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Implementation of Sea-Way Border Alert System Using RSSI

Sanjai B, Santhosh Kumar, Dr.P.G.V Ramesh

UG Students, Dept. of E.C.E., St.Joseph's Institute of Technology, Chennai, India

Professor, Dept. of E.C.E., St.Joseph's Institute of Technology, Chennai, India

ABSTRACT: The technology proliferation of Received Signal Strength Indication (RSSI) is used to provide location based positioning and time details in all climatic conditions and even anywhere anytime. This method focuses on implementing border identification system for all boats. However, the existing system is not powerful enough to prevent the crime against fishermen as it gives only the information a boat the border identification but not about the exact distance that the boat has travelled from the border The proposed system's transmitter section includes microcontroller RSSI module, voice playback circuit and DC motor and the receiver section includes RSSI, PC as monitoring database in the control room of port, And we can monitor the fishermen through IOT module. This system gives three kind of alerts to the fisherman in the boat .The first alert will be given in the form of message. The second alert is if the distance between the fisherman and the border does not decrease despite of the alert message then the APR voice will alert the person that there is a border at a certain distance ahead. The third alert will be in the form of action that is the boat engine will be turned off so that he cannot cross the border.

KEYWORDS: RSSI

I. INTRODUCTION

A seaborder is a conceptual division of earth's water surface are as using physiographic or geopolitical criteria that are recognized by the UnitedNations Convention on the law of sea. Every nation is isolated by their seaborders and it can claim up to 12 nautical miles of territorial sea in which ships from other countries can sail freely through, but cannot fish, carry out military exercises or do scientific research. Beyond this12 nautical miles of buffer space, it is known as the contiguous zone. Route in movement is a stand out amongst the most principle applications in seaways transport. Sea route is not as simple as street movement since its spread generally and absence of the way. For the sheltered route indicate of the anglers in inside the nation outskirt and along these lines turning away them from intersection as for as possible. RSSI module predicted alarming framework gives useful, valid time pontoon following an area found and announcing. This informs where the pontoon is exactly situated, since the land information is being gotten with this framework. At the point when the vessel moves promote towards as far as Possible the bonafide time parameter , for example, correct scope and longitude Information's are accounted for to sentinel. RSSI is the relative received signal strength indication in a wireless environment, in arbitrary units. RSSI is an indication of the power level being received by the receiving radio after the antenna and possible cable loss. Therefore, the greater the RSSI value, the stronger the signal. Thus, when an RSSI value is represented in a negative form (e.g. −100), the closer the value is to 0, the stronger the received signal has been. RSSI can be used internally in a wireless networking card to determine when the amount of radio energy in the channel is below a certain threshold at which point the network card is clear to send (CTS). Once the card is clear to send, a packet of information can be sent. The end user will likely observe an RSSI value when measuring the signal strength of a wireless network through the use of a wireless network monitoring tool like Wire shark. As an example, Cisco systems cards have an RSSI maximum value of 100 and will report 101 different power levels, where the RSSI value is 0 to 100. Another popular WiFi chipset is made by Atheros. An Atheros-based card will return an RSSI value of 0 to 127 (0x7f) with 128 (0x80) indicating an invalid value. There is no standardized relationship of any particular physical parameter to the RSSI reading. The 802.11 standard does not define any relationship between RSSI value and power level in milliwatts or decibels referenced to one milliwatt(dBm).

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II. RELATED WORK

In 2016 EmidioDiGiampaolo and Francesco Martinelli proposed a method to global localization system for an indoor autonomous vehicle equipped with odometry sensors and a radio-frequency identification (RFID) reader to interrogate tags located on the ceiling of the environment. The RFID reader can measure the phase of the signals coming from responding tags. This phase has non-univocal dependence on the distance robot tag, but in the considered frequency, it is really sensitive to a change in the position of the robot.For this reason, a multihypothesis Kalman filtering approach provides a really satisfactory performance even in the case that a very small density of tags is used: In the experimental tests, an average position estimation error of about 4 cm is achieved using only two tags for an area of about 5 m2.

In 2017, Simo Sarkka proposed an UHF RFID location tracking system, which is based on measuring the phases of backscattered signals from RFID tag using multiple spatially distributed antennas at a single carrier frequency. The wavelength ambiguity of the phase measurements is resolved by using the extended Kalman filter (EKF) and the Rauch-Tung-Striebel (RTS) smoother, where the state includes the position, velocity and the phase offsets of antennas. The performance of the method is experimentally verified at 890 MHz using a commercially available RFID reader.

In 2020, Mauro Boccadoro In this proposed method a global localization problem of a robot moving in a known environment is considered. The environment is equipped with a relatively sparse set of passive RFID (Radio Frequency IDentification) tags. The robot can detect the presence of the tags when traveling in their proximity and combines this information with the one given by other sensors). The RFID measurements are characterized by a highly non Gaussian noise: for this reason in the literature Particle Filter (PF) methods have often been used to fuse these data with the measurements coming from other sensors. In this paper a different approach is pursued, based on the observation that RFID readings can be considered as noisy quantized measurements of the pose of the robot or as noisy dynamic constraints on the pose itself. This allows to exploit the rich literature on Kalman quantized filtering or Kalman constrained estimation, to realize reliable methods with a satisfactory performance which require a computational time significantly lower with respect to the one needed by a PF. Simulative and experimental results will be reported to illustrate the proposed methods.

In 2017, SIMON J. JULIER., proposed The extended Kalman filter (EKF) is probably the most widely used estimation algorithm for nonlinear systems. However, more than 35 years of experience in the estimation community has shown that is difficult to implement, difficult to tune, and only reliable for systems that are almost linear on the time scale of the updates. Many of these difficulties arise from its use of linearization. To overcome this limitation, the unscented transformation (UT) was developed as a method to propagate mean and covariance information through nonlinear transformations. It is more accurate, easier to implement, and uses the same order of calculations as linearization. This paper reviews the motivation, development, use, and implications of the UT.

PROPOSED ALGORITHM

In the proposed system, the boat distance can be measured using the received signal strength received from the slave RSSI (boat). Arduino UNO is used as the controller which controls the proposed system. By using this RSSI we can find the location (zone) of the boat in the sea. Whenever the boat is to reach the border the APR voice alert the concern person in the boat and at the same time boat will automatically turn OFF. IOT is used to monitor the overall process. LCD is used to print the current stat. Received Signal Strength Indicator (RSSI) is a measure of the power present in a received radio signal. RSSI is usually invisible to a user of a receiving device. However, because signal strength can vary greatly and affect functionality in, IEEE 802.11 devices often make the measurement available to users. It is a measure of the power level that a RF client device is receiving from an, for example. RSSI is the relative signal strength in a wireless environment and can be measured in any unit of power. It is often expressed in decibels (db), or as percentage values between1-100, and can be either a negative, or a positive value.

III. RESULTS

The system is developed to find the boat by measuring its distance by using the received signal strength received from the slave RSSI (boat). Whenever the boat is to reach the border the APR voice alert the concern person in the boat and at the same time boat will automatically turn OFF. IOT is used to monitor the overall process.

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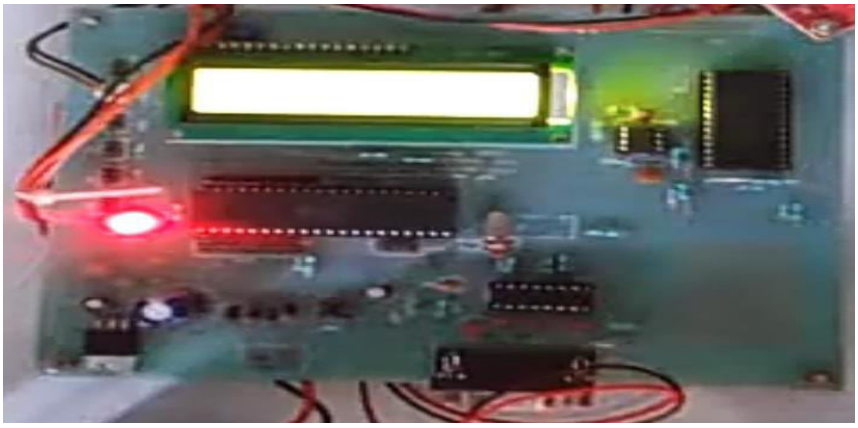
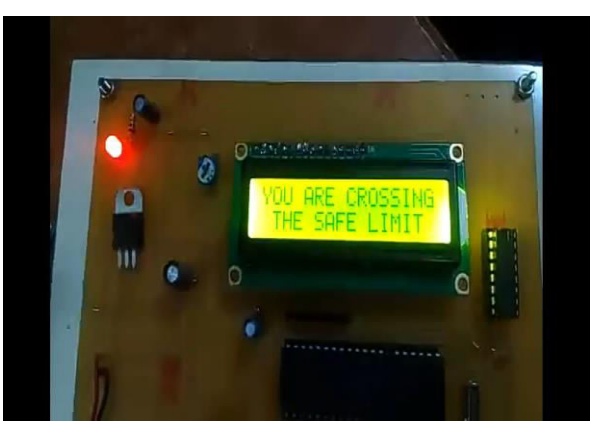
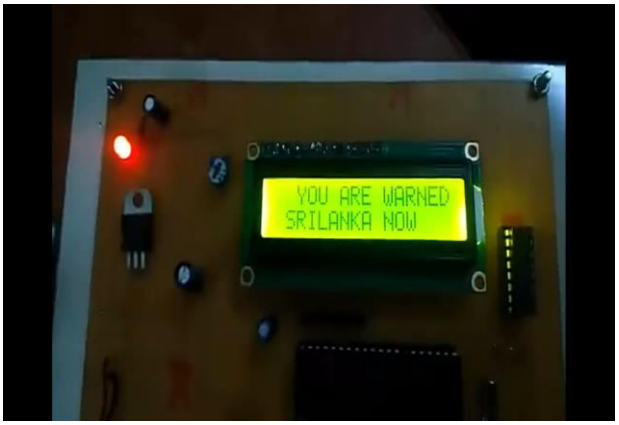


In this module implement the three zones, that is safety zone,intermediate zone and danger zone. Ultrasonic sensors are based on measuring the properties of sound waves withfrequency above the human audible range. They are based on three physical principles: time of flight, the Doppler effect, and the attenuation of sound waves.





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IV. CONCLUSION AND FUTURE WORK

RSSI is used to find the location of the boat and this will help the fisherman to be aware of the border and so this project can save the fisherman from high payments and imprisonment .The proposed system is that it is of low cost it does not require a large data base to store the longitude and the latitude values it can find the accurate location of the boat and can calculate the exact distance between the boat and the border and it is a wireless communication .In previous days fisherman cannot find out the border. Arduino UNO is used as the controller which controls the proposed system. By using this RSSI we can find the location (zone) of the boat in the sea. Whenever the boat is to reach the border the APR voice alert the concern person in the boat and at the same time boat will automatically turn OFF. IOT is used to monitor the overall process. LCD is used to print the current stat. With the help of this paper, fisherman can easily know the border and navigation officers can easily track the boat or ship. This paper will reduce the human losses from the border wars. This system can be implemented in the future by installing it in the boats and sending alerts to the control room by the satellite communication.

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