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SHIPYARD WORKPLACE EMERGENCY MONITORING ANDALERTING SYSTEM

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ABSTRACT

The Shipyard Workplace Emergency Monitoring and Alerting System is designed to improve safety in shipyards. It uses advanced technology like sensors, real- time data analysis, and communication networks to keep track of different safety conditions, such as gas levels, fire risks, and structural safety. These sensors continuously collect and analyze data, allowing the system to quickly detect any dangers and alert the necessary people through alarms, text messages, and emails. The goal is to prevent accidents, reduce response times, and ensure the safety of shipyard workers. In conclusion, the Shipyard Workplace Emergency Monitoring and Alerting System is a major step forward in shipyard safety. By using modern technology to provide real-time monitoring and quick alerts, it helps prevent and respond to emergencies more effectively. This project aims to protect the lives of shipyard workers. Successfully implementing this system could also serve as a model for improving safety in other industrial environment.

I. INTRODUCTION

The Shipyard Workplace Emergency Monitoring and Alerting System is a high-tech solution designed to make shipyards safer. It uses modern technology like sensors, real- time data analysis, and strong communication networks to keep an eye on various safety conditions such as gas levels, fire risks, and structural safety. These sensors collect and analyze data continuously, allowing the system to quickly spot dangers and alert the right people through alarms, text messages, and emails. The goal is to prevent accidents, ensure quick emergency responses, and protect the workers in shipyards.

This project involves creating and setting up a complete system that includes hardware, software, and communication tools. The hardware part is made up of sensors placed around the shipyard to monitor environmental and safety conditions. These sensors send data to a central unit that uses advanced algorithms to detect any problems or potential emergencies. The software part includes an easy-to-use interface that shows real-time data and safety information about the shipyard. The communication tools make sure that alerts are sent quickly to the right people, allowing for fast and coordinated responses to emergencies. The system also includes a feedback feature to keep improving based on real- world use and user input.

Results from using the Shipyard Workplace Emergency Monitoring and Alerting System have shown major improvements in safety and emergency response times. The real-time monitoring helps to detect potential hazards early, allowing for preventive actions before accidents happen. The quick alert system ensures that emergencies are communicated swiftly and effectively, reducing response times and improving coordination among emergency teams.In conclusion, this system not only enhances the safety of shipyard workers but also promotes a culture of preparedness and proactive risk management. The success and positive results of this system suggest that it could be a model for improving safety in other industrial environments as well.

II. LITERATURE REVIEW

- The paper presents a system designed to enhance fire detection and response on ships. The system uses a distributed network of sensors to monitor temperature, humidity, smoke, and gas levels. Data from these sensors are collected by nodes, processed by a microcontroller, and transmitted to a central server via LoRa communication technology. This setup allows for real-time monitoring and alerts, improving the safety and

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efficiency of fire management on ships.

- The article provides an in-depth review of the development and application of IoT technologies in industrial settings. It highlights key enabling technologies such as RFID, wireless communication, and sensor devices, which are foundational to industrial IoT. The paper discusses various industrial IoT applications, illustrating the transformative impact of IoT on industrial operations. Additionally, it identifies current research trends and outlines significant challenges, such as technical, security, and integration issues, that need to be addressed to fully realize the potential of IoT in industries. The survey systematically summarizes the state-often-art in industrial IoT, offering a comprehensive overview of its advancements and the hurdlesthat remain.
- The paper discusses about the development of a system designed to improve fire detection and alarm capabilities on ships. The system utilizes multiple sensors to monitor for signs of fire, such as temperature and smoke, and employs advanced algorithms to enhance detection accuracy and reduce false alarms. This approach aims to provide more reliable and timely fire alerts, thereby enhancing safety on board ships.
- The paper provides updated guidelines to enhance safety and health in the shipbuilding industry. It emphasizes creating a strong safety culture, clearly defines roles and responsibilities, and promotes modern safety management systems. The guidelines ensure that workers are informed about risks, can participate in safety decisions, and have the right to avoid dangerous situations.
- The paper proposes an industrial workplace alerting and monitoring platform that combines pose estimation with personal protective equipment (PPE) detection to detect unsafe activities and ensure the use of PPE in industrial settings. Using a monitoring systems also allows staff tocommunicate with workers. These features of a monitoring system are perhaps the most important for keeping workers safe.
- The paper describes the system that uses sensors to keep an eye on and regulate environmental variables like CO2 levels, temperature, relative humidity, and light intensity. The collected data is sent to a web page, where the sensor data is visualized through the generation of graphical statistics. The focus is on using IoT technologies to enable thorough and easily accessible weather monitoring.

III. PROBLEM STATEMENT

To develop a Safety measuring and monitoring system and log critical ambient data/ parameters namely temperature, humidity, smoke, light, fire along with camera for monitoring the work from remotely in under construction ship.

IV. METHODOLOGY

The aim of this study is to detect and monitor fire, heat, humidity and gas environment without the need for manual intervention. This method is divided into three parts. The first part is design, then hardware definition and finally operation.

The three documents were put together and then tested toprevent and monitor the safety of the crew on the cruise ship.

This involved deploying the hardware components across designated locations within the shipyard, configuring the software modules, and integrating the entire system into the existing infrastructure. Comprehensive testing and validation procedures 8 were conducted to verify system functionality, responsiveness, and adherence to safety standards. Additionally, user training and documentation were provided to facilitate smooth adoption and operation of the system by shipyard personnel.

An LCD display is among the most often used components connected to a micro controller. This project uses a 16x2display. This translates to 16 characters by 2 lines each line.

The methodology is divided into three parts. The first part is on the design structure, followed by hardware description and the finally on the programming design. All these three parts were assembled together and experiments were then performed.

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V. SYSTEM DESIGN

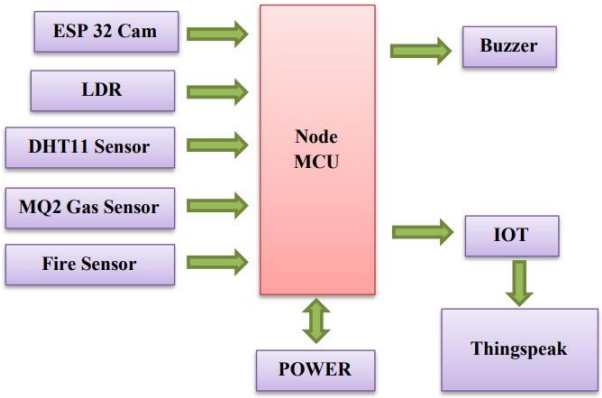

Figure. 1: Block Diagram

Figure .1 shows the block diagram of Workplace Safety Monitoring System in Shipyard.

- The hardware part is one of the crucial parts in the development of Workplace Safety Monitoring System in Shipyard. It includes Node MCU, ESP32 Camera, LDR, Fire Sensor, MQ2 Gas Sensor, DHT 11 Sensor, Buzzer, IOT module and Power Supply.
- Node MCU is used as a micro-controller that connects other components. The power supply of 12 V 1.3 A is given tothe Arduino as well as to relay.
- If any kind of flame/smoke or exceeds the temperature/humidity, then system will give input to NodeMCU.
- Then Node mcu will beep the buzzer and sends value of each to IOT. Thingspeak logs all the data in form of graph.

VI. RESULT AND DISCUSSIONS

Results from using the Shipyard Workplace Emergency Monitoring and Alerting System have shown major improvements in safety and emergency response times. The real-time monitoring helps to detect potential hazards early, allowing for preventive actions before accidents happen.

Figure 2: Hardware Setup

Figure 2 shows the temperature and humidity at normal surroundings. The temperature value is in Degree celcius and Humidity is given in Relative Humidity. System presents the real time temperature and humidity from DHT11 sensor.

Figure 3: LCD displaying gas detected

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Figure 3 shows gas detected due to excess gas is detected by MQ2 sensor and displayed on LCD.

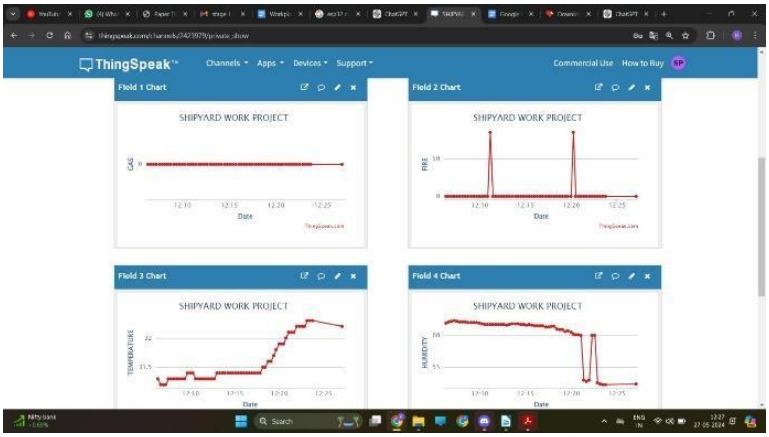

Figure 4: IOT graph generated

The figure 4 shows the graph of temp., humidity, gas and fire using thingspeak software which logs all the parameters data which gets updated after every 15 seconds. When temperature of the surroundings exceeds 50 degree celcius; the sensor detects high temperature and alerts the worker.

Thingspeak continuously monitors the changes in workplace environment. These real-time results enable continuous monitoring and prompt response to changes in temperature and humidity, essential for ensuring the safe workplace.

This project presents a workplace monitoring and alerting system for shipyard and it is designed and implemented with NODE MCU Microcontroller in embedded system domain. The result shows that higher efficiency is indeed achieved using the embedded system. The proposed method is verified to be highly beneficial for security purpose and also for industrial purpose.

VII. CONCLUSION

In conclusion, a shipyard emergency monitoring and alerting system is essential for keeping workers safe. It uses sensors to detect fires, gas leaks, and accidents, and it sends this information to a central control unit. If there's an emergency, the system triggers alarms with loud sounds, flashing lights, mobile notifications, and announcements. Automated systems like fire suppression and ventilation are activated to protect workers and property. Continuous monitoring and data logging help to spot issues early and improve safety measures. Reviewing this data after incidents helps refine emergency response plans. this system provides a thorough approach to safety, making the shipyard a much safer place to work. With regular upkeep and proper training, it effectively protects workers from potential hazards.A shipyard emergency monitoring and alerting system is a crucial safety tool for protecting workers in a potentially risky environment.

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