teaching everyone with respect to these bore well mishaps, there showed up on be no advancement in the quantity of weepy accidents.

This paper is basically organized as follows: in first section introduction to the rescue system is mentioned. In section 2, brief literature review is mentioned. In section 3, implementation of the proposed system is mentioned. In section 4, results obtained from the setup are mentioned. And then finally in last section the paper is concluded.

LITERATUREREVIEW

In the current strategy the basic controlling of an armed robot to definitely rescue the kid from the small-bore gap is majorly constrained by the depending on individual from outside and also there is no general customizable arm width robot for each bore well size.Bygone framework, a major opening is burrowed nearly close to the bore well where the child is stuck until the major profundity where the kid is caught for quite a while. Indeed, even a little time postponement in these cases, assets may decrease to a very low value the opportunity to spare the kid alive. The effected region close to the bore opening may contaminate once in a while contain shakes somewhere inside

becomes riskier, for that situation the opportunity to spare the kid alive is very low and highly unsafe.

Due to very less oxygen and almost no light source that may cause the significant trouble and also may scare the child during the activity of rescue of the youngster. Till date there is no such good and extraordinary hardware for saving the youngster caught inside the bore opening.There is no good and reliable system to rescue the youngster. The advanced military individuals are called if this procedure doesn't work to rescue the system. It includes a very great deal of time and near vitality and also costly assets which are not efficient or effectively accessible from all over the place.

The basic component of the drag well is very small for any child in troublesome and also splendid goes as diminished inside it, the important safeguarding task in that situation is extremely troublesome for the rescuers.The general computerized system which will join an outfit to the kid using expanded arms for saving the kid is major concern to develop these days. The video visiting strategy of the camera based rescue is additionally accessible for talking with the kid and keeping the kid calm under this situation and also guiding him to help. The robotic arm resembles arm, with the goal that the lifting system of the child is extremely troublesome.

A robot basically comprises of three motors to spare a kid on the drag well optimistically. The essential motor is utilized for development generally which is all over by utilizing screw bar. The Second motor is basically used for getting reason with the outside of lead screw course of action. Another motor is also utilized to rescue the youngster through rack and pinion game plan. In light of the area of the youngster, the entire course of action can be turned. At that point the kid is lifted from the bore well.

PROPOSED METHADOLOGY

This section gives implementation of the proposed rescue system. The rescue system is divided into two sections namely Borewell section and Monitoring section. Each section has its specific function and components. The Borewell section representation module is shown in the Fig. 1. The Monitoring section representation module is shown in the Fig. 2. The Borewell section side consist of the following modulesMicrocontroller,CO2 Sensor,LCD,Pressure sensor,PIR Sensor,Power supply, Relay, Temperature sensor.
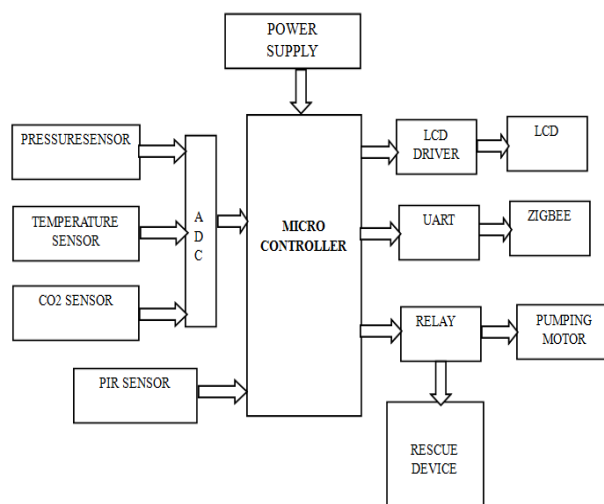

Fig. 1. Block Representation of the Borewell sectionof the rescue system.

POWER SUPPLY

A 230v, 50Hz Single phase AC power supply is given to a stepdown transformer to get 12v supply. This voltage is converted to DC voltage using a Bridge Rectifier. The converted pulsating DC voltage is filtered by a 2200uf capacitor and then given to 7805 voltage regulator to obtain constant 5v supply. This 5v supply is given to all the components in the circuit. A RC time constant circuit is added to discharge all the capacitors quickly. To ensure the power supply a LED is connected for indication purpose.

PRESSURE SENSOR

The MS7310D pressure sensor die is designed for low pressure sensor systems with the highest demands on resolution and accuracy. Its sensor element consists of a silicon micro-machined membrane bonded on a Pyrex™ glass support. The sensor signal is proportional to the pressure difference between back and front side of the membrane. The pressure is sensed by four implanted piezo resistors, giving a large output signal. The MS5535-30C is a high-pressure version of MS5535C pressure sensor module. It contains a precision piezo resistive pressure sensor and an ADC-Interface IC. It uses an antimagnetic polished stainless ring for sealing O-ring. It provides a 16 Bit data word from a pressure and temperature dependent voltage.

TEMPARATURE SENSOR

The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in ° Kelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient Centigrade scaling. Low cost is assured by trimming and calibration at the wafer level. The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy The LM35D is also available in an 8-lead surface mount small outline package and a plastic TO-220 package.

PIR SENSOR

The PIR-Series Outdoor Passive Infrared Detector is designed for detection of intruders at distances up to 75 or 100 meters. The devices can for example be used for perimeter protection and securing of long buildings. The PIR's can also be used in conjunction   with a CCTV system and they are particularly useful in combination with a Video Movement Detector (VMD). The Ernitec PIR's are truly passive devices which detect objects entering or crossing its field of view. The detectors are designed to detect any intruder by his movement and infrared contrast against the background. The detectors do not emit any signal, nor do they require a transmitter to be located nearby. The detectors have a nominal range of 75 or 100 m with a curtain shaped field of view. The curtain shape is ideal for the protection of perimeters and long buildings as it has a narrow and long range.

MICROCONTROLLER

The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller which provides a highly flexible and cost-effective solution to many embedded control applications. In addition, the AT89S52 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port, and interrupt system to continue functioning. The Power-down mode saves the RAM contents but freezes the oscillator, disabling all other chip functions until the next interrupt or hardware reset.

ADC

The ADC0809 data acquisition component is a monolithic CMOS device with an 8-bit analog-to-digital converter, 8-channel multiplexer, and microprocessor compatible control logic. The 8-bit A/D converter uses successive approximation as the conversion technique. The device eliminates the need for external zero and full-scale adjustments. Easy interfacing to microprocessors is provided by the latched and decoded multiplexer address inputs and latched TTL TRI-STATE® outputs. The ADC0808, ADC0809 offers high speed, high accuracy, minimal temperature dependence, excellent long-term accuracy, and repeatability, and consumes minimal power. These features make this device ideally suited to applications from process and machine control to consumer and automotive applications. For 16-channel multiplexer with common output (sample/hold port) seeADC0816 data sheet.

RELAY

A **relay** is an electrically operated switch. Many relays use an electromagnet to operate a switching mechanism mechanically, but other operating principles are also used. Relays are used where it is necessary to control a circuit by a low-power signal or where several circuits must be controlled by one signal. The first relays were used in long distance telegraph circuits, repeating the signal coming in from one circuit and re-transmitting it to another. Relays

were used extensively in telephone exchanges and early computers to perform logical operations. A type of relay that can handle the high power required to directly control an electric motor is called a contactor. Solid-state relays control power circuits with no moving parts, instead using a semiconductor device to perform switching.

LCD

LCDs come in many shapes and sizes most common is the 16character x 2 line display with no back light. It requires only 11 connections – eight bits for data (which can be reduced to four if necessary) and three control lines (we have only used two here). It runs off a 5V DC supply and only needs about 1mA of current. To get the display working requires eight bits of data, a register select line (RS) and a strobe line (E). These are supplied from the PC printer port (refer to schematic). A third input, R/W, is used to read or write data to/from the LCD. In this kit the R/W line is tied low so only writes to the LCD are possible (more on this later). The eight bits of data are supplied from the printer port data lines and two printer port control lines are used for RS ('auto') and E ('strobe'). Basically, the LCD has two registers, a data register and a control register. Data is written into the control register when RS is low and into the data register when RS is high. Data is latched into the LCD register on the falling edge of Enable'.
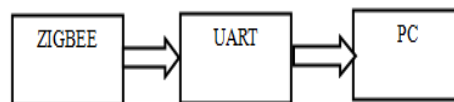

Fig. 2. Block Representation of the Monitoring section of the rescue system

UART

A UART is usually an individual (or part of an) integrated circuit used for serial communications over a computer or peripheral device serial port. The Universal Asynchronous Receiver/Transmitter (UART) controller is the key component of the serial communications subsystem of a computer. The UART takes bytes of data and transmits the individual bits in a sequential fashion. At the destination, a second UART re-assembles the bits into complete bytes. Serial transmission of digital information (bits) through a single wire or other medium is much more cost effective than parallel transmission through multiple wires. A UART is used to convert the transmitted information between its sequential and parallel form at each end of the link.

ZIGBEE

ZigBee is the set of specs built around the IEEE 802.15.4 wireless protocol. The IEEE is the *Institute of Electrical and Electronics Engineers*, a non-profit organization dedicated to furthering technology involving electronics and electronic devices. The **802 group** is the section of the IEEE involved in network operations and technologies, including mid-sized networks and local networks. **Group 15** deals specifically with wireless networking technologies, and includes the now ubiquitous 802.15.1 working group, which is also known as Bluetooth®. The standard itself is regulated by a group known as the **ZigBee Alliance**, with over 150 members worldwide. One ZigBee network can contain more than 65,000 nodes (active devices). The network they form in cooperation with each other may take the shape of a star, a branching tree or a net (mesh). What's more, each device can operate for years off of   a AA cell. That means that each node uses little power.

RESULTS

In this section, the results are discussed for the child rescue system using Zigbee. In Fig. 3, the image of the prototype design is shown.
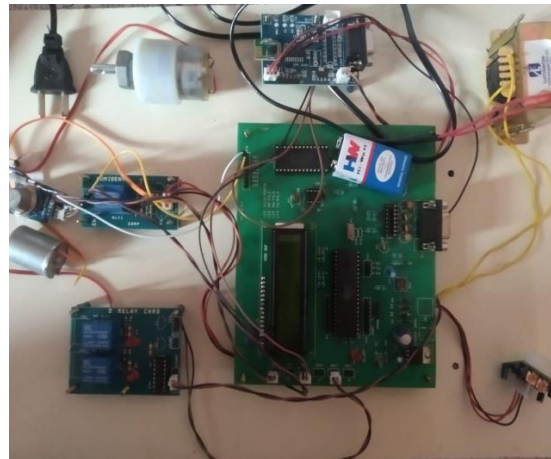
Fig. 3. Implemented Hardware Image

The above figure shows the implementation of the hardware used which consists of gripper and motors for up down gear. This setup is then tested on various possibilities and then the surveillance is received on phone through camera. The parameters of temperature and gas sensor are tested through Zigbee under long range for final outputs. It is seen that the data was successfully received within high-speed times. The very important and basic advantages of the proposed system are – the system is very high speed because of communication from Zigbee, it consists of good mechanism for child rescue, the camera used has night vision to see child in low light conditions. The gas values can be continuously monitored for any hazardous substance and low oxygen levels to supply oxygen below. The system was well tested and found high accuracy of up to 99%. The testing of the system was perfumed using the setup prototype with dummy borewell and was found efficient in the rescue of the child. The motors are selected according to the weight of child and can be easily implemented as a rescue product.

CONCLUSION

Hence the system is successfully implemented and tested with positive outcomes. As we see enormous of measure of lives are lost in view of youngsters or creature falling into borewell. We have structured a framework which can securely expel the kid from borewell as fast as could be expected under the circumstances. Constant checking of framework will givea reasonable perspective on the bore well with the assistance of remote camera. Also, with the assistance of temperature, gas sensor,and camera with gripper we can keep up safe condition. The framework can be further being utilized to recuperate the exploited people from numerous enterprises, sewage, pipeline. This gives quick assistance during disaster and help to spare various measure of life.

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