IOT Based Intelligent Gas Leakage Detector

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ABSTRACT

Sewage treatment is an important environmental protect problem. If the drainage system is not maintained properly, the pure water get mixed with drainage water and cause infectious disease. It is very important that underground drainage system should work in a proper manner to keep the city clean, safe and healthy. At present, the toxicity of gases in sewage cannot be monitored. So various kind of work has been done to detect, maintain and manage these underground systems. To create a barrier to this problem, a hardware model is designed to monitor the sewage system. In this paper, it is discussed about the method to measure the water level in sewage continuously using the ultrasonic sensor. The toxicity of CO and methane gases are also sensed to avoid danger for human life.

INTRODUTION

The underground drainage system monitoring plays a very important role in making the cities cleans. In India, the process of monitoring and maintaining the drainage system is done manually. The drainage consists of solid and liquid waste generated by hospitals, industries, factories and from homes. Hazardous gases are released from this waste which affects the human health. Exposure of sewage workers to poisonous gases increases the chances of sewage workers affected by diseases like paratyphoid fever, hepatitis and even death. Manual monitoring & cleaning the drainage is necessary but it leads to huge accidental deaths of human due to over gas in manholes. According to the recent survey at least one worker had died while cleaning sewage tank for every five days since the beginning of 2017. The death of sewage workers has been increasing day by day. In order to protect the sewage worker from death we have come up with the solution called IOT based underground drainage monitoring system which helps in monitoring hazardous gases present in sewage & helps to alert the sewage workers whenever the gas level crosses the specified limit. It also displays the value of gas level in the smart phone through the app. It also helps to decide whether it is safe for the worker to work in the environment or not.

LITERATURE REVIEW

Paper1: Monitoring Smart City Applications using Raspberry PI Based on IOT

In this research paper implementation of Internet Of Things (IOT) is shown for monitoring various applications in Smart City using Raspberry PI. which leads to improvement in efficiency as well as reducing cost and maintaining economic value. Using easy wireless communication system information can be shared faster. There are various types of sensor present in smart city and collecting data from all those variety of sensor and transferring it to Raspberry PI3 controller which further send this to control room via email can be done.

Paper 2: Automated Internet of Things for Underground Drainage and Manhole Monitoring System for Metropolitan Cities.

This research paper discusses the importance of sensor networks in the IOT world. Since there are a lot of devices that too of different varieties which sometimes leads to issues in defining common requirements for the WSN nodes and platforms. Real world approach to resolve this issue and

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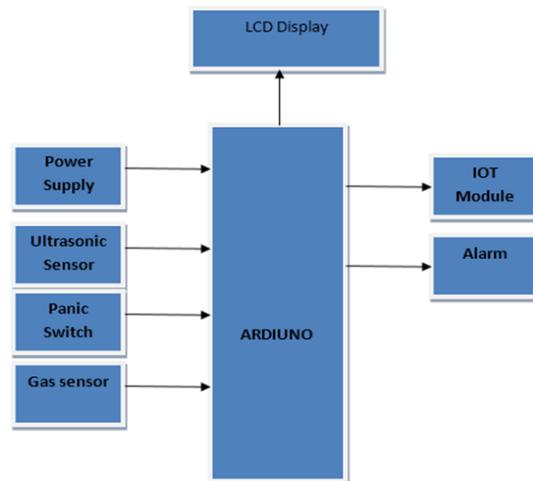**Anusuyadevi M. B** et al., Inter. J. Int. Adv. & Res. In Engg. Comp., Vol.–09(02) 2021 [xxx-xxx]

making system more accurate, less costly and easy to maintain. This model checks water level, temperature as well as pressure in drainage system

IOT technology for improving and maintaining sewage conditions and providing solutions to fatal issues that will have features like low maintenance, low cost, fast deployment, and a high number of sensors, long life-time and high quality of service. There can be improvement by provide more features like blockage preventions, safety precautions, and concerns for sewage cleaners by checking sewage lines conditions, live analysis of every sewage line analyzing sewage waste.

Existing System

The existing system alerts the user through an alarm when there is any leakage of gas in house and commercial premise and avoids accidents due togas leakage but people are unaware of the status of their gas cylinder this may cause delay in booking of new cylinder. So this stands as an disadvantage of the existing system.

Proposed System

The proposed system provides you an interconnected web of various sensors which will bring us real time values of the environment which can be compared to concentration of gases and temperature up to point that does not harm human body and provides workable conditions. These threshold values can be classified into various categories such as workable and dangerous. Apart from providing safety precautions to cleaners our proposed system will have record of water level with sudden water level change in any two adjacent sensor can be blockage or leakage which both are hazardous can be avoided and crossing threshold height of drainage a notification will be sent to government authorities which are responsible for maintaining sewage lines and take care of potential overflow and similar to gases we can have a database for battery of sensors which will lead to ease in maintaining process and over underground system will become smart which will contribute to making a city smarter.

Block Diagram

Gas Sensor

The mine gases are tremendously centered and toxic, grow to be a danger to each miner's fitness and the surroundings and also restrict visibility. The fundamental factor of the flammable gases that leak from coal seams is methane. The sensor makes use of MID04 infra-red methane sensor. The attention sensing vary of 300 ppm to 10,000 ppm is appropriate for leak detection. The temperature vary

of the sensor is from $-10o$ C to 50o C and it consumes strength much less than one hundred fifty mA at 5 V. The MG-811 is the carbon dioxide sensor. It is tremendously touchy to CO2 and much less touchy to alcohol and CO. It ought to be used in air satisfactory control, ferment process, indoor air monitoring application. The output voltage of the module falls as the attention of the CO2 will increase.

Emergency Alert Messaging And Sending
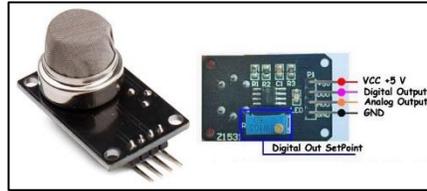
Emergency Alert Messaging and sending phone The heart of the application is the emergency alerts being sent to the contacts in case of emergency. For example, if the person is listed as Trusted Contact by the woman who downloads this application, in case of any emergency, alerts will be sent to the person. So there is no risk of losing any alerts during simultaneous logins.

Buzzer

Buzzer or beeper is an audio signalling device. Buzzer will automatically turn on when alcohol is detected.

Ultrasonic

The ultrasonic sensor and radar system work on the same principle. It is used to measure distance with the help of ultrasonic waves of frequency more than 18kHz.IN our research it will be used to detect water level in sewages.

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ESP8266 WIFI Module

The receiving internet records via ESP8266 modem when interfaced with microcontroller or PC is tons much less tough as differentiated and Ethernet module when you consider that ESP is a SoC and Integrated TCP/IP way of life stack. AT firmware is supplied convenient to use bearing set with which it will in accepted be orchestrated or labored at a variety of Baud Rate (Supported 9600, 115200 or 57600). Plain Text may additionally be despatched via the modem via interfacing solely three warning signs of the successive interface of modem with microcontroller (TxD, RxD and GND). In this arrangement RTS and CTS symptoms of successive port interface of ESP Modem are associated with one another. The transmit banner of successive port of microcontroller is associated with of the consecutive interface get sign (RxD) of ESP Modem whilst get banner of microcontroller successive port is associated with transmit hail (TxD) of successive interface of ESP Modem.
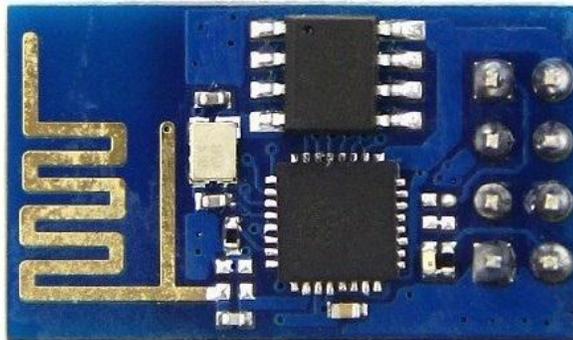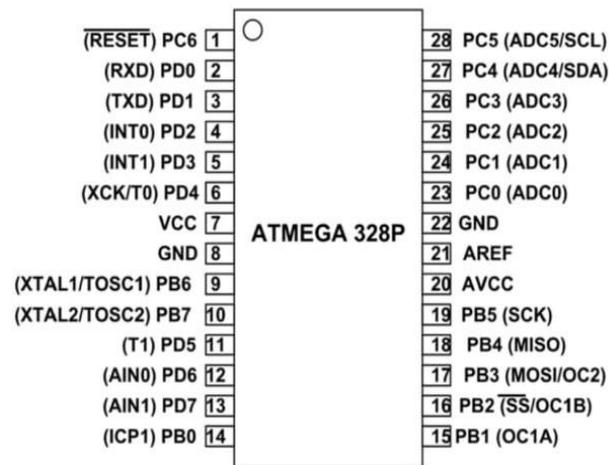

Microcontroller Arduino

Arduino Uno is primarily based on AVR microcontroller referred to as Atmega328. This controller comes with 2KB SRAM, 32KB of flash memory, 1KB of EEPROM. Arduino Board comes with 14 digital pins and 6 analog pins. ON-chip ADC is used to pattern these pins. A sixteen MHz frequency crystal oscillator is geared up on the board. Following parent indicates the pinout of the Arduino Uno Board.

```
(RESET) PC6 [1]          [28] PC5 (ADC5/SCL)
  (RXD) PD0 [2]          [27] PC4 (ADC4/SDA)
  (TXD) PD1 [3]          [26] PC3 (ADC3)
 (INT0) PD2 [4]          [25] PC2 (ADC2)
 (INT1) PD3 [5]          [24] PC1 (ADC1)
(XCK/T0) PD4 [6]         [23] PC0 (ADC0)
       VCC [7]  ATMEGA   [22] GND
       GND [8]   328P    [21] AREF
(XTAL1/TOSC1) PB6 [9]    [20] AVCC
(XTAL2/TOSC2) PB7 [10]   [19] PB5 (SCK)
    (T1) PD5 [11]        [18] PB4 (MISO)
  (AIN0) PD6 [12]        [17] PB3 (MOSI/OC2)
  (AIN1) PD7 [13]        [16] PB2 (SS/OC1B)
  (ICP1) PB0 [14]        [15] PB1 (OC1A)
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Pin description

There are various I/O digital and analog pins positioned on the board which operates at 5V. These pins come with fashionable running scores ranging between 20mA to 40mA. Internal pull-up resistors are used in the board that limits the modern-day exceeding from the given running conditions. However, too lots enlarge in present day makes these resisters vain and damages the device.LED. Arduino Uno comes with built-in LED which is related thru pin thirteen Providing HIGH price to the pin will flip it ON and LOW will flip it OFF.Vin. It is the enter voltage supplied to the Arduino Board. It is unique than 5 V provided via a USB port. This pin is used to grant voltage. If a voltage is supplied via electricity jack, it can be accessed thru this pin.5V. This board comes with the capability to grant voltage regulation. 5V pin is used to furnish output regulated voltage. The board is powered up the usage of three approaches i.e. USB, Vin pin of the board or DC energy jack.USB helps voltage round 5V whilst Vin and Power Jack guide a voltage stages between 7V to 20V. It is endorsed to operate the board on 5V. It is vital to notice that, if a voltage is furnished thru 5V or 3.3V pins, they end result in bypassing the voltage law that can injury the board if voltage surpasses from its limit.GND. These are floor pins. More than one floor pins are supplied on the board which can be used as per requirement.Reset. This pin is integrated on the board which resets the application walking on the board. Instead of bodily reset on the board, IDE comes with a characteristic of resetting the board via programming.IOREF. This pin is very beneficial for supplying voltage reference to the board. A protect is used to examine the voltage throughout this pin which then pick the applicable strength source.PWM. PWM is furnished via 3,5,6,9,10, 11pins. These pins are configured to provided 8-bit output PWM.SPI. It is acknowledged as Serial Peripheral Interface. Four pins 10(SS), 11(MOSI), 12(MISO), 13(SCK) grant SPI verbal exchange with the assist of SPI library.AREF. It is referred to as Analog Reference. This pin is used for imparting a reference voltage to the analog inputs.TWI. It is known as Two-wire Interface. TWI verbal exchange is accessed via Wire Library. A4 and A5 pins are used for this purpose. Serial Communication. Serial conversation is carried out via two pins known as Pin zero (Rx) and Pin 1 (Tx).Rx pin is used to acquire information whilst Tx pin is used to transmit data.External Interrupts. Pin two and three are used for imparting exterior interrupts. An interrupt is known as by means of offering LOW or altering value.

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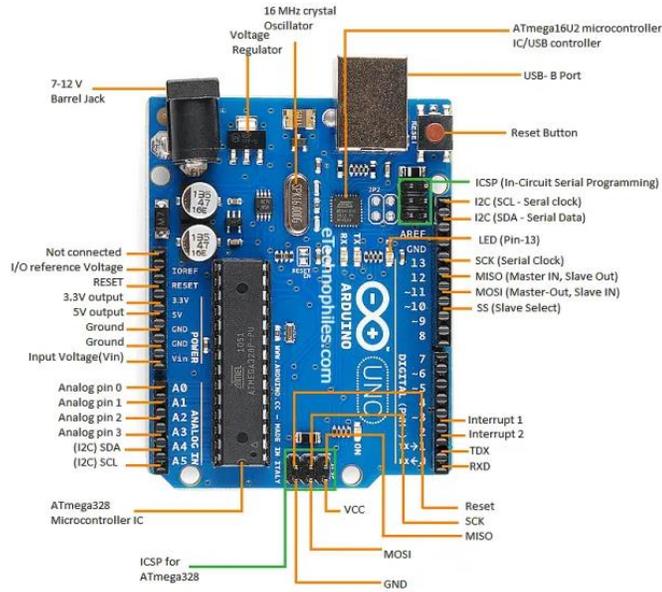
RESULT

An iot app is developed to display the amount of gas levels individually to the sewage workers. When the gas level crosses the threshold value, the buzzer makes a sound alerting the sewage worker. This system prevents the death of sewage workers. Below two cases are mentioned for the clear understanding of the working of application.
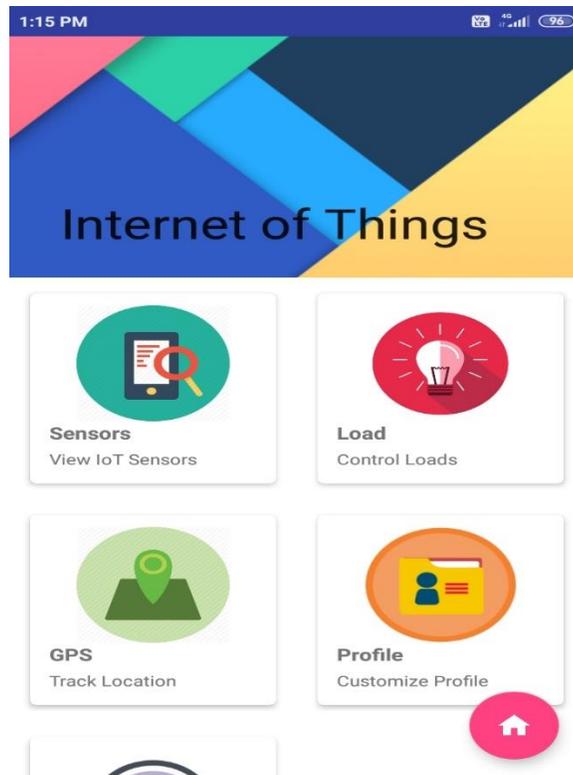
Circuit Diagram
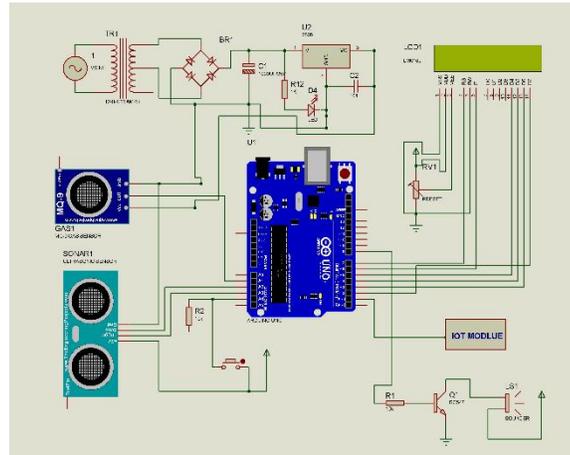
CONCLUSION

Internet of Things has gained its wide popularity in recent days due to its various streams of applications which has paved way for smooth, safe and easier mode of living style for human beings. Though, several techniques is existing for the same, yet sewage cleaning is one major concern and challenge always. This paper thus put forth a new proposed system which is microcontroller based application of sewage workers health monitoring systems using IOT. This device is designed keeping in mind, the measurement of necessary parameters, which needs to be monitored for unhindered safety of the workers. The device finds major application in household sewage systems, municipal manholes and sewage, sewer, deep well, gutters and drains etc. However, the places where toxic gases or fumes are present should never be handled by human workers directly. In country like India where sewage is mostly cleaned by humans, which make this device useful around India.

The proposed methodology helps to prevent the sudden accident of workers and also helps to keep the society clean. The smart safety device is cost wise less and fast in accessing the WSN and transfers the information to both the concerned department and emergency department. The proposed device helps the worker at a basic level of knowledge to understand the gas level and his pulse rate. The smart device can be implemented and used across the world and also helps to monitor the overflow of the sewage water.

REFFERENCE

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