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Implementation of IOT Based Smart Integration System for Vessels

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ABSTRACT: Protection is the primary concern these days. People often lose their lives because of poor emergency facilities in case of not detecting the changes in basic parameters in Vessels such as CO₂ Level, Flame status, Humidity, Temperature, Water Level Status and also unawareness of the objects which are present under water. Prevention of accidents is not possible but we can reduce the probability of occurrence of accidents. For protecting the vessels from collisions, overloading and for detecting basic parameters like humidity, water level, flame, gas in ships. The total ship condition and also the location of the ship will uploaded to the server at every instant of time through thingspeaks.com. By that way we can track the ship in any condition. In addition to this controlling and monitoring the safety room is introduced. In which, it is made up of black box material. That room consisting of human basic needs and for safeguard, the safety room door will open automatically when the ship is in abnormal condition. By this way we can save the passenger's life even ship was damaged.

KEYWORDS: Data Monitoring, IoT, Processing, Overloading.

I. INTRODUCTION

In this paper, we focus on a smart integration system for vessels based on IOT, The development of transportation system has been the generative Power for human beings to have the highest civilization above creature in the earth Marine industry has a great importance in our daily life. transportation plays a vital role in the recent years the increase in the demand has been accelerated by rapid development of IoT technology. The simplest way of detecting an abnormal data and GPS receiver for any abnormal detection and uploaded to the Server.

II. LITERATURE SURVEY

It enhances the value of the different products to the user level with the increase of the user perspective towards the desired outcomes, there is a random and simultaneously furtherance of the products. The utilizing modules for the detecting the basic parameters and up to the standard of one generation of technology. It is not that much of reliable for saving the passengers life when any abnormal condition occurred.

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III. PROPOSED METHODOLOGY AND DISCUSSION

The device main moto is to controlling and monitoring the Sensor data through open could which is Thinksaspeaks.com. In this project GPS is used for tracking the position of the Vessel, raspberry pi 3b+ is used for uploading all those essential data to server. In this a safety room is implemented which includes all basic needs of humans to save the passengers life's at abnormal situations. A mini under water radar system is implemented to avoid the underwater obstacles. To avoid the over loading a Weight sensor is include to detect it which in turns controls the vessels engine

III A. Block Diagram

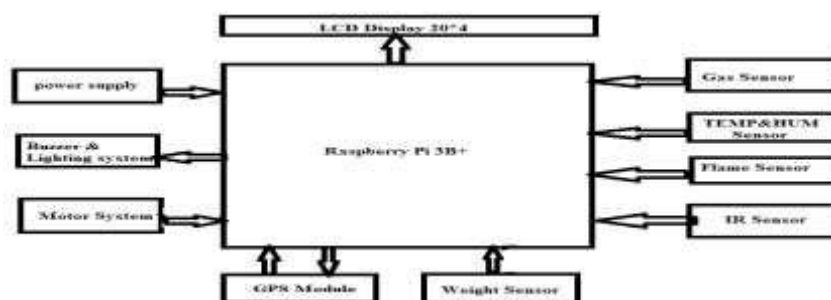


Fig. 1: Block Diagram of the Project

III B. Flowchart of the System

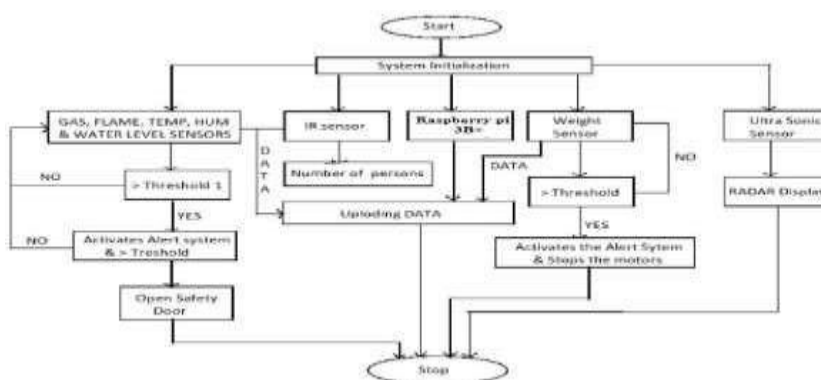


Fig. 2: Flowchart of the Project

III C: Overview of the Project

The device is controlling and monitoring the Sensor data through open could which is Thinksaspeaks.com. In this project GPS is used for tracking the position of the Vessel, node MCU is used for uploading all those essential data to server. In this a safety room is implemented which includes all basic needs of humans to save the passengers life's at abnormal situations. A mini under water radar system is implemented to avoid the underwater obstacles. To avoid the over loading a Weight sensor is include to detect it which in turns controls the vessels engine.

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III. C. 1:Raspberrypi3

Raspberry pi is a series of small single-board computers (SBC is a complete computer built on a single circuit board, with microprocessors, memory, input/output and other features required of a functional computer) developed by the Raspberry Pi foundation as shown in Fig.3.



Fig. 3: Raspberry pi3B+

III. C. 2: GPS MODEM:

This GPS Receiver Modem is based on SIMCOM' Sim28M/Sim28ML GPS Module. Sim 28ML supports various location and navigation applications including autonomus as shown in Fig.4.



Fig.4: GPS Module

III. C. 3: GAS SENSOR:

A gas sensor is a device which detects the presence or concentration of gases the Atmosphere as shown in Fig.5.



Fig. 5 : Gas Sensor

III. C. 4: Liquid Crystal Display

A liquid crystal display (LCD) is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in colour or monochrome as shown in Fig.6

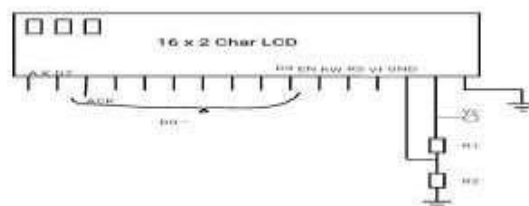


Fig. 6: Liquid Crystal Display

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III. C. 5: IR SENSOR:

An IR is an electronic instrument that is used to sense certain of characteristics of its surroundings. It does this by either emitting or detecting infrared radiation as shown in Fig.7.



Fig.7: IR Sensor

III. C. 6: DHT SENSOR:

The DHT11 is a basic, ultra low-cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air and spits out a digital signal on the data pin (no analog input pins needed). It's fairly, simple to use, but requires careful timing to grab data as shown in Fig.8.



FIG.8:DHT11 Sensor

III. C. 7: FLAME SENSOR:

A flame detector is a sensor designed to detect and respond to the presence a flame or fire, allowing flame detection. Responses to a detected flame depend on installation, but can include sounding an alarm, deactivating a fuel line and activating fire suppression system. as shown in Fig.9.



Fig.9: Flame Sensor

III. C. 8: WEIGHT SENSOR:

A load cell is a sensor or a transducer that converts a load or force acting it into an electronic signal. This electronic signal can be a voltage change,current change or frequency change depending on the type of load cell and circuitry used as shown in Fig.10.



Fig.10: Load Cell

III. C. 9: BUZZER:

A buzzer or beeper is an audio signaling device, which may be Mechanical, electromechanical,or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke as shown in Fig.11.



Fig.11: Buzzer

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III. D: BLOCK DIAGRAM FOR RADAR:

By interfacing these three modules we can implement a radar application is shown in Fig.12.

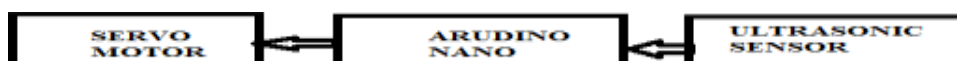


Fig.12: Block Diagram of RADAR

III. D.1: ULTRASONIC SENSOR:

HC-SR04 Ultrasonic (US) sensor is a 4 pin module, whose pin names are Vcc, Trigger, Echo and Ground respectively. This sensor is a very popular sensor used in many applications where measuring distance or sensing objects are required. The module has two eyes like projects in the front which forms the Ultrasonic transmitter and Receiver as shown in Fig.13.



Fig.13: Ultrasonic Sensor

III. D.2 ARDUINO NANO:

Arduino Nano is a surface mount breadboard embedded version with integrated USB. It is a smallest, complete, and breadboard friendly. It has more analog input pins and onboard +5V AREF jumper. Physically, it is missing power jack. The Nano is automatically sense and switch to the higher potential source of power is shown in Fig.14.



Fig.14: Arduino Nano

III. D.3 SERVO MOTOR:

A servo motor is an electrical device which can push or rotate an object with great precision. If you want to rotate and object at some specific angles or distance, then you use servo motor. It is just made up of simple motor which run through servo mechanism are shown in Fig.15.



Fig.15: Servo Motor

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IV. EXPERIMENTAL RESULTS

This project presents smart way of controlling and monitoring of all basic parameters in vessels. The result shows that higher sensitivity and accuracy is indeed achieved using this project. This made the project more user- friendly and reliable. The proposed method is verified to be highly beneficial for the automotive industry.

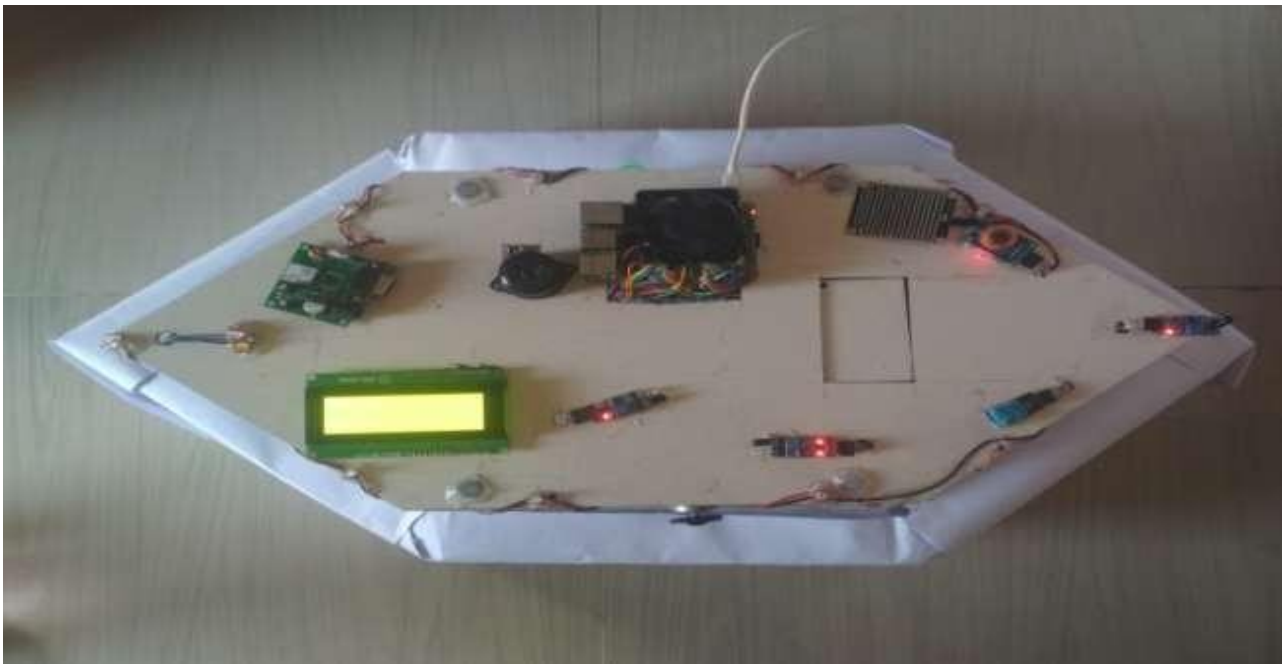


Fig.1 Final View of the Proposed Project



Fig.2Final View of the Proposed Project output displayed on LCD screen

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Fig.3 Final View of the Proposed Project output uploaded to the server Red lines indicates obstacle. Green lines indicates there is no obstacles.

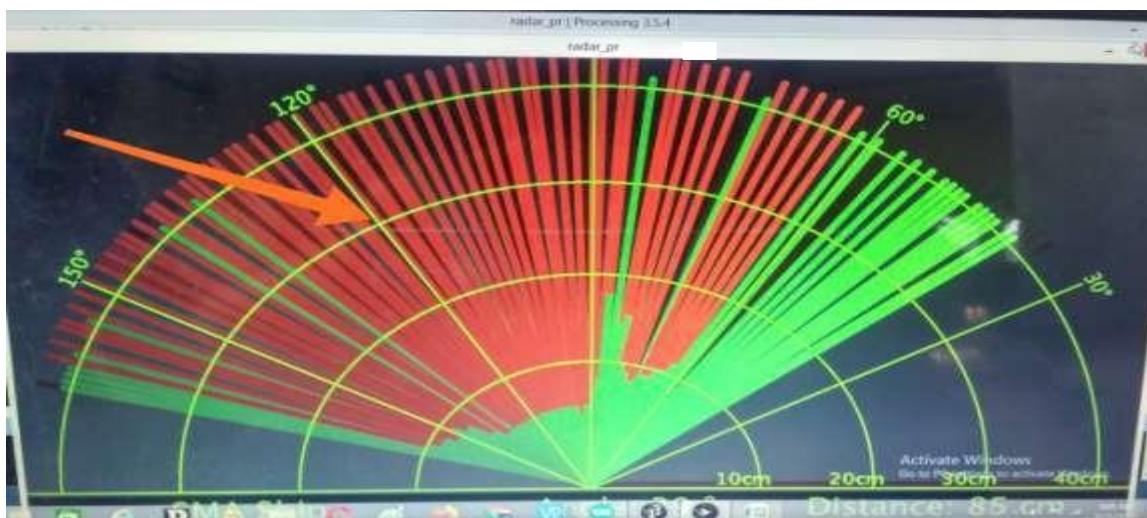


Fig.4. RADAR with obstacle in system.



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V. CONCLUSION

- The present module approach for abnormal condition detection applicable both for new models or pre existed vessels. By Safety room concept we can save the passenger's life even vessel is in danger situation.
- Our method of reducing collision modules abandon IoT, it is comprehensive resolution in order to support the module to bring it to a range to facilitate the user.

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BIOGRAPHY



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