FISHERMEN TRACKING AND COMMUNICATION USING LIFI TECHNOLOGY

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ABSTRACT

Underwater media is the most challenging medium for data communication. It is because of its qualities. Acoustic waves and optical signals are two of the different communication modes that are now in use in water media. In order to get around this, this idea uses an electromagnetic approach to transmit data over a water medium. It transmits data via sources of magnetic transmitters. This is more cost-effective and efficient than the other available options, and it will guarantee the maximum transmission rate. Automation using GPS tracking features is also included in this project. The goal of our suggested system is to provide a technologically advanced mobile computing device that is easy to understand and operate. to encourage, adequately inform, and shield IMBL from crossing the maritime border at any cost. And provide complete security and dependable protection for the lives of Indian Fishermen. Several contemporary mobile computing ideas must be applied in order to complete this assignment. WWSNs are systems that use water for communication and have submerged sensor components. The vast majority of WWSN applications include water monitoring, intelligent communication, and environmental surveillance. Emergency communications are received in this suggested system and sent by water to a centralized server or fishermen's boat in case of an emergency. Keywords: natural disaster, emergency, GPS, GSM, boat, fishing boat, level sensor, distress alert, and distress message.

I. INTRODUCTION

The way we interact with the physical world has been completely transformed by the Internet of Things (IoT), with IoT-based solutions being used in a wide range of industries, including logistics, transportation, healthcare, and agriculture. The fishing business is one of the most likely to profit from this. Millions of people around the world depend on the fishing sector, yet it suffers difficulties from weather fluctuations, equipment malfunctions, and maritime mishaps. Therefore, keeping track of fishermen and responding quickly to problems require a dependable communication system. This study offers a cable water communications-based Internet of Things (IoT) fisherman tracking and communication system. Underwater sensors gather information such as position, water pressure, and temperature and then use wired water technology to send the information to a central computer. The data is analyzed by the server, which provides fishermen, fishery management, and rescue teams with up-to-date information. This method uses wireless technology to communicate the position of the boat to coastal guards via Internet of Things technology. It deals with problems

like maritime border disputes, which are especially common between India and Sri Lanka, two nearby nations. Continuous connectivity is ensured by a GPS receiver on the boat that maintains communication with satellites in the Low Earth Orbit. With the help of an LCD display and buzzer, the GPS-equipped microcontroller warns fishermen when they are about to cross international borders. Every 40 seconds, a Wi-Fi sensor also transmits messages to the monitoring server with location updates and meteorological information gleaned from temperature and humidity sensors. The system's dual goals are to precisely pinpoint the boat's location, keep an eye on border crossings, and deliver critical weather updates for safe navigation.

II.LITERATURE SURVEY

Al-Ramadhan, B. Al-Sahen, M. Ayesh, S.E.Esmaeili -"The Design of A Boat Safety and Accident Prevention System"- 2017

In our day-to-day life we hear a lot of news about fishermen, once out on the sea the fishermen are subjected to various oceanographic and climatic conditions.The fishermen are unable to get the help from the government during emergency situations. This project gives them a solution to get rid of those problems. Neo 7m GPS module is interfaced to monitor the location of the boat all the time.We have also fed the location of the islands in the particular zone, so that they can land safely when the cyclone is severe. We can also use a GSM modules to transfer the message from the land mass or the coastal guards to the fishermen in the boat.In future, ISRO is planning to make marine communication successful with the help of launching a satellite. This helps to communicate their nearby land location to the rescue team or their family members. Fishing is one of the most dangerous profession in this world because they are subjected to various oceanographic and climatic conditions and the fishing activity is not being done peacefully.The fishermen are arrested, or shot, by the neighbour countries and they are died due to storm and cyclone. To develop an effective tool to provide the safe navigation system for commercial vessels through waterways is vital thing globally. Safety studies have found that majority of them work at risk. The space research organizations taking this issue into consideration, and they are planning to launch a satellite for the betterment of marine communication .This project will be a solution for border crossing problems, cyclone detection and land safely in the nearby islands.

A.S.M. Nawroz Jahan, IfratIkhtear Uddin, MD. Nasim Mahmud Rone, Dr. Nova Ahmed-"A Low-cost Boat Distress Alert And Safety System "-2020.

Fisherman of Bangladesh have little to no equipment on their boat to get help in time of need. Every year thousands of fishermen die on the sea because of natural disaster since they don't have any kind of system onboard which can transmit distress messages. A solution to this problem is to provide them an affordable system so that they can send distress alert to get help in their location. Hence to solve this problem this paper proposes a low-cost Solar powered GPS and GSM based boat distress alert system which can track boat location and during an emergency, it can send a distress message to rescue party with all necessary location information. Bangladesh has a long history of natural disasters.

Between 1980 and 2008, it experienced 219 natural disasters. The geographical location, land characteristics, multiplicity of rivers and the monsoon climate render Bangladesh highly vulnerable to natural hazards. Natural disaster like cyclone takes lives of many people in coastal area, during these cyclone fishermen who went for fishing on sea or river become the most vulnerable [1]. On 2007 cyclone sidr a tropical cyclone hit Bangladesh, during this cyclone just in Barguna and Patuakhali districts about 110 fishermen on 13 trawlers went missing [2]. Bangladesh is considered one of the most suitable regions for fisheries in the world. Bangladesh is 11th in marine fisheries. Fisheries contribute 3.69% of national GDP [3]. A study shows that Bangladesh government provides supports of Life jacket (35 percent), GPS tracker (10 percent), and telescope (8 percent) for the fishermen safety which is clearly not enough. Every year thousands of fishermen dies during natural disaster or various engine malfunction on the sea or river [4]. In Bangladesh fishing boats have little to no equipment for their safety or for emergency communication. Traditionally stranded boat waits for another boat to pass by and ask for help. In addition, during natural disaster fishermen don't have any equipment to ask for help in their location. Few works have already been done on a boat safety system in Bangladesh, one of them is a COSPAS-SARSAT alternative for EPIRB Transponder [5] and smartphone-based warning messaging system for marine fisheries were developed to help the local fishermen [6]. In Kuwait a team developed a boat safety system to avoid obstacle and for emergency contact [7], more details about these works are available in related work section. Fishermen need an emergency communication system so that in time of emergency they can get help from coast guard or another rescue party. Our solar-powered GPS and GSM based system will contribute to providing safety to fisherman in time of needs by sending their location information to the rescue team.

Aishwarya Dalvi et al.,(2016),"Fishermen nautical border alert system", International Journal of Advanced Research in Computer Engineering&Technology (IJARCET),Vol. 5 Issue 3.

As the world travelling towards monitoring every humans and animal which are surviving with the help of global positioning system. In this analysis, we try to trace out the best tracking devices and concept which is very useful to this society. Here we can summarise some of the tracking devices like global positioning satellite GPS and radio frequency identification devices like RFID in their proposed systems. In the following survey, we can come across many devices like tracking system embedded with Global System for Mobile Communications and differential global navigation satellite GSM . which are all used to find their location to reach the land safely. In this beautiful world, measuring the world and partitioning the world becoming common regarding also concerning the language and people character. While separating the whole world is not possible with the help of the human being. While measuring the land and stating the accuracy of a particular location is not possible. People who take the vessel into the sea can able to return safely in situations. They are facing many problems like climatic condition which cannot be predicted since they travel around more than two weeks. This duration is nearly big and

the climate change and they trapped in the worst situation. similar they can also cross the international and national ocean border and face many law issues with the nearby countries. Due to these types of issues, they are facing a lot of financial issues as well as life issues with coast guard In [6], Sathe Pooja develops a model which is used to track vehicles which are all moving as well as routing them using GPS and GSM in a large outdoor area. The moving element was equipped with a global positioning Satellite device unit which is used to calculate the coordinates of each position, Which then communicate to GSM device what they installed Transmitter and receiver section. In Tamilnadu more vessels sailing towards sea for their life, more than 21000 are used to fulfil their life needs. They are frequently crossing the international border knowingly or unknowingly and met with unwanted problems. To avoid such things, researchers trying to find many devices which inform them of the location with 100 per cent accurate and with low cost. In day-to- day life we hear about many tamil fishermen being caught and put under srilankan custody and even killed. The sea border between the countries is not easily identifiable, which is the main reason for this cross border cruelty. Here we have designed a system using embedded system which protects the fishermen by notifying the country border to them by using Global Positioning System (GPS) and Global system for mobile communication (GSM). We use GPS receiver to find the current location of the fishing boat or vessel. Using GPS, we can find the current latitude and longitude values and is sent to the microcontroller unit. Then the controller unit finds the current locationby comparing the present latitude and longitudinal values

with the predefined value. Then from the result of the comparison, this system aware the fishermenthat they are about to reach the nautical border. The area is divided into four zones- normal zone, warning zone, zone near to restricted zone and finally the restricted zone. If the boat is in normal area, then the LCDdisplays normal zone. Thus they can make it clear that the boat is in normal area. In case it moves further and reaches the warning zone,the LCD displays warning zone. If the fisherman ignores the warning or fail to see the display and movefurther, and if the boat enters the zone nearer to the restricted zone the alarm will turn on and the speed of the boat engine automatically gets controlled by 50%. If the fisherman did not take any reaction about the alarm and move further, then the boat will enter into the restricted zone, the alarm continues to beep as before, and once it touches the restricted zone, the boat engine gets off by the control of fuel supply to engine.

Arunvijay et al., (2014), "Design of border alert system for fishermen using GPS", International Journal of Students Research in Technology &Management Vol 2 (02), ISSN 2321-2543, pg.67-70.

The Tamil Nadu fishermen even today invoke the historical rights and routinely stay into the International Maritime Boundary Line (IMBL) for fishing. From Tamil Nadu about 18,000 boats of different kinds conduct fishing along the India-Sri Lanka maritime border. But by accidentally crossing the border without knowledge, they get shot by the Lankan navy. This leads to loss in the both humans as well as their economic incomes. We have developed a system which eliminates such problems and saves the lives of the fishermen. The GPS

Modem will continuously give the signal which determines the latitude and longitude and indicates the position of the fishermen to them. Then it gives the output which gets read and displayed in the LCD. The same data is sent to the mobile of the fisherman and simultaneously the same data is sent to the Sea border security. An EEPROM is used to store the data, received by GPS receiver. The hardware which interfaces with microcontroller are LCD display, GSM modem and GPS Receiver.GPS (Global Positioning System) is increasingly being used for a wide range of applications. It provides reliable positioning, navigation, and timing services to worldwideusers on a continuous basis in all weather, day and night, anywhere on or near the Earth. 28 satellites inclined at 55° to the equator orbit the Earth every 11 hours and 58minutes at a height of 20,180 km on 6 different orbital Lanes and each one of these satellites has up to four atomic clocks on board. All we require is an accurate clock. By comparing the arrival time of the satellite signal with the onboard clock time, at which the signal was emitted, the latitude and longitudinal degree of the boat's location is determined. The current design is an embedded application, which will continuously monitor a moving Boat and once the boat goes beyond the level of the defined layer the particular operation will be done. For doing so an AT89c51microcontroller is interfaced serially to a GSM MODEM AND GPS receiver.

Asst.Prof.A.Palanisamy,C.Anuchandhar, M.Boobalan,P.Gokul,A.Mathiyarasan- "Border Line Dispute Ship Border Security System for Fishermen using wireless communication"-2021.

The adoption of IoT system assures to be the best for various alert system and prevention purposes in risk factors. Our approach attempts to assist the fisherman in safety calls and avoidance of danger situations. To aid the fishermen in prevention of crossing the prohibited border in sea, we have designed an embedded system to notify sea border of our country by using IOT and RF Transceiver. The embedded unit control overall system performance and compare pre-defined and present value of fisherman position and inform to them about their current location whether they are in safety zone or restricted zone. IOT and RF communication units provides location of all zones of sea. The embedded unit interface with fisherman by LCD display. The system aims at providing a system that will alert the fishermen well in advance and ensure maximum safety and peace at the border and also notify the patrol system in emergency time by software. This will help and increase safety of fisherman life. Recently unmanned border patrol system consisting of high tech devices, like unmanned aerial vehicles, surveillance towers equipped with wireless camera used to monitor fishermen whose family's main economical support is fishing. From Tamil Nadu about 18,000 boats of different kinds conduct fishing along the India-Sri Lanka border. But accidentally crossing border without knowledge, they get shot by the Lankan navy. This leads to loss in the both humans as well as their economic incomes. We have developed a system which eliminates such problems and saves the lives of the fishermen. Border systems have recently achieved interest to address concerns about national security. The major problem in protecting long stretches of borders is the need for large human

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involvement. This system is designed to avoid such kind of accidents and to alert the fishermen. In Tamilnadu about 20,000 vessels make spinning routinely stay into the International Maritime Boundary Line (IMBL) of India- Sri Lanka for fishing.
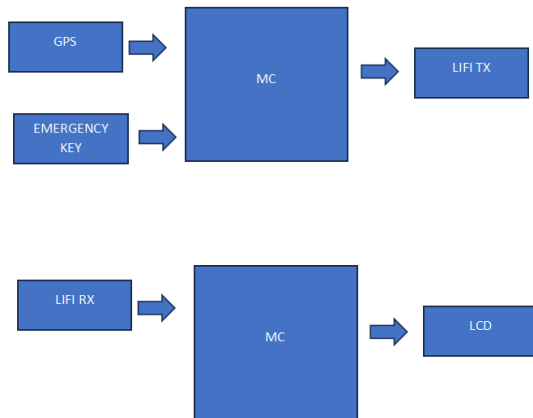

Fig1: Block diagram

The **Fishermen Tracking and Communication Using Li-Fi Technology** system provides a robust solution to enhance the safety and communication of fishermen operating in remote and potentially hazardous environments. The system utilizes **Li-Fi** (Light Fidelity) technology for high-speed, secure communication between fishing boats and centralized servers. Li-Fi, which uses visible light to transmit data, provides faster data transfer rates and is more efficient than traditional wireless communication methods, making it ideal for water environments. The system also incorporates **GPS tracking** to monitor the real-time location of fishing boats, ensuring that fishermen are always aware of their whereabouts and can be tracked in case of emergencies.

In addition to location tracking, the system is equipped with **level sensors** that detect water level anomalies, such as flooding or water ingress. If the water level exceeds a predefined threshold, the sensors trigger an alert, notifying nearby boats or the central server of the potential danger. The system also includes **GSM technology** as a backup communication method to ensure that distress signals can be sent or received over long distances when Li-Fi communication is not feasible.

When an emergency occurs, such as an engine failure, bad weather, or an accident, the boat automatically sends a distress message, including its GPS location, to the central server or other nearby boats. The system then coordinates rescue efforts by relaying this information to the relevant authorities or fishermen in the area. A mobile application allows users to interact with the system, displaying real-time data, enabling manual distress signals, and providing updates on the boat's status.

This system not only improves communication and safety but also ensures timely responses to emergencies, minimizing risks to fishermen's lives. The combination of **Li-Fi**, **GPS**, **GSM**, and **level sensors** creates a comprehensive communication and tracking network that is reliable, cost-effective, and easy to use, offering fishermen a technologically advanced solution for safer maritime operations. The system's ability to track boats in real-time, send emergency alerts, and provide a backup communication channel ensures that fishermen can operate with peace of mind, knowing that they are connected to help whenever needed.

III.CONCLUSION

The research uses magnetic transmitter sources and electromagnetic techniques to propose a novel underwater data

transmission technology. It keeps fishermen from crossing maritime limits and incorporates GPS tracking for their protection. Additionally, the system makes it possible to send emergency signals across the water, enhancing the effectiveness and dependability of underwater communication. Should a fisherman disregard the warning and proceed, the alarm will sound, reducing the boat engine's speed by fifty percent. The boat will enter the restricted area, keep beeping, and turn off the engine by regulating the fuel supply if the fisherman does not respond.

IV.REFERENCES

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