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Border Alert Fishing Boat Security System Using Global Positioning System

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Abstract: This paper introduces an intelligent design which would transform the life of fishermen community in India. One of the problems faced by the Indian fishermen is the arrest made by the neighboring country. This is because of the lack of knowledge of their position across the sea. This problem can be overcome with the dynamic location of the vessel by using the Global Positioning System and the Electronic Control Unit that has ARM7 microprocessor. 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 location by comparing the present latitude and longitudinal values with the predefined value. Then from the result of the comparison, this system aware the fishermen that they are about to reach the nautical border. 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% and once it touches the restricted zone, the boat engine gets off by the control of fuel supply to engine.

Keywords: ARM Processor, GPS Module, Zigbee, Microcontroller.

I.INTRODUCTION

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 issue of fishermen straying into each other's territorial waters has come as a potential irritant, of which the Indian fishermen are usually charged of tres passing the maritime boundary. So to stop our fishermen from crossing the border we have developed a method to stop our fishermen navigating towards the other country's border. The main objective of this paper is to detect the location of the boat via GPS which is the most accurate and fastest way of locating the vessel, alert them with an alarm and to stop the boat from trespassing into the Sri Lankan border. The reason to stop the boat is to prevent smugglers and intruders to neglect the alarm and alert the coast guard.

Today Internet has become one of the important parts of our daily life. It has changed how people live, work, play and learn. Internet serves for many purpose educations, finance, Business, Industries, Entertainment, Social Networking, Shopping, E-Commerce etc. The next new mega trend of Internet is Internet of Things (IOT). Visualizing a world where several objects can sense, communicate and share information over a Private Internet Protocol (IP) or Public Networks. The interconnected objects collect the data at regular intervals, analyse and used to initiate required action, providing an intelligent network for analyzing, planning and decision making. This is the world of the Internet of Things (IOT).The IOT is generally considered as connecting objects to the Internet and using that connection for control of those objects or remote monitoring. But this definition was referred only to part of IOT evolution considering the machine to machine market today. But actual definition of IOT is creating a brilliant, invisible network which can be sensed, controlled and programmed. The products developed based on IOT include embedded technology which allows them to exchange information, with each other or the Internet and it is assessed that about 8 to 50 billion devices will be connected by 2020. Since these devices come online, they provide better life style, create safer and more engaged communities and revolutionized healthcare. The entire concept of IOT stands on sensors, gateway and wireless network which enable users to communicate and access the application/information. Be that as it may, among all the regions no place does the IOT offer more prominent guarantee than in the field of health awareness.

II. LITERATURE SURVEY

Kawaguchi akira et al [1] This paper deals with a marine traffic simulation based on an autonomous ship cluster behaviour model in which each vessel's manoeuvring decision is made by taking into consideration of four independent forces that act on it, namely, goal attainment, centripetal, collision avoidance, and following forces. The compositional force, which determines each vessel's behaviour, is calculated based on the four forces with a specific weight function for each. The weight functions in the present paper were designed so that (1) they could reflect ship operators' individual differences with respect to safety precaution by introducing smooth, non-linear curves, and (2) the same simulation result could be obtained when the ratio of the outputs of these four functions were the same. The ranges of the simulation parameters were determined so that they would reflect realistic ship operation environment. Nine thousand and six hundred cases were simulated varying the number of ships, initial interval between ships, weights of the

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centripetal, collision avoidance, and following forces. The influences of the simulation parameters on the mean distance between ships, the collision ratio, aspect ratio and the collision limit parameter region are discussed. The results should contribute to an optimal parameter setting for the ship cluster behaviour simulator to be built in the future.

Kondo hayato et al [2] this paper presents a simulation study of the characteristics of obstacle avoidance and passage navigation by multiple ships forming a group. To make this possible, they added two new forces, i.e. obstacles avoidance force and scrape avoidance force to the previous model that only had four independent forces, i.e., goal attainment, contracting, expanding, and cluster collision avoidance forces. In this new model, manoeuvring decisions of ship agents are computed by combining the above-mentioned six independent forces.

The weight for obstacle avoidance force was determined based on the behaviour characteristics of a single ship case. The simulation results revealed that collisions occur immediately before ships reach, and immediately after they have avoided an obstacle in case of avoiding an obstacle. When navigating through a passage, collisions occur immediately before and after entering a passage, and shortly after ships have left a passage. It is also discussed that the time change of the cluster's emergent characteristics (mean distance, cluster configuration keeping ratio, number of collisions, aspect ratio) in passage navigation, the effect of passage width on the cluster width, and the impact of way point location in entering a passage.

Akaira kawaguchi et al [3] The aim of this research is to realize a computerized, intelligent, and an autonomous system to support navigation for multiple ocean-going vessels that share the same sailing course like a transport convoy. Detecting and evading other clusters in close proximity is one of the most important tasks in navigation as contacting these will potentially cause serious risks to the ship.

Focus of this paper is to investigate computational capabilities added to the so-called ship cluster behaviour model of our previous work. Enhancement is made to predict a risky situation and to guide for multiple ship clusters, enabling them to move safely and avoid contact with each other. Such improvement is critical, especially when the traffic becomes congested with a number of clustered ship groups moving to distinctive directions. Foundations for and preliminary experimental results of this study are presented.

Wang et al [4] This Chapter briefly describes both the offshore safety case approach and formal safety assessment of ships. The current practices and the latest development in safety assessment in both the marine and offshore industries are outlined. The relationship between the offshore safety case approach and formal ship safety assessment is described anddiscussed. The study of risk criteria in marineand offshore safety assessment is carried out.The recommendations on further work required are finally given.

III.PROPOSED SYSTEM

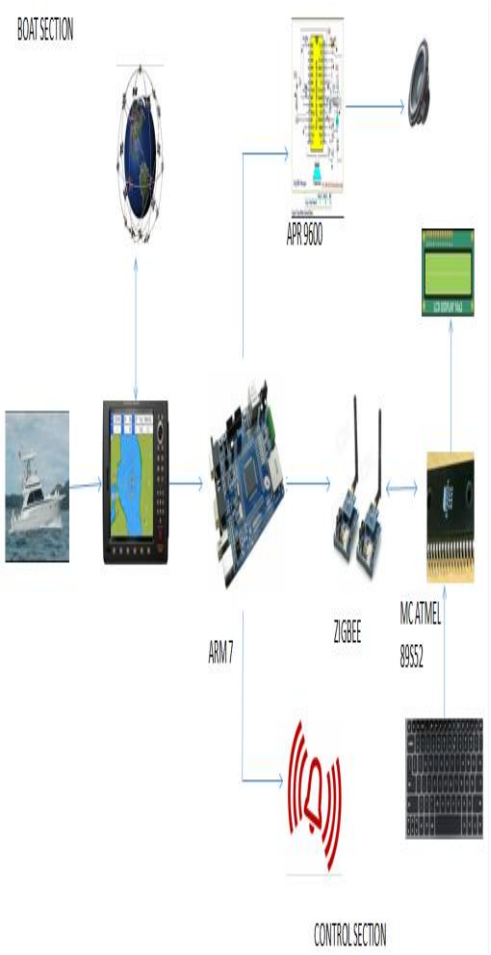

Fig-1: Proposed Block Diagram

Working Principle:

The proposed system is used to denote the boundary to the fishermen and to stop the boats from trespassing into the border. It is done by GPS which receives a signal from the satellite and gives the current position of the boat. The arm processor is programmed to compare the current longitudes and longitudes with the stored longitudes and longitudes of the border. Each boat has a unique number through which a record of how many boats is monitored in the control station.In ZIGBEE transceiver, the latitude and longitude value is send from which ZIGBEE information obtained using wireless mode. This unit consists of Alarm and Voice IC with speaker which control from the control unit. The control section monitors the location of boats and alerts them first and prevents them from crossing the boundary. Features such as automatic turn off boat engine before 5km when trying to cross the border.

Benefits

- The hijack of the ship by the pirates can be eradicated.
- The lost ship wrecks due to natural calamities can be identified.

By keeping the kits in the entire boats and by knowing the locations of all the boats we can use our kit to assist the traffic.In case of any accident on the sea.

It can be detected by the system and the accident location of the boat is sent to the rescue team.

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IV. SOFTWARE DESCRIPTION

A. Keil µVision3 IDE

The µVision3 IDE is a Windows-based software development platform that combines a robust editor, project manager, and makes facility. µVision3 integrates all tools including the C compiler, macro assembler, linker/locator, and HEX file generator. µVision3 helps expedite the development process of your embedded applications by providing the following:

- Full-featured source code editor,
- Device database for configuring the development tool setting,
- Project manager for creating and maintaining your projects,
- Integrated make facility for assembling, compiling, and linking your embedded applications,
- Dialogs for all development tool settings,
- True integrated source-level Debugger with high-speed CPU and peripheral simulator,
- Advanced GDI interface for software debugging in the target hardware and for connection to Keil ULINK,
- Flash programming utility for downloading the application program into Flash ROM,
- Links to development tools manuals, device datasheets & user's guides.

The µVision3 IDE offers numerous features and advantages that help you quickly and successfully develop embedded applications. They are easy to use and are guaranteed to help you achieve your design goals.

The µVision3 IDE and Debugger is the central part of the Keil development tool chain. µVision3 offers a Build Mode and a Debug Mode. In the µVision3 Build Mode you maintain the project files and generate the application. In the µVision3 Debug Mode you verify your program either with a powerful CPU and peripheral simulator or with the Keil ULINK USB-JTAG Adapter (or other AGDI drivers) that connect the debugger to the target system. The ULINK allows you also to download your application into Flash ROM of your target system.

B. Flow Chart

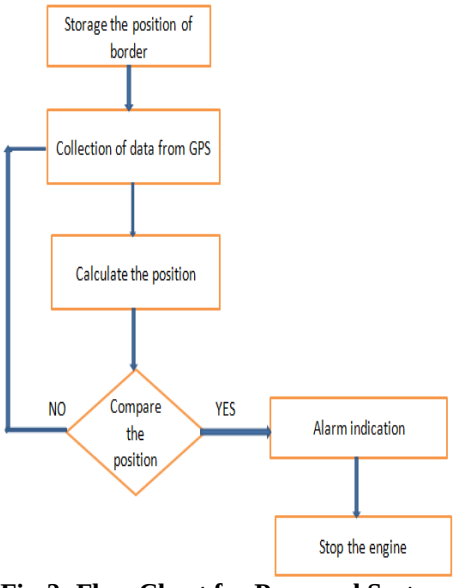

Fig-2: Flow Chart for Proposed System

C.Program

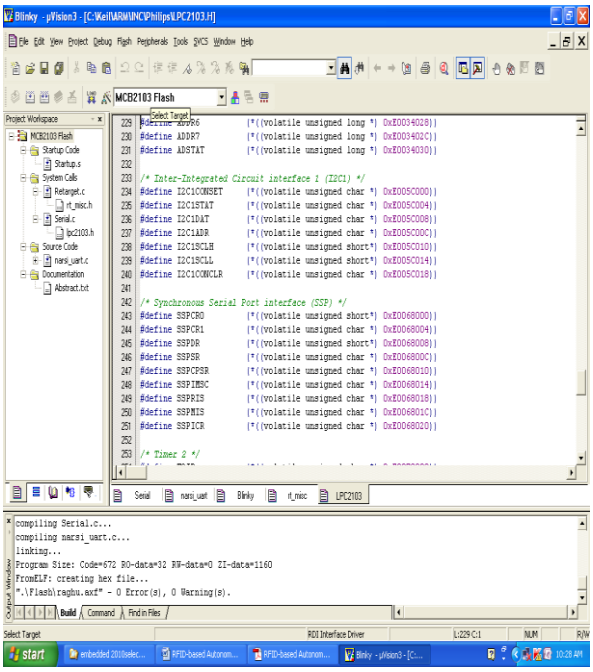

Fig-3: Program Execution

D.Simulation Results

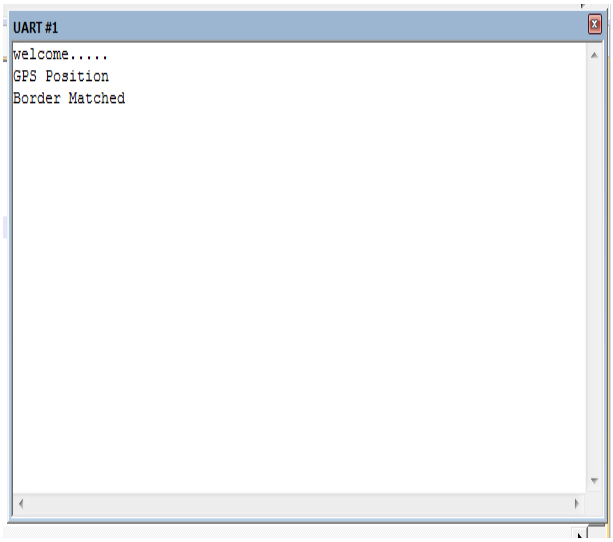

Fig-4: Representation of GPS

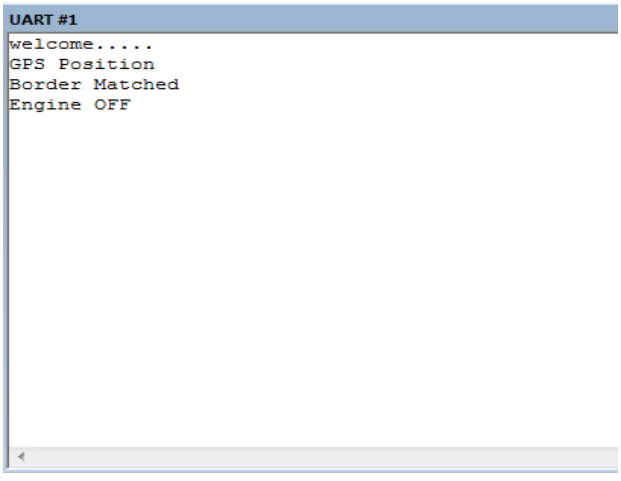

Fig-5: Representation of Engine Level

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V.CONCLUSION

In the recent times the arrest of Indian fishermen across Sri Lanka and Pakistan has been increased. The fishermen find it difficult to keep note of the borders and stray into other country's borders. Our aim is to give wireless support to those fishermen and also to track them if they are found missing. Our other aim is also to stop illegal activities such as smuggling. This project is a low cost efficient method of wireless tracking. It also gives sufficient information to both ship and coastal guardians of anyone crossing the border. The process of routing the fishermen will make it more efficient. The process of increasing the accuracy will be achieved greater in the near future.

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