Automated Safety ensuring System for PassengerBoats using Arduino

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Abstract
It was noticed that numerous vehicles utilizing sensors are working more productively. The majority of the bikes and vehicles which are made of sensors are working effectively in avoiding accidents. Because of this, there are very few street mishaps happening. Considering the above scenario where the number of accidents occurring is very low, if we can execute the idea of the concept of utilizing sensors in the boats, wecan diminish boat mishaps. This is the principle thought behind our task. The task was done utilizing the Internet of Things. Task usage can be finished utilizing multiple sensors along with the Arduino.
*Keywords—Internet of Things, Arduino, Sensors.*

I.INTRODUCTION
The objective of the project, modeling a boat with advanced features. Nowadays, there are heaps of boat mishaps happening [2]. A great many people are losing their lives in such mishaps. To defeat these disadvantageswe designed a boat with cutting- edge features. The IR sensor distinguishes the individual, refreshes the check, and sends the tally to the control room. The temperature sensor which is available in the boat detects the temperature, analyzes the result, and sends it to the controlroom. Another feature is water identification in the boat. Atany point,if the water comes into the boat, there will be immediate signalsgiven that there is some damage or accident happened to the boat which may not be noticed.In such cases, the travellers in the boat can get prompt assistance from the control room beforethere is any harm.For this situation, we will organize the sensor in the cellar layer of the boat with the goal that it can undoubtedly distinguish the water in the boat and impartsdanger signals. We implemented this smart boat with different sensors to guarantee a safe journey and also spare thelives of the passengers in case of an accident by giving immediate danger alerts.

II. EXISTING MODEL
There are many progressed boats with various features like fast,remote-controlled boats, PV controlledboats, power boats [3], and so on. All these boats were developed only keeping in view of speed and quality. So,there is no development of boats to evade the boat mishaps using sensors.
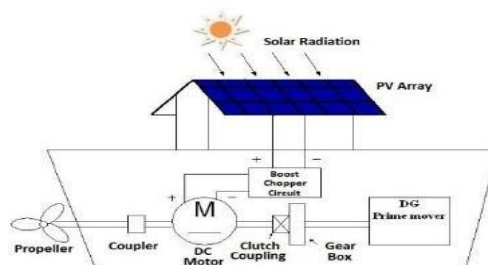
Fig 1: PV Controlled Boats

All the new developments are only regarding speed andquality.But, there were many boat accidents occurring ona daily basis and most of the people are losing their livesdue to it [4]. In some of the cases, due to a lack of immediate help people are dying. There is a huge loss ofproperty and life in such accidents. To overcome these drawbacks we are designing a boat with some advanced features.

III. PROPOSED MODEL
The primary motto of our project is to decrease the rateof boat mishaps occurring. We are acquainting

various features withthe smart boat like viable utilization of life coats, sensors that tally individuals count with the numberof life jackets, and water sensors that detect the presenceof water at the cellar of the ship. So, utilizing these featureswe can spare the lives of numerous numbers of individuals. We can undoubtedly get quick assistance inrisky circumstances, by quickly identifying accidents.

Benefits of proposed model

With the help of the designed smart boat, we can sparethe livesof the individuals. The individuals in the boat canget quick assistance from the control room even before therisk occurs or as soon as it occurs. We can likewise checkthe water existence inside the boat with the assistance of certain water sensors. Ensuring effective utilization of lifejackets spares the individual from risks. With this proposed smart boat, we can spare the lives of lots of individuals.

VI.BLOCK DIAGRAM
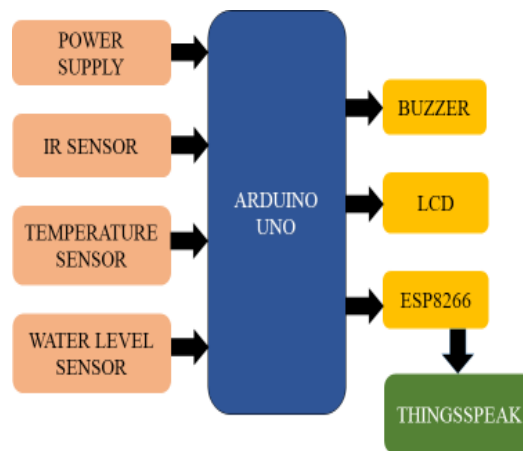
Fig 2: Block Diagram

The project is made to work as per predefinedcustomized sensors.

• Whenever a passenger enters or exit the boat, the IR sensor distinguishes the individual, refreshes the individual's check, and sends to the control room.

• The DHT11 sensor which is available in the boat distinguishes the temperature, and sends the analyzed output to the control room.

• When the water locator sensor distinguishes water in the basement of the boat, it sends to thecontrol room. When water level is high an alarm is made by the buzzer as an indication topassengers to get quick assistance.

V. REQUIREMENT ANALYSIS

Functional Requirement Analysis

A Functional Requirement document is a guided description of the service that the software should offer. It defines the functionality of a software system or its subsystems. A functionwill be its inputs to the software system along with its behaviour and related outputs. (Example, a function can be a simple calculation, complex data manipulations, business process, userinteraction, or any other specific functionality whichcharacterizes what operation will a system is likely to perform).Functional requirements when combined along with requirementanalysis will be able to identify all the missing requirements which are needed. They also help in definingthe expected system service and behaviour of the system. Functional Requirements are additionally called Functional Specifications and the errors that are found inthis requirement gathering stage are the cheapest to fix. The main purpose of this requirement document is toprovide safety to the passengers in the boat. So for providing safety we take help of various sensors and otherdevices.

Non user Requirements

Non-functional requirements determine the quality attribute of a software system. Quality of software

systems is judged based on Responsiveness, Usability, Security, Portability, and other non-functional standards such as performance, cost, etc. which are vital to the success of any software system.

- **Performance:** The sensors which are used in this project have accurate and effective responsiveness.
- **Security:** Our project provides a high-security and safety rate to the passengers.
- **Maintainability:** Defects in the project can be easily recovered. We can easily replace the sensors which are not working with brand new ones.
- **Interoperability:** Here, we use the information of one functionality to the other functionality. By this exchanging information feature we get benefited a lot.
- **Cost:** Cost is a little complex.

System Requirements

Arduino is an open-source physical computing electronics platform dependent on a straightforward I/O board and provides an environment for the development of coding in Arduino programming language. Arduino can be utilized to develop interactive objects by reading inputs from an assortment of sensors or switches, and controlling a variety of engines, lights, and turn them into different outputs. Arduino activities can be independent, or they have the ability to communicate with the program running on our PC (for example Flash, etc.).

Why utilizing Arduino

Arduino has this very simple as well as gives accessible user experience. The Arduino Software is adaptable and is easy for new beginners to use, yet it is still flexible enough for the advanced level users to take complete advantage of it as well. Having the privilege of being cross-platform this software can run on multiple operating systems like Windows, Linux, and Macintosh, and due to all these advantages, Arduino has been used in several projects and numerous applications. In order to use this device, it must be connected to a computer via USB, and communicates using the standard serial protocol, runs in standalone mode, and as an interface connected to personal computers.

Arduino is economical and relatively very inexpensive when compared to the other microcontroller's platforms. The least expensive module costs around $30 per board, which needs to be assembled by hand and comes with free authoring software. Arduino comes with software and hardware which is extremely accessible and very flexible to be extended and customized. Arduino is well supported by a rapidly growing online community that is already available with lots of sources [6].


Fig 3: Arduino Uno Board

Sensors

Sensors are electronic gadgets that detect and respond to the particular type of input from the physical environment, it is a. measure of physical quality, for instance, temperature or light is taken as input and converted to a voltage. This cycle of transforming one type/form of energy into another type/form of energy is called transduction. Frequently in daily usage, sensors are also called transducers. Sensors can be comprehensively arranged into two different classifications: analog sensors and digital sensors. But, there are a few other types of sensors that are mostly used in many electronic applications (example, Water sensor, Temperature sensor, IR sensor, Ultrasonic sensor, Pressure sensor, Proximity

sensor, etc.).
The sensors utilized in the project are IR sensor is used to calculate the number of travellers, the temperature sensor is used to identify the temperature and detect the human presence; water identification sensor is used to recognize the presence of water in the boat.
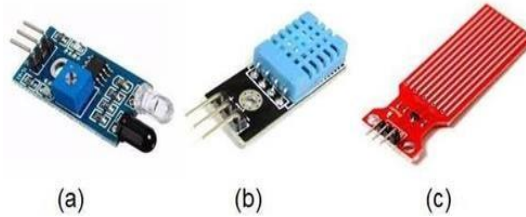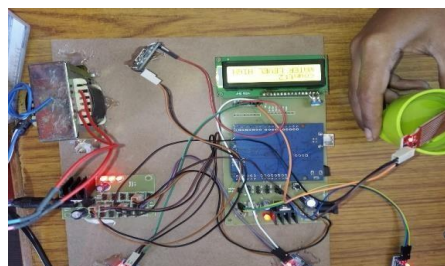

Fig 4: Sensors used for prototyping are
(a) IR Sensor (b) Temperature Sensor
(c) Water Sensor

VI.RESULT
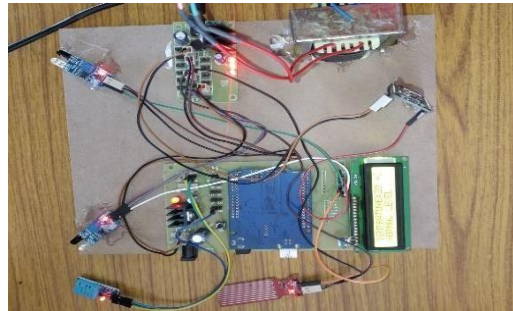
Fig 5: When temperature and water level is low

Fig 6: Water level is high and count value is incremented when person enters the boat

Fig 7: Count value is decremented when person exit from the boat

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Fig 8: Live data is received through ThingsSpeak IOT platform

CONCLUSION AND FUTURE ENHANCEMENT

An Autonomous Smart Boat is planned and built up that can be utilized for saving the lives of travellers and intimating if there is a possibility of occurrence of risk so travellers can be protected. The device is made to work autonomously as per predefined customised sensors. Utilizing this smart boat we can lesser boat accidents, accordingly accomplishing the prosperity of travellers. This is the standard idea behind our task. Here, we are executing the tasks using the Internet of Things. In the future, we will give some wellbeing safety measures to the driver on account of medical issues of the driver. So, we can eliminate the accidents caused due to the bad health of the driver.

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