Intelligent Passenger Alert System in Railways

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Abstract— This paper focuses on developing an intelligent system which senses every location with the help of GPS receiver and intimates each passenger to know their own destination through phone call. The proposed system facilitates the passenger to identify their particular destination easily. The system would alert the passenger when the train reaches before particular station by audio voice come to their mobile phone. The paper is designed to locate in train and announce the location with the help of technology, by using which the signal sent by the satellites to GPS receiver are interfaced with a PC for locating the exact location of the train.

Key words: Location Identification, GPS Receiver

I. INTRODUCTION

Unpredictable railway schedules which are made practically impossible to find the specific destination on where we have to reach. To overcome this problem, the paper made the concept of making calls to the passengers when their destination is reached by the train. Nowadays people travelling from one place to another place have become a part of our day to day life and the people who depends on the public transports. Due to presence of this system, the passengers are easily to know their destination.

This paper focuses on developing an advanced railway control systems in which a GPS receiver is used for tracking the location of the train. Initially GPS tracking is developed for military purposes, but now it is mostly used for various applications [1][2]. These devices allow people to track others as well as valuables through internet from anywhere else. By using GPS, location identification has seen a sharp rise owing to its simplicity and increasing affordability of GPS based devices [3].

It is highly intelligent monitoring system in which the GPS (Global positioning system) receiver is capable of identifying the location in which it is present in the form of latitude and longitudes. The GPS gives the data received from the satellites.

In this paper, the microcontroller is used which is interfaced with a GPS receiver so that it can receive the information about the location in which the train is present. When the station location is received it automatically intimates the passengers.

GPS receivers are used to provide three dimensional locations such as latitude, longitude and altitude with precise time. These receivers provide reliable positioning, navigational and timing services to worldwide users in any climatic conditions whether day or night anywhere in the world and around the earth. Embedded system is a computing device that has computer hardware with software embedded in it. Embedded system is mainly used for its size and cost benefits and it improves performance and reliability. Embedded system is used in variety of applications and it controls many devices in common use today. Embedded system are generally based on the microcontrollers and designed to do some specific task, rather than be a general purpose computer for multiple tasks.

Objective of the paper is to create an application that is able to estimate destination station and alert the passengers through phone call and also to offer a convenient mobile information service, this ensures the passengers to get the alert of destination station before train reaches the destination. The mobile is portable thing; it is the best way of communication. So, we have chosen the phone call as the best service to intimate the passenger as even the basic mobile will support this application. Hence better way to alert all class people and is cost effective.

II. EXISTING METHOD

The existing system involves announcing the arrival and departure information manually in a particular station name. The proposed system is an automated system with very limited human intervention.

The disadvantages of the existing system are
- More manpower is required
- It produces alarm, so passengers are disturbed

The existing system displays the number of railway stations on TFT display and also this system produces alarm when the train reached less than 10km from destination. So, it generates unwanted disturbance to the passengers.

In existing method, the device displays list of railway stations and an input is get from the passenger by invoking the touch screen and pointer context application programming interfaces. The received input is processed for identifying the user's selection. The GPS related APIs are from the GPS receiver to initiate the receipt of information. The received data is decoded and the latitude and longitude information is retrieved. This existing system is implemented in Field Programmable Gate Array board.

If the distance is lesser than 10 kilometres, the alarm system is generated. The position and speed related information is updated, displayed continuously and distance is recalculated at the refresh rate supported by the GPS receiver [4].
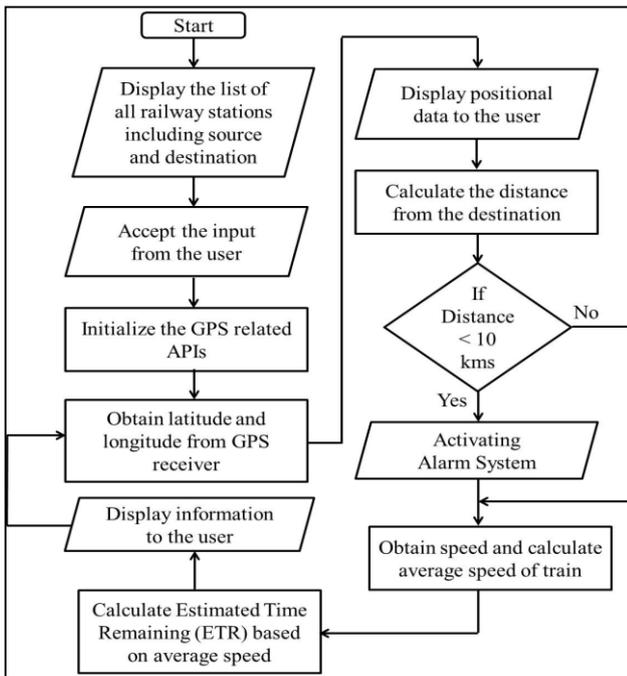
III. FLOW CHART
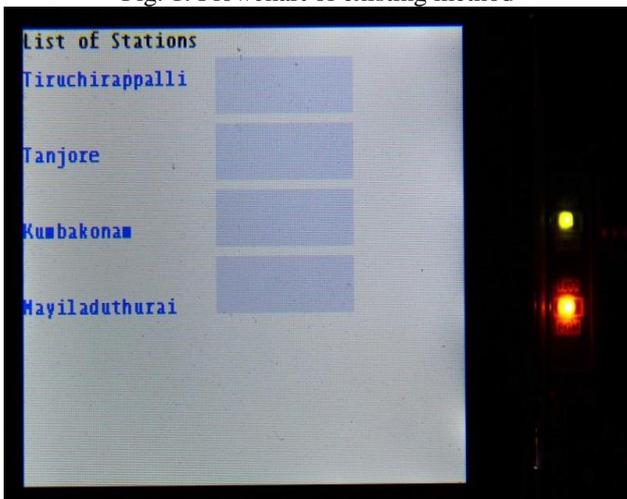

Fig. 1: Flowchart of existing method

Fig. 3: List of Railway Stations on TFT Display

IV. PROPOSED METHOD

Security in travel is primary concern for everyone, during night time, passenger not identifies their destination accurately and even sometimes they slept well during night times. Many passengers are affected by this problem. To avoid this mistake, the proposed system senses GPS location and the system which is capable of announcing the station name when the train reaches before the station which will be helpful for passengers travelling in AC coaches as well as for non-local passengers who may not have idea about the local areas. The passenger's mobile is ringing when the passenger reaches before their destination. So, the passengers easily know their destination.

Advantages of the proposed system are,

– Identify the destination station very easily
– This can be used for buses also
– Basic mobile can also be used
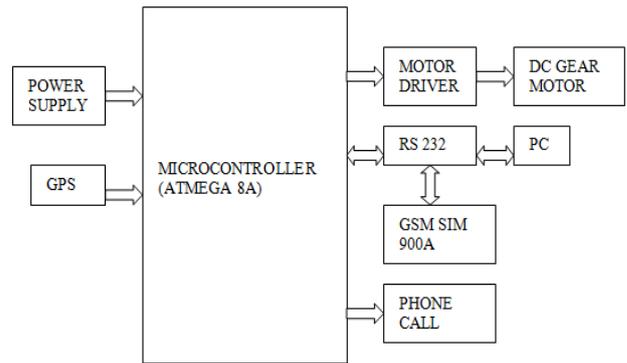
A. Block Diagram
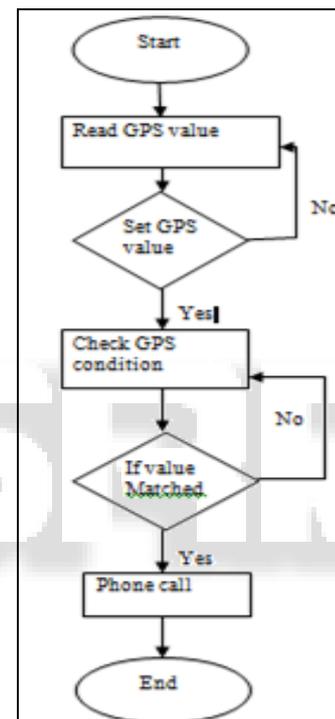

Fig. 3: Block Diagram

B. Flow Chart

Fig. 4: Flowchart of proposed method

V. APPROACH AND METHODOLOGY

In this paper, a GPS receiver is used for tracking the location of the train. The receiver collects positional (x, y, z coordinates) and time data from all the satellites. For example, assuming that four satellites are spotted, the pseudo ranges are calculated as:

$$R^1 = CT - CT^1 = \sqrt{[(x^1-x)^2 + (y^1-y)^2 + (z^1-z)^2]}$$
$$R^2 = CT - CT^2 = \sqrt{[(x^2-x)^2 + (y^2-y)^2 + (z^2-z)^2]}$$
$$R^3 = CT - CT^3 = \sqrt{[(x^3-x)^2 + (y^3-y)^2 + (z^3-z)^2]}$$
$$R^4 = CT - CT^4 = \sqrt{[(x^4-x)^2 + (y^4-y)^2 + (z^4-z)^2]}$$

Where,
R^k= Pseudo range of kth satellite
$x^k, y^k, ^k$k=Position of kth satellite
T=Clock bias of receiver
T^k=Clock bias of kth satellite
C=Speed of light

The location of the receiver is calculated by solving these equations and the position is obtained in terms of the

Cartesian coordinates and time. The coordinates are resolved into latitude, longitude, altitude and speed etc. Distance is calculated as:

$$Distance = Speed * Time$$

VI. CONCLUSION

Avoidance of missing the destination can be overcome by implementation of phone alert system within the train. The practical implementation and concept of this work could be useful for a lot of passengers' especially handicapped people and aged people to know their destination by themselves. This paper aims at an automated system to make announcements automatically. Finally, when the train reaches before destination, station name is announced via mobile. The future work of this paper will create a mobile application.

REFERENCES

[1] Zhou Jianjun, Zhang Man, Min Cao Gang, Li Su, Liu Bin,"Automatic navigation system for electric power vehicles with EPS," in Vehicle Power and Propulsion Conference, 2008, pp.1-3.

[2] William.R.Young Jr., "Tracking electric vehicles with GPS", in South-con/96, Conference Record, 1996, pp.285-289.

[3] Shreenivas. R. Jog, Mukul .S. Sutaone, Vishweshvar.V.Badawe, "Ruggedisation methodologies for GPS based Vehicle Tracking System", in 3rd International Conference on Electronics Computer Technologies, 2011, pp.214-218.

[4] Anish NK, S.Moorthi,"Intelligent location identification and passenger alert system in Indian railways using GPS receiver".

[5] F.Y.Wang, "Parallel control and management for intelligent transportation system: Concepts, architectures, and applications", IEEE Trans. intell. Transp. System, vol.11, no.3, pp.630-638, Sep.2010.

[6] Xiaolei Yu. Yongrong Sun, Jianye Liu and Jianfeng Miao, "Design and realization of synchronization circuit for GPS software receiver based on FPGA", in journal of systems Engineering, 2010, vol.21, no.1, pp.20-26.

[7] Ershen Wang, Shufang Zang, Qing Hu, Jiang Yi and Xiaowen Sun, "Implementation of an Embedded GPS Receiver based on FPGA and MicroBlaze", in 4th International Conference on Wireless Communications, Networking and Mobile Computing, 2008, pp.1-4.

[8] Pan Ming, "FPGA based GPS application system design", in Control and Decision Conference, 2009, pp.1384-1387.

[9] Ying Du, Jie Li, Bo Wang and Qiao Jiang, "Design of GPS data acquisition and processing system based on FPGA", in 2nd International Conference on Information Science and Engineering, 2010, pp.118-1120.

[10] Junfeng Wang, Jungang Wang, Clive Roberts and Lei Chen, "Parallel monitoring for the next generation of train control systems", IEEE Trans. on intelligent systems, vol.16, no.1, February 2015.