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Fisher Safe IOT System

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ABSTRACT: The problem of fishermen straying into neighboring countries' territorial waters has the potential to sour bilateral relations between the two states. Security issues with the International Marine Time Boundary Line (IMTL) between nations will never go away. Fishermen may inadvertently cross the border into another country due to their negligence. In a circumstance like this, the opposing fleet might attack them. An embedded system-based gadget has been created to safeguard fisherman in order to prevent such a scenario. The fishermen use a GPS device to determine their present location. The fishermen's heartbeat is continuously monitored by the heartbeat sensor. Data is transferred to cloud storage via IOT via GSM. The control room sends out a warning message to fishermen who venture beyond the national border.

KEYWORDS: Arduino UNO microcontroller, Global Positioning System (GPS), Global System for Mobile Communication (GSM).

I. INTRODUCTION

Even now, fishermen often cross the international marine border line to fish, calling forth the nights of history. The major goal is to provide an environment that is fair and easy to use so that fisherman can deal with risky situations. GPS and GSM were utilized in the creation of this system. A GPS route finder uses information from GPS satellites to locate natural areas. When fishermen beyond the border can be spotted, this gadget can track the GPS data at every signal time.

II. EXISTING METHODOLOGY

The current method uses GPS to determine the ship's position and initiates an automated stop when it approaches the boundary. GSM is used to convey the warning message. This kind of surveillance device is not available to fishermen who own tiny boats, and there is no way to keep an eye on their health. Consequently, there is no safety for fishermen, which causes them to perish.

III. PROPOSED METHOD

This method uses an embedded model to prevent conflict between two nations and save the lives of fisherman. This equipment is used by every fisherman who is sailing in the boat. This equipment is made out of a GPS receiver that tracks the fishermen's location all the time. The gadget that keeps track of fishermen's pulse rates has a fixed heartbeat sensor. The control room keeps an eye on the cloud storage where the GPS position and heart rate are kept. The microcontroller memory has a predefined list of the specific layer land that is border level. A warning message is sent to the coastal guard and fishermen if the current value is compared to the predefined value and both values are the same or more than the predefined value. Here, the position and heartbeat rate are stored and shown using the Thingspeak IOT application. A Google map can be used to see the location. The suggested system's general block diagram is shown in Fig. (1).

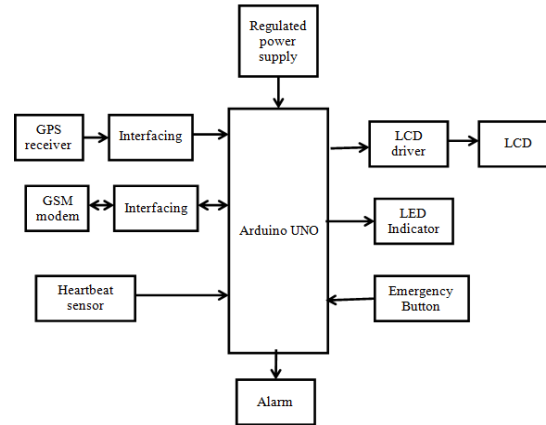


Figure 1. Block Diagram of proposed system

IV.SOFTWARE DESCRIPTION

4.1 PROJECT DESCRIPTION

The Internet of Things (IoT) has revolutionized the way we interact with the world around us, offering a seamless integration of physical devices, sensors, software, and connectivity protocols. This transformative technology has found applications across various sectors, from healthcare and transportation to agriculture and manufacturing. In this comprehensive guide, we will delve into the intricacies of IoT, exploring its components, architecture, applications, challenges, and future prospects.

4.2.IOT

The IOT based architecture provides high level flexibility at the communication and information. The IOTs major significant trend in recent years is the explosive growth of devices connected and controlled by the internet. The IOT would encode 50 to 100 million objects and be able to follow the movement of these objects. It allows the object to be sensed or controlled remotely across existing network infrastructure, creating opportunities for more direct interaction of the physical world in to computer based systems. It results in improved efficiency, accuracy and economic benefit in addition to reduced human intervention.

Introduction to IoT:

The Internet of Things refers to a network of interconnected devices, sensors, actuators, and software applications that collect, exchange, and analyze data to automate processes, enhance efficiency, and enable new services. These devices communicate with each other over the internet or local networks, creating a vast ecosystem of interconnected smart objects.

Components of IoT:

Sensors and Actuators: These are the foundational components of IoT, responsible for collecting data from the physical environment and initiating actions based on received instructions. Sensors detect various parameters such as temperature, humidity, light, motion, and pressure, while actuators control physical processes or devices based on the received data.

- Connectivity Protocols: IoT devices utilize various communication protocols to transmit data over networks. Common protocols include Wi-Fi, Bluetooth, Zigbee, Z-Wave, LoRaWAN, cellular networks (3G, 4G, and 5G), and Ethernet.
- Gateways: Gateways serve as intermediaries between IoT devices and the cloud or central server. They aggregate data from multiple devices, perform preprocessing tasks, and transmit the data to the cloud for further analysis and storage.
- Cloud Platforms: Cloud platforms provide the infrastructure and services for storing, processing, and analyzing IoT data. They offer scalability, reliability, and accessibility, enabling real-time insights and actionable intelligence.

- **Data Analytics and Machine Learning:** Advanced analytics techniques, including machine learning algorithms, are employed to derive meaningful insights from the vast amounts of IoT data. Predictive analytics, anomaly detection, and optimization algorithms help in making data-driven decisions and improving system performance.

Architecture of IoT:

The architecture of an IoT system typically comprises four layers:

- **Perception Layer:** This layer consists of sensors, actuators, and edge devices deployed in the physical environment. Sensors collect data, while actuators execute actions based on received instructions.
- **Network Layer:** The network layer facilitates communication between IoT devices, gateways, and cloud servers. It encompasses various communication protocols and technologies for data transmission, such as Wi-Fi, Bluetooth, and cellular networks.
- **Middleware Layer:** The middleware layer includes gateways and edge computing devices that preprocess data before transmitting it to the cloud. These devices filter, aggregate, and analyze data locally to reduce latency and bandwidth requirements.
- **Application Layer:** The application layer comprises cloud-based platforms and software applications that enable data storage, processing, visualization, and application-specific services. It encompasses data analytics, machine learning, dashboards, and APIs for integrating IoT data with other systems.

Applications of IoT:

IoT technology has diverse applications across industries, including:

- **Smart Home Automation:** IoT-enabled smart home devices, such as thermostats, lighting systems, security cameras, and appliances, enable remote monitoring and control, energy efficiency, and personalized user experiences.
- **Healthcare:** IoT devices in healthcare monitor patients' vital signs, track medication adherence, assist in remote patient monitoring, and enable telemedicine services, improving patient outcomes and reducing healthcare costs.
- **Smart Cities:** IoT solutions for smart cities encompass intelligent transportation systems, environmental monitoring, waste management, energy management, and public safety initiatives, enhancing urban sustainability and quality of life.
- **Industrial IoT (IIoT):** IIoT applications optimize manufacturing processes, asset management, predictive maintenance, supply chain logistics, and remote monitoring of industrial equipment, increasing productivity and efficiency.
- **Agriculture:** IoT sensors and drones in agriculture monitor soil moisture, crop health, weather conditions, and livestock behavior, enabling precision agriculture techniques, resource optimization, and yield enhancement.
- **Retail:** IoT technologies in retail encompass inventory management, supply chain optimization, personalized marketing, customer engagement, and smart retail stores equipped with cashierless checkout systems and interactive displays.

4.2. THINGSPEAK

Thingspeak is an Internet of Things application (IOT). It can save and retrieve data from objects utilizing the internet protocol thanks to its API. It gathers and stores information on the cloud. The interface gives items in the Internet of Things (IOT) environment basic communication capabilities. Channels are used to store data. Thingspeak has an advantage over the other in that data channels are hosted for free. Each channel contains four extra fields for location information in addition to up to eight fields for data storage. We may obtain the data from Thingspeak by using the entry ID. In addition to offering web server maintenance, the Thingspeak web service is more beneficial. Fig (2) represents the block diagram using IOT indicating the slave device and master control.

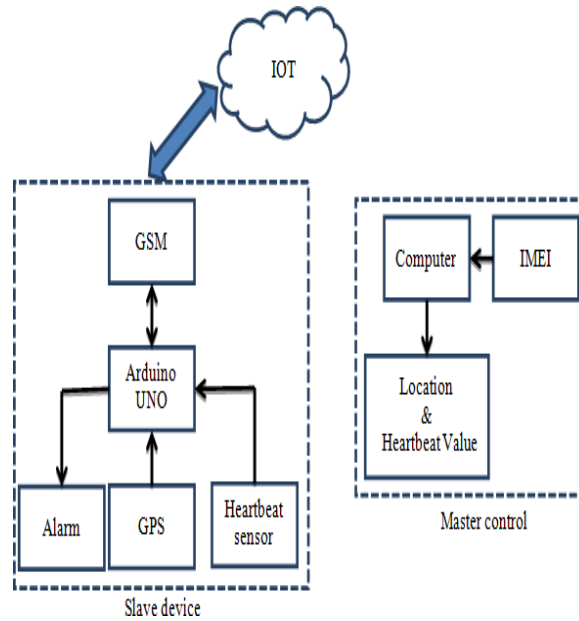


Figure 2. Block Diagram using IOT

V.HARDWARE COMPONENTS

1.Power Supply

In this, 9V rechargeable battery used for power supply.It provides the necessary voltage to the microcontroller unit.

2.Arduino (Microcontroller)

Based on the ATmega328, the Arduino UNO is a microcontroller based device.It contains six analog pins, a digital oscillator operating at 916 MHZ, fourteen digital input/output pins, a USB port, a power jack, an ICSP header, and a reset button.The FTDI USB to serial driver chip is not used by the UNO, which sets it apart from all other boards. Rather, it utilizes an ATmega801 that has been configured as a USB to serial converter.

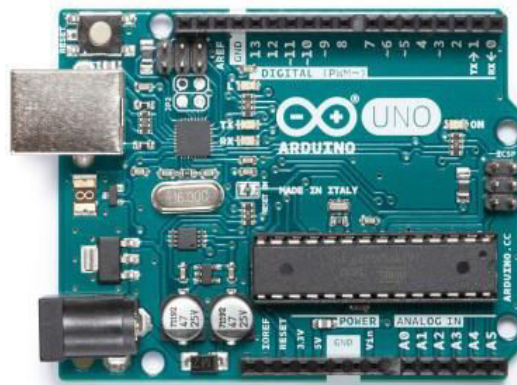


Figure 3. Arduino Uno (Microcontroller)

3.Global Positioning System (GPS)

A network of 24 satellites in orbit make up the GPS, a satellite-based navigation system.Latitude and longitude data are provided by GPS. The precision of the units is between 10 and 20 m.An electrical gadget called a GPS receiver picks up signals from three or four satellites.The GPS receiver may store the device's current position by using distance measurements from numerous satellites. The GPS operates at a temperature of roughly - 40 to +85 degrees Celsius.



Figure 3.1 GPS MODULE

4. Global System for Mobile communication (GSM)

The GSM network operates between 900 and 1800 MHz in a variety of carrier frequencies. It is predicated on the division of a spectrum into tiny pieces using both the TDMA and CDMA mechanisms. The GSM module has additional uses in addition to message transmission and receiving. Additionally, GSM satellite roaming has increased service accessibility to places without territorial coverage.



Figure 4.1 GSM MODULE

VI. RESULTS AND DISCUSSION

This approach uses an Arduino UNO microcontroller to carry out the procedure. Here, the microcontroller is interfaced with a GPS receiver, LCD display, and heartbeat sensor via a GSM module. After receiving the information from the satellite, the GPS receiver outputs the latitude and longitude. In a similar vein, the heartbeat sensor records the heartbeat rate continually. Using GSM and IOT, the heart rate as well as the latitude and longitude values are stored in the cloud. The heart rate and current position can be tracked using IOT from any location in the globe. A warning message is sent to the fisherman whenever they cross the border. When a different scenario emerges, the Coast Guard receives the message as well and assists the fishermen. Fig (4) represents the overall hardware assembly unit and the LCD display indicates the latitude and longitude specifications

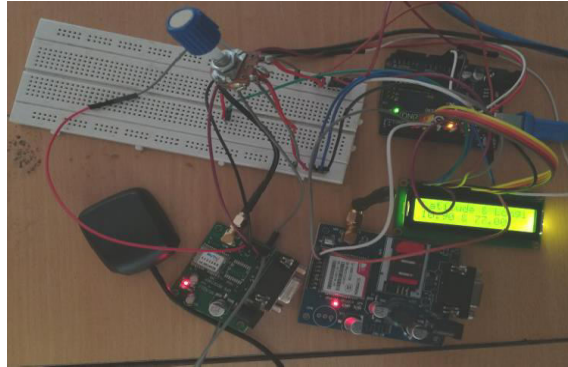


Figure 4. Overall Hardware Assembly Unit

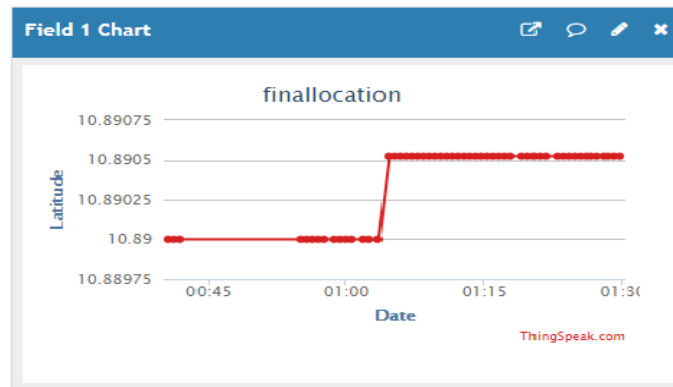


Figure 5. Latitude value using Thingspeak

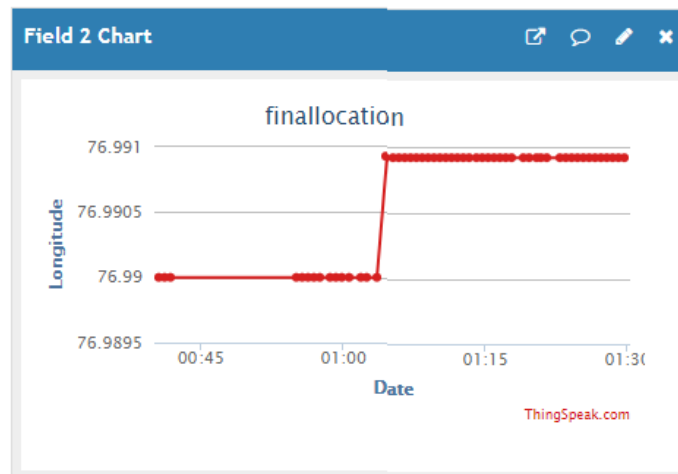


Figure 6. Longitude value using Thingspeak

Fig (5) and (6) indicates the IOT based output. Here the position of the person can be tracked.

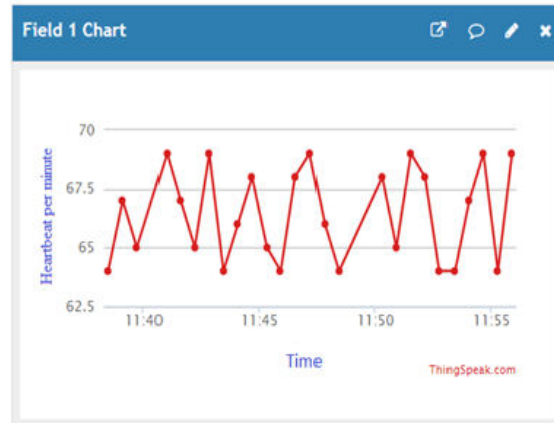


Figure 7. Heartbeat value using Thingspeak



Figure 8. Location displayed through map

Fig (7) indicates the heart beat rate and the variations after certain time can be noted. This helps to continuously monitor the health of the fisherman. The location can be triangulated in the google map as shown in the fig (8).

VII.CONCLUSION

The technique used keeps track of each fisherman's latitude and longitude position continuously; with this information, border violations can be reported. Every fisherman's heart rate is continuously tracked, allowing medical aid to be sent right to their location.

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