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INDUSTRIAL SAFETY SYSTEMS USING EMBEDDED SYSTEMS

G.V. Chalapathi Rao[1], R. Devender[2], M. Sai Kumar[3], V. Balaji[4]
[1]*Assistant Professor, Electronics and communication engineering, Maturi venkata subba rao engineering college, Hyderabad, Telangana.*
[2,3,4]*UG- Electronics and communication engineering, Maturi venkata subba rao engineering college, Hyderabad, Telangana.*

ABSTRACT
Fire alarm systems are essential in alerting people before fire engulfs their homes. However, fire alarm systems, today, require a lot of wiring and labour to be installed. This discourages users from installing them in their homes. The proposed system is an ad-hoc network that is distributed over the house. This system consists of a microcontroller (ESP32) connected to an infrared flame sensor that continuously senses the surrounding environment to detect the presence of fire. And also MQ2 and MQ135 gas sensors are used for the detection of smoke and other toxic gases and alert them as per the condition. The microcontrollers create their own Wi-Fi network. Once fire is detected by a sensor, it sends a signal to a microcontroller that is triggered to send an notification to the user and alert the house by producing a local alarm. The user can also get information about the status of his home.

I. INTRODUCTION
Air contamination is the most concerning issue of each country, regardless of whether it is created or creating. Medical issues have been developing at quicker rate particularly in metropolitan spaces of agricultural nations where industrialization and developing number of vehicles prompts arrival of parcel of vaporous poisons. Destructive impacts of contamination incorporate gentle unfavourably susceptible responses like bothering of the throat, eyes and nose just as some major issues like bronchitis, heart infections, pneumonia, lung and exasperated asthma. As per an overview, because of air contamination 50,000 to 100,000 unexpected losses each year happen in the U.S. alone. While in EU number ranges to 300,000 and more than 3,000,000 around the world. implies when there are adequate measure of hurtful gases present noticeable all around like CO2, smoke, liquor, benzene, NH3, LPG and NOx. It will show the air quality in PPM on the LCD and just as on page so it can screen it without any problem. LPG sensor is included this framework which is utilized generally in houses. The framework will show temperature and mugginess. It runs outside on 100 square kilograms in a metropolitan climate. A low power ZigBee sensor network is proposed to follow VOC emanations rates in indoor conditions. An indoor and open air quality checking framework dependent on WSN is introduced. A scope of sensors in every hub is either designed or remotely associated with the focal control gadget. A control program for air quality is presented progressively. The machine comprises of seven sensors that control seven gasses.76

II. LITERATURE SURVEY
[1] A Wi-Fi empowered indoor air quality checking and control framework:- Published in: Control and Automation (ICCA), 2017 thirteenth IEEE International Conference Authors: Xiaoke Yang, Lingyu Yang, Jing Zhang (School of Automation Science and Electrical Engineering, Beihang University, Beijing, 100191, China) This paper proposes an open foundation of a WiFi-empowered indoor air quality observing and control framework, which could be joined into a particularly 'shrewd structure' structure. The total programming and equipment plan of this framework is introduced, alongside a progression of control tests.
[2] A low-power continuous air quality observing framework utilizing LPWAN dependent on LoRa:- Published in: Solid-State and Integrated Circuit Technology (ICSICT), 2016 thirteenth IEEE International Conference Authors: Sujuan Liu, Chuyu Xia, Zhenzhen Zhao (College of Electronic Information and Control Engineering.

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[3] As correspondence module LoRa sends the information to the focal checking unit and afterward the information would be saved in the could. The reach tests at an outside region show that LoRa can reach to around 2Km. The TX power is just around 110mA which is lower contrasted and other utilized remote innovation. A simple to utilize GUI was planned in the framework.
[4] IoT empowered proactive indoor air quality checking framework for reasonable wellbeing the executives:- Published in: Computing and Communications Technologies (ICCCT), 2017 second International Conference Authors: M.F.M Firdhous, B.H Sudantha, P.M Karunaratne (Dept. of Information Technology, University of Moratuwa, Sri Lanka) This paper proposes an IoT based indoor air.
[5] A remote framework for indoor air quality checking:- Published in: Industrial Electronics Society , IECON 2016 - 42nd Annual Conference of the IEEE Authors: R du Plessis, A Kumar, GP Hancke (Department of Electrical, Electronic and Computer Engineering, University of Pretoria, South Africa) This paper depicts the advancement of a remote observing framework which can be conveyed in a structure. The framework estimates carbon dioxide, carbon monoxide and temperature.
[6] A productive cloud-based administration of IoT gadgets for air quality observing:- Published in: Research and Technologies for Society and Industry Leveraging a superior tomorrow (RTSI), 2016 IEEE second International Forum The Internet of Things worldview starts from the multiplication of insightful gadgets that can detect, register and convey information streams in a universal data and correspondence organization. The extraordinary measures of information coming from these gadgets acquaint a few difficulties related with the capacity and handling abilities of the data.
[7] An inserted framework model for air quality observing:- Published in: Computing for Sustainable Global Development (INDIACom), 2016 third International Conference Authors: Sneha Jangid, Sandeep Sharma (School of ICT, Gautam Buddha University, Greater Noida, India)
[8] A constant surrounding air quality observing remote sensor network for schools in shrewd urban areas:- Published in: Smart Cities Conference (ISC2), 2015 IEEE First International Authors:H. Ali, J. K. Soe, Steven. R. Wel (School of Electrical Engineering and Computer Science, The University of Newcastle, Callaghan, NSW 2308, Australia) In this paper, a minimal expense sun oriented controlled air quality checking framework dependent on ZigBee remote organization framework innovation is introduced. The sun oriented controlled organization sensor hubs can be sent by schools to gather and report ongoing information on carbon monoxide (CO), nitrogen dioxide (NO2), dust particles, temperature, and relative mugginess.
[9] A shrewd sensor framework for air quality observing and gigantic information assortment:- Published in: Information and Communication Technology Convergence (ICTC), 2015 International Conference Authors: Yonggao Yang, Lin Li (Department of Computer Science, Prairie View A&M University, Prairie View, TX 77446, U.S.A) Air contamination has been difficult for climate assurance. Viably gathering and deductively envisioning the air quality information can all the more likely assist us.

III. EXISTING SYSTEM

The proposed framework permits schools to screen air quality conditions on a work area/PC an application planned utilizing LabVIEW and gives an alarm if the air quality attributes surpass satisfactory levels. They tried the sensor network effectively at the Singapore grounds of the University of Newcastle, Australia. The exploratory outcomes acquired by them showed that the sensor organization can give excellent air quality estimations over a wide scope of CO, NO2 and residue focuses. The plan included different units principally: detecting unit, handling unit, power unit, show unit, correspondence unit. This work will apply the methods of electrical designing with the information on natural designing by utilizing sensor organizations to gauge Air Quality Parameters.
The framework estimates carbon dioxide, carbon monoxide and temperature. The framework created in this paper can fill in as the checking part of a HVAC control framework and capacity as an indoor air quality screen autonomously. The IoT gadget has been modified to gather and send information

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at a timespan minutes over blue tooth association with a door hub that thus speaks with the handling hub by means of the WiFi neighborhood. The sensor was adjusted utilizing the standard alignment techniques. As an extra ability, the proposed air contamination observing framework can produce admonitions when the contamination level surpasses past a foreordained edge esteem. The proposed framework can be spread out in an enormous number in the observing region to shape sensor organization. The framework incorporates a solitary chip microcontroller, a few air contamination sensors.

The proposed framework works over a current Wi Fi remote organization using the MQTT convention. It is fit for observing the indoor air quality as well as controlling an air purifier to control the particulate matters fixation. Examination results under a genuine office climate exhibit the adequacy of the proposed plan.

IV. PROPOSED SYSTEM

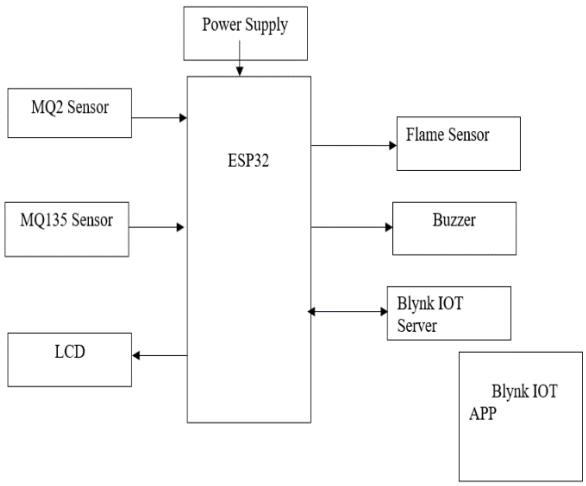

FIG: BLOCK DIAGRAM

The data collected in a local area can be sent at any distance where it can be seen and further controlling action may be initiated if required. The WSN based air monitoring system collects the data from the area where the sensors are deployed and the data can be displayed on the computer screen or on the mobile APP. The computer data can be sent to any terminal which is connected to Internet. Hence by using IOT, the long distance transmission of the data can be done. The monitoring is limited to area but the information can be forwarded to any control station. Hence by using IOT, the air pollution level of the campus even cities can be monitored and necessary advisory can be issued if required.

This system consists of a microcontroller (ESP32) connected to an infrared flame sensor that continuously senses the surrounding environment to detect the presence of fire. And also MQ2 and MQ135 gas sensors are used for the detection of smoke and other toxic gases and alert them as per the condition. The microcontrollers create their own Wi-Fi network. Once fire is detected by a sensor, it sends a signal to a microcontroller that is triggered to send an notification to the user and alert the house by producing a local alarm. The user can also get information about the status of his home via LCD display alert.

VI.RESULTS

By using this technology, our project is able to detect the Toxic gases and Flame/Fire by using the respective sensors (MQ2, MQ135 and Flame sensor). The below images shows the values or ranges in terms of ppm. Whenever a gas is detected, LCD displays its ppm range and displays MQ2/MQ135/Fire is detected. Also there will be live streaming of data on LCD as well as on BLYNK

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APP. If any abnormal gas or fire is detected we get a notification for our registered mail which is used to register in BLYNK server and on Blynk app

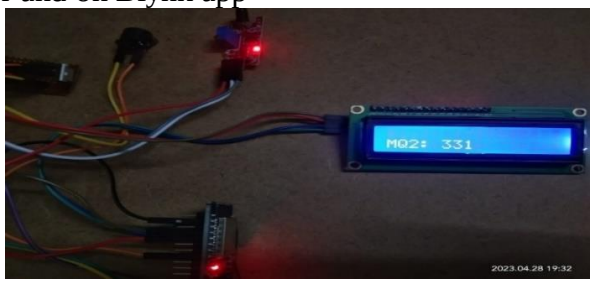

FIG: MQ2 GAS SENSOR

FIG: MQ2 GAS DETECTION

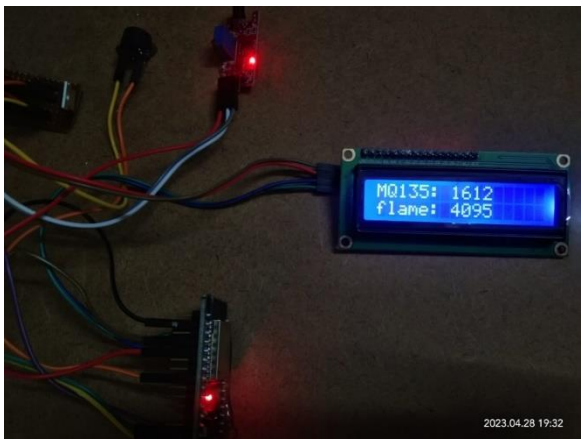

FIG: MQ135 & FLAME SENSOR RANGES

FIG: FIRE DETECTION

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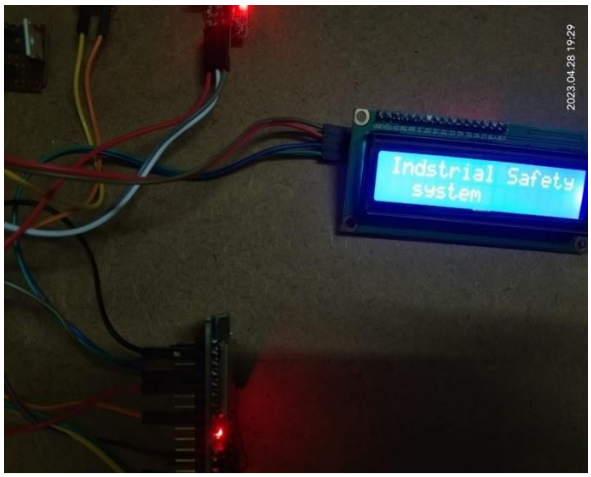

FIG: “INDUSTRIAL SAFETY SYSTEMS”

VII. CONCLUSION

With the use of IOT technology enhances the process of monitoring various aspects of environment such as air quality monitoring issue proposed in this project. Here, using the Flame Sensor and MQ2 and MQ135 gas sensors, it gives the sense of different type of dangerous gas and ESP32 is the heart of this project.

VIII. FUTURE SCOPE

Real time deployment of the proposed model is to be carried out in the future. Maintenance of the equipment in all weather conditions, transmission of data effectively etc. are the challenges that need to be addressed. This system can be implemented in Remote control of robot with Camera and video transmission can be added. And it can be enhanced by Adding prevention mechanism.

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