MARITIME BORDER ALERT BY LOCATION MONITORING USING GPS FOR PROTECTION OF FISHERMEN

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Abstract **The fisheries are very important part of Indian Economy. Our fishermen sometimes unknowingly or due to bad weather or for better catch of fish enter the Sri Lankan maritime border and face the cruelty of the Sri Lankan navy personnel. To guide them along the border and to inform the Indian Navy immediately about the entry of fishermen into the Sri Lankan maritime border the proposed system uses a administrator database in the Navy side to which all the fishermen must be registered. A NOKIA 6600 mobile phone to be owned by the fishermen to access the GPS for finding the location of the fishermen, to send message to the Indian Navy about the whereabouts of the fishermen and simultaneously to the fishermen alerting them to come back inside our maritime border.**

Keywords- GPS, Maritime border, PostgreSQL Database

I. . INTRODUCTION

The fisheries form the most important GDP contribution of India, next to agriculture. With the exclusive economic zone (EEZ) of 2 million square km, the fishing is one of the greatest employing sectors in India. According to the CMFRI Census 2010, there are 3,288 marine fishing villages and 1,511 marine fish landing centers in 9 maritime states and 2 union territories. The total Marine fisher folk population was about 4 million comprising centers in 864,550 families. About 38% marine fisher folk were engaged in active fishing with 85% of them having full time engagement. About 63.6% of the fisher folk were engaged in fishing and allied activities. The problem lies in the fact that India and Sri Lanka share a 400 km maritime border. So there obviously comes a lot of trouble for both the Indian and Sri Lankan fishermen when they cross the border. This paper suggests the use of GPS, to find whether the fishermen has actually crossed the border and if so then to locate them exactly using latitude and longitude positions from the registered mobile number in the database and give them an alert message. It can also be used to count the number of fishermen in who had crossed the border.

II. BOUNDARY BETWEEN INDIA AND SRILANKA

The boundary between India and Sri Lanka in the waters from Adam's Bridge to Palk Strait shall be arcs of Great Circles between the following positions, in the sequence given above, defined by latitude and longitude.
Positions Latitude Longitude
Position 1 12° 05'.0 N 82° 03'.0 E
Position 2 12° 05'.8 N 82° 05'.0 E
Position 3 12° 08'.4 N 82° 09'.5 E
Position 4 12° 33' 0 N 82° 46'.0 E

III.   . GPS-GLOBAL POSITIONING SYSTEM

Global positioning system has now become the integral p a r t of the mobile communication. GPS uses the 24 satellite system to track the position of the user. It gives the exact latitude and longitude of the user. For any application we require only three satellites in the LOS (Line Of Sight) position. NOKIA 6600 has the GPS system which can be used to track the location of the user and a message can be sent to the administrator and simultaneously to the fishermen, if the mobile goes out of radius i.e., the maritime border of India.

The accuracy of GPS depends on the type of receiver. Most hand-held GPS units have about 10-20 meter accuracy. Other types of receivers use a method called Differential GPS (DGPS) to obtain much higher accuracy.DGPS requires an additional receiver fixed at a known location nearby. Observations made by the stationary receiver are used to correct positions recorded by the roving units producing an accuracy greater than 1meter.

IV.   RELATED WORKS

This work deals with the mobile location tracking application in a cellular mobile network. It is based on Location based service that describes tracking system called mobile tracker using GPS as a location provider through the geographic positions of a mobile network. This implements a client server system that helps the users to locate their friends and receive alerts whenever they are nearby. It enables the user, basing on the radius around the mobile device defined by the administrator. MYSQL database is used to update the location information and track the location.

This modern vehicle tracking systems commonly use Global Positioning System (GPS) technology for locating the vehicle, but other types of automatic vehicle location technology can also be used. Vehicle information can be viewed on electronic maps via the Internet or specialized software. To avoid stealing this paper implement a system, by which more security is provided to the vehicle. The RF transmitter is attached with the vehicle which has its own identification. This data will be continuously transmitted to the RF receiver connected

to the microcontroller. This GPS will get the location and the position of vehicle and transmit that data to the microcontroller. Suppose the RF receiver not receiving signal from the transmitting unit, receiver unit send the signal to the microcontroller, from that we can identify the theft. If the vehicle is theft it automatically sends location of the vehicle to its owner as a SMS through GSM modem. If a password like SMS is sent by the owner, it automatically stops the vehicle.

[3]GPS is used to find the peers who are in the friends list of the social networking sites based on the users' selection. It requires both communication and computation resources. The computation can be carried out either between the individual users in a peer-to-peer fashion or by centralized servers where computation and data can be collected at one central location. In the peer- to-peer model, a novel algorithm for minimizing the number of location update messages between pairs of friends is presented. We also present an efficient algorithm for the centralized model, based on region hierarchy and quad trees. The paper provides an analysis of the two algorithms, compares them with a naive approach, and evaluates them using the IBM City Simulator system.

<div align="center">V.   PROPOSED SYSTEM</div>
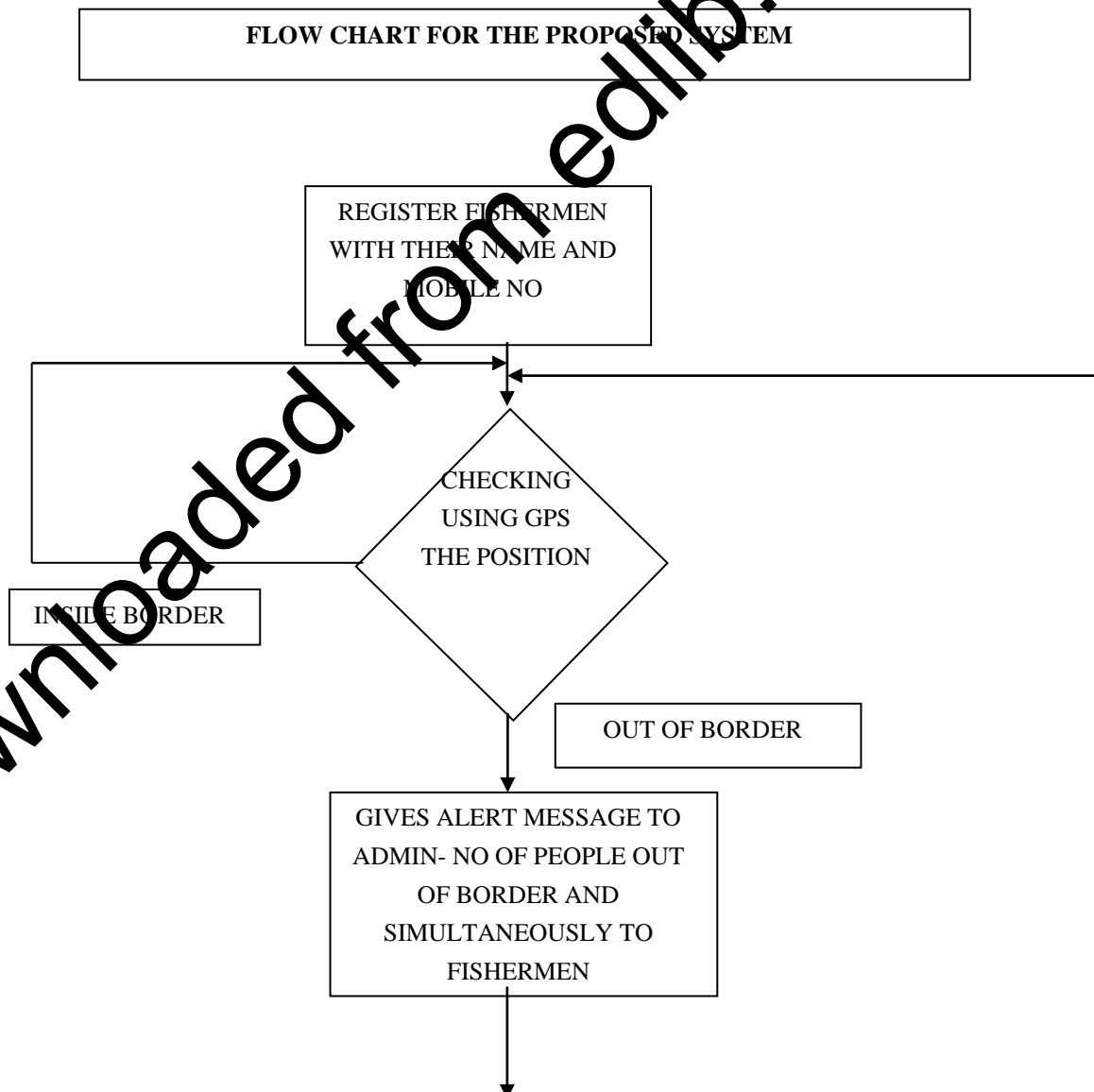
5.1 WHY NOKIA 6600?
Nokia has introduced a lot of models. The reason behind choosing this model of mobile phone is the GPS facility and the JAVA base for finding the location using map download.

The previous versions of Nokia also have the GPS facility, but the battery holding time is quite decent in this mobile (4 hrs using continuously) when compared to other previous versions. Another reason why Nokia6600 can be used is that it is low cost when compared to other higher versions. It can be used in Tamil version which would be very useful for the fishermen as most of them lack English knowledge. This is just a suggestion and if there is a use of higer versions mobiles there would be no problem in the operation of the system.

5.2 DATABASE- PostgreSQL

PostgreSQL   is   an object-relational database   management   system (ORDBMS) with an emphasis on extensibility and standards-compliance. This has the advantage that if a new fisher man registers himself in the network, then the database supports addition as required. As a database server, its primary function is to store data, securely and supporting best practices, and retrieve it later, as requested by other software applications, be it those on the same computer or those running on another computer across a network (including the Internet). It can handle workloads ranging from small single-machine applications to large Internet-facing applications with many concurrent users. Recent versions also provide replication of the database itself for security and scalability. It is free and open source software, released under the terms of the PostgreSQL License, a permissive free software license. Here we use PostgreSQL as back end and Microsoft access as front end for storing the mobile numbers and giving any messages to the administrator respectively

FLOW CHART FOR THE PROPOSED SYSTEM

REGISTER FISHERMEN WITH THEIR NAME AND MOBILE NO

CHECKING USING GPS THE POSITION

INSIDE BORDER

OUT OF BORDER

GIVES ALERT MESSAGE TO ADMIN- NO OF PEOPLE OUT OF BORDER AND SIMULTANEOUSLY TO FISHERMEN

5.3 MICROCONTROLLER MSP430

Msp430 is a low power microcontroller used for this application. The Texas Instruments (TI) MSP430 family of processors are low power 16 bit The boundary points are marked above. These points should be stored in microcontroller. The computation is done in the microcontroller with these points. Thus vessel crossing the border is being calculated.

VI. WORKING WITH MICROCONTROLLER

Security force installed with microcontroller receives the data from the GPS receiver through UART. The data received contains many details along with latitude and longitude. The latitude and Longitude of the current position is separated from the detailed data from GPS. The current positions are compared with already stored latitude and longitude of countries boundary locations.

At first the latitude is compared with stored latitude which identifies if the current position is located near to the boundary. If the latitude matches then the adjacent latitudes and longitudes of the present latitude is retrieved from the microcontroller. The current position received from GPS is stored as S1 (latitude), S2 (longitude). The latitude S1 is compared with stored latitudes. If latitude match, then adjacent latitude and longitudes (X1, Y1 and X2, Y2) are retrieved from stored table and substituted in the equation given below
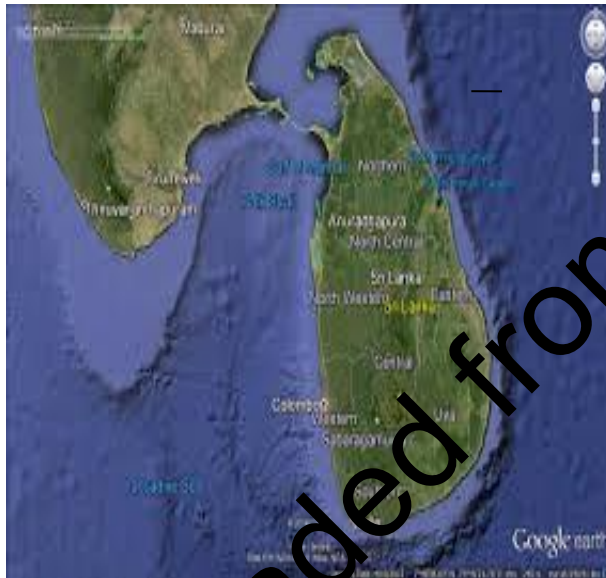
$$(Y-Y1)/(Y2-Y1) = (X-X1)/(X2-X1)$$

By simplification, we get ax + by = c

Now S1 and S2 are substituted in above equation of line.

Here two cases are possible:

Case 1: If LHS<RHS, then vessel is inside country border.

When vessel is inside country's border, the microcontroller gets the input from GPS receiver after a short delay loop. Latitude and longitude is extracted and Manipulation with the new locations is done in the algorithm.

Case 2: If LHS>RHS, then vessel has crossed border.

When vessel crosses border, an alarm is generate immediately. Along with alarm a signal is also sent to GSM module for transmission of message to desired sender. Alarm continues until the vessel comes back inside the country's border.

VII.FOUR LAYER ALERT

Boat Position and Navigation System contains,

- Layer1: Green LED indication
- Layer2: Red LED indication
- Layer3:alert given to the security force
- Layer 4: alert the fisher man

SCOPE

This proposed system can be used in area wherever border dispute is prevailing. For example, it can be used in the Tamil Nadu-Sri Lanka maritime border and also in Gujarat-Pakistan border where the same kinds of problem exist. Location of any lost vehicle could be found

FUTURE WORK

Can be used to find the people who are tres-passing the maritime border

CONCLUSION

The proposed system uses the GPS to monitor the position of the fishermen and update the navy with the position of the fishermen and warn them when they go out Of the Indian maritime border.

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