"DETECTION OF AMBIENT TEMPERATURE OF BOREWELL BASED ON IOT"

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Abstract: The children demise inside the borewell is expanded in nowadays, with uncovered borewell they fallen without knowing and lost their lives due to suffocation inside, likewise without oxygen, food and so forth. The harmful gases like carbon monoxide, Methane, LPG, hydrogen sulphide inside the bore-well it will influence the children breathing and furthermore this may prompt unconsciousness, and without oxygen it might influence the brain functioning of child and child may die and furthermore explicit distance of the child at what distance child stuck isn't know.

To overcome these, we need to detect the various gases with different multiple gas sensors additionally to get the temperature and humidity condition. Alongside this ultrasonic sensor is utilized to get the distance of child at what distance child got stuck. We have utilized two Arduino Uno microcontrollers which is at the transmitter side and other at Receiver side also utilized two LORA module as the communication devices. With the help of IoT involved in the proposed system. Every one of these information are sent to the cloud and we can monitor the data in the thing speak dashboard through PC or from our smart phone through Android App Usage and also, through LCD at Receiver end.

We can utilize this proposed framework inside the borewell for up to 100-meter depth. Thus, we came up with this Design and Development of IoT enabled Gas sensing system for remote monitoring of Air quality in borewell Rescue operations. Based on proposed system results of real time data the Rescue specialists can make a further move by providing of oxygen, food, and so forth Save their lives.

Keywords: ArduinoUno, Arduino nano, Esp8266(wifi module), Sensors(MQ4,MQ7,MQ135,MQ6), PIR sensor

I.   INTRODUCTION

India is a land of agriculture most them depends on the agriculture as their occupation. Water is most essential thing in every one's life. Agriculture is mainly depending on the water. Water shortages are increasing day by day and so farmers are therefore drilling more borewells, due to ground Water deprivation.

Borewell becomes more and more water depleted over time. Disasters have increased at Bore Well nowadays, and most of the dried bore-well is not closed due to irresponsible it may take some one's life and most of the cases children falling into borewell.

To protect a child fallen into Borewell Rescue authorities drill the land from other side. Meanwhile inside the bore-well proposed model will get hazardous gases concentration of carbon monoxide, Methane, Lpg also, temperature and humidity condition and distance of child from the proposed model at what depth child got stuck.

II.   RELATED WORK

1.   Literature Survey

| Sr.no	Publisher	Author	Year	Name of the paper	Methodology
1	RIACT Journal of Physics: Conference Series	L. Abhishek and J .Kathirvelan	2021	Design and development of IoT enabled gas sensing system for remote monitoring of air quality in borewell rescue operations	We can utilize this proposed framework inside the borewell for up to 80-meter depth. . We have utilized two Arduino Uno microcontrollers which is at the transmitter side and other at Receiver side also utilized two ZigBee's as the communication devices. With the help of IoT involved in the proposed system. [1]
2	7th International Conference on Signal Processing and Integrated Networks, 2020.	S. Singh, M. J. Baruah and R. K. Verma	2020	Implementation of a Child Rescue System from Bore well using Zigbee for Long Range Applications.	In this work they thought of utilization of sensors and microcontrollers for rescue improves the proficiency of their system. Utilizing observation camera, they are utilizing hand gripper for kid rescue by with security. This aide in the rescue of kid from bore wells and furthermore gives continuous information of sensors and camera on mobile and a LCD module of the system through communication with ZigBee. The real time temperature sensed data are missing, also lpg gas sensed data are missing [2].
3	International Journal on Emerging Technologies	Sriramireddy K,D. Satyanarayana and Ravikumar Mandava.	2020	An Investigation on Bore-well Rescue Robot–Present Devices and Techniques	we presented the study of various Borewell Rescue Robots, which are the existing robotic models available in nowadays, how robots find out the child location in bore well and the way of rescuing the child's life [26].

| 4 | IEEE Third International Conference on Circuits, Control, Communication and Computing, | A. Shenai, A. Antin, P. R and D. Soman, | 2018 | Development of In-Pipe Robot for Assisting Borewell Rescue Operations. | This work outlines an imaginative strategy to survey the state of the casualty by dissecting different subtleties

like the profundity at which the kid is trapped, location of destructive gases present, temperature, mugginess conditions and live feed of the casualty utilizing an in-pipe robot. sensed gas data having mixture of alcohol, smoke, ammonia, gases results but they do not classify as individual gas how much of alcohol ppm, ammonia ppm, smoke ppm it is showing the result of combination of alcohol, smoke, ammonia gases as single gas data this might get confuse to for rescue operator which gas to diffuse or neutralize.

They could have used any particular gas sensor or they could have classified as individual gas in mixture of gases.so that even rescue operator and others can also understand [3]. |

5	International Journal on Emerging Technologies,	Monisha, K., Mythilid, C., Priya, S. M., & P., A. P.	2018	A Multifunctional System Based Rescue Robot Adapted For Borehole Accidents Controlled Using Arduino.	A multifunctional system based rescue robot adapted for borehole accidents controlled using Arduino system[25]
6	International Journal of Computer Aided Engineering and Technology, 10(3), 266-273	Sridhar, K. P., Hema, C. R., & Deepa, S.	2018	Comparative study of design and analysis of gripper systems for bore well rescue operation.	Borewell rescue robot with the help of the gripper system[21]
7	Indo-Iranian Journal of Scientific Research (IIJSR), 2(2), 5	Suji, M. P., Farhin, M. B. S., Sheikh, M. N., Ramijha, C., & Jayaraman, G.	2018	Smart Bore well Rescuing Robot.	Smart bore well-rescuing robot system using Adriano UNO and ultrasonic sensor[11].
8	International Journal of Computer Engineering and Applications	Chaitra, C., Kavyashree, K., Athulya, A., Aswanth, Nambiar., & Guruprasad U	2018	Child Detection and Rescue System for Borewell Accidents.	Child detection and rescue system for bore well accidents using sensors and DC motors, robotic arm systems[27]
9	International Journal of Engineering & Technology,	S. M, P. N and S. R ,	2018.	Design and implementation of labview based bore well child rescue robot .	In this work they designed the rescue robot which consists of the microcontroller which is used to control motor, camera, temperature sensor, altitude sensor to find distance measurement. This proposed system design implemented only in the LabVIEW. This does not have the hardware implementations [10].

III.   PROPOSED SYSTEM

The main aim of our project is to sense the poisonous gas inside the borewell along with this will also get the distance information of child and temperature &humidity condition. This block diagram section consists of as follows:● Transmitter side ● Receiver side.

- **Block Diagram**

Transmitter:
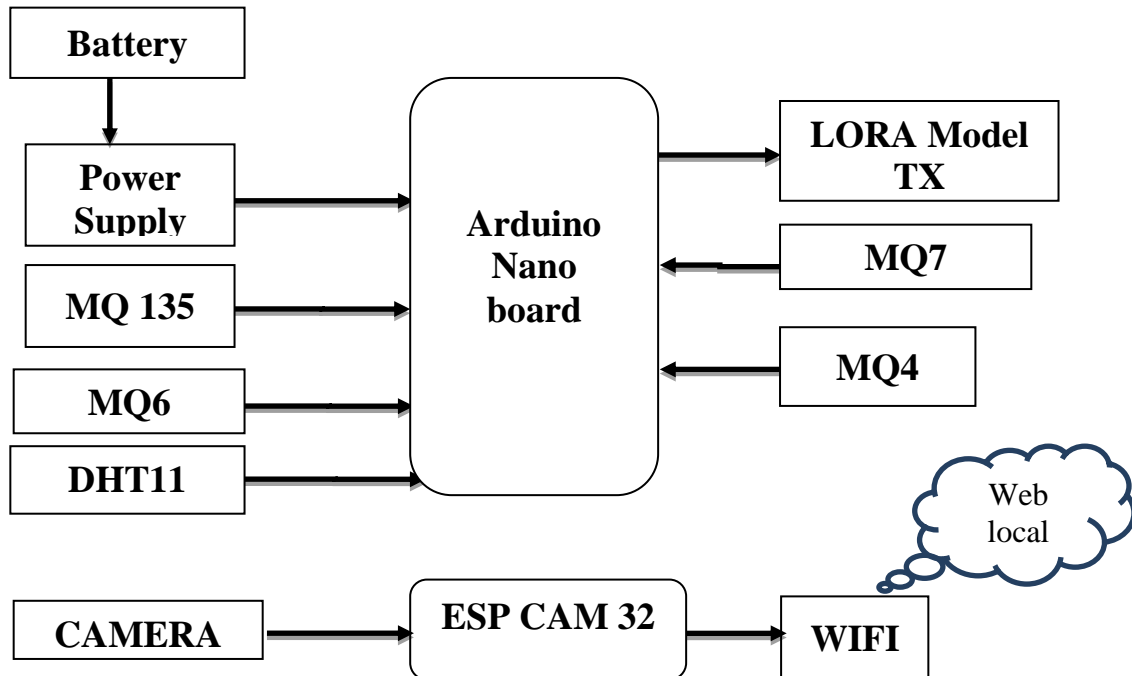
Figure: Block Diagram of Transmitter

Receiver:
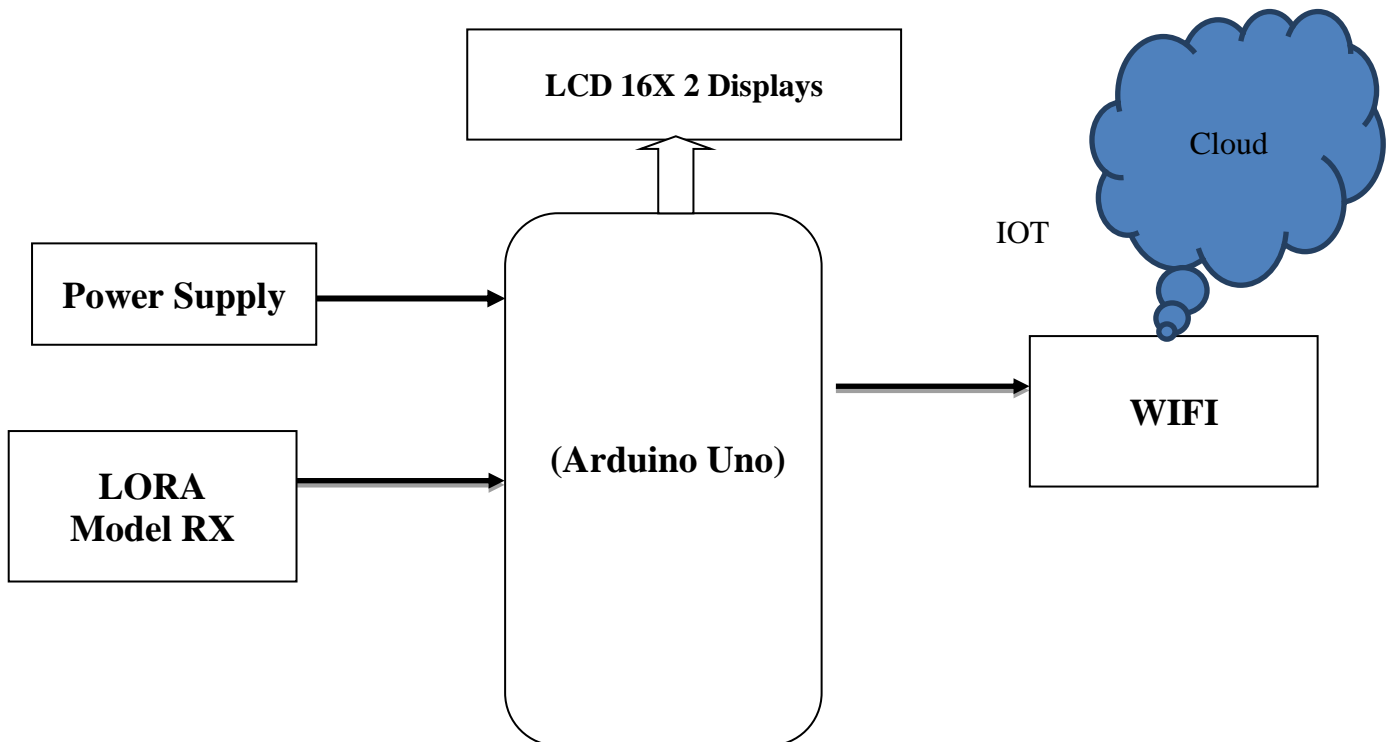
Figure: Block Diagram of Receiver

Software Requirements:
1)   Arduino IDE (Programming)
2)   Express PCB (Circuit &layout design)

Hardware Requirements:
1)   Arduino Uno and Arduino nano
2)   Esp Cam32, Esp8266 (wifi module)
3)   Battery
4)   MQ6,MQ4,MQ7,DHT 11,MQ135,PIR SENSOR
5)   Regulator (7805)
6)   Lcd 16*8

3.2 Block Diagram Description

Transmitter side :

To sense the harmful gases inside the bore-well here we are using MQ-4, MQ-6, MQ-7,MQ135, gas sensors. MQ-4 sensor for detection of methane, MQ-6 sensor for detection of LPG and MQ-7 for detection of carbon monoxide. MQ-135 Gas sensor can detect gases like Ammonia (NH_3), sulfur (S), Benzene (C_6H_6), CO_2, and other harmful gases and smoke. Along with this ultrasonic PIR sensor is used to get the distance of obstacle (child) at what depth child got stuck and DHT11 sensor for to sense Temperature and humidity. These are the gas sensors is used to sense the different gases present around inside the borewell.

This sensor detects the gases and transmits the Analog signal coming from sensor to the Arduino microcontroller. This Arduino Nano microcontroller having 10 Bit ADC and convert these Analog signals to the digital signals. This ADC takes sample of Analog signal then converts into Digital signal which corresponding to Analog. For longer range of communication here proceeding with LORA Modules.

To transmit this digital signal for long range we are using two Lora Modules. We need to configure two Lora as Co-Ordinator Lora and Router Lora. Then the coordinator Lora is interfaced with Arduino Nano micro controller that is connecting TX pin of LORA to RX pin of Arduino. RX pin of Lora to TX pin of Arduino which is at Transmitter end. And a 5000mah 5V battery power bank for power supply for the circuit present in the Transmitter side. Transmitter side is enclosed in a box. After powered on all the sensors, microcontroller & Lora get powered on. The Co-Ordinator Lora send's the data to the receiver side.

ESP CAM 32 also added on Transmitter side for the video streaming.

Receiver side:

Receiver side consists of Arduino Uno with Ethernet shield and 16*8 LCD interfaced also with 4 LEDs for Harmful gas alerts as shown in Figure.**1.2** Next interface the Ethernet shield on Arduino Uno microcontroller. After this Lora (router) is connected to RX pin of Lora with TX pin of Arduino and TX pin of Lora with RX pin of Arduino. Along with this a 16*8 LCD interfaced with it. 4 -LED'S for harmful gas Alerting when it exceeds the harmful threshold range the LED will blink.Plug in the RJ45 cable from Ethernet shield to Laptop, then plug in the USB cable of Arduino Uno to Laptop. After a few seconds the receiver side gets powered ON.

The Ethernet shield with Arduino gets IP address after getting connected to specified IP address. Router Lora receives the data coming from the other end. Then it sends data to the Thing speak cloud.

At each interval of 60seconds of time period it sends the data to Thing speak cloud. Then we can monitor the real time Data through Mobile App or through Thing speak dash board from PC also we can monitor the Real time Data through 16*8 LCD.

EXPERIMENTAL RESULTS

The expected result of this   proposed system will help rescue operators for consistent checking of framework by observing t gases Methane, LPG, Ammonia (NH_3), sulphur (S), Benzene (C_6H_6), CO_2, other harmful gases and

smoke, Carbon-monoxide concentration with focus additionally, temperature & humidity conditions and alongside the Distance information of obstacle (child).

Subsequently the proposed system will effectively execute in borewell and came with Positive Monitoring of the real time data in the thing speak dashboard from mobile App or can monitor data in the thing speak dashboard through PC also.

CONCLUSION

Many child deaths are appeared in the past due to bore well accidents. This borewell accident mainly happens in rural areas because of lack of knowledge of people. So this proposed system will save many children's life with a high success. Based on proposed system results of real time data the Rescue specialists can make a further move by providing of oxygen, food, and so forth Save their lives.

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