

Implementation of Automatic Movement of Emergency Vehicle System (AMEVS)

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Abstract: Automatic Movement of Emergency Vehicles Technique is using Wireless Embedded System for Transportation based on GSM and GPS Technology. In case of miss happenings like fire and accidents in the city AMEVS technique is very useful to save lives in emergency.

With the help of AMEVS, ambulance and fire brigade will reach the accidental spot immediately which will save the lives. Safety security and accident prevention is more challenging in highly populated cities. So in order to bring a solution for this problem this system is proposed.

Accident place can be detected by GPS sensors. GPS (Global Positioning System) is used to get latitude and longitude of the accident place. In the proposed technique, if an emergency vehicle has met with accidents then alert message with the location coordinates is sent to the main service centre.

We describe an Automatic Movement of Emergency Vehicles Technique offering a solution to the problem of Ambulance and Fire Brigade management and emergency incident handling in the RAIPUR City in Chhattisgarh state.

Keywords: Global Positioning System, Geographical Information System, Automatic movement of emergency vehicle system, Global System for Mobile Communication.

1. INTRODUCTION

This research paper mainly focused on finding routes may prove to be time-consuming in the cases of large city with very dense road networks. However, by exploiting recent advances in the field of data structures, the performance of a shortest-path algorithm in terms of the required computational time can be significantly enhanced. The incorporation of the enhanced shortest-path algorithm within the GIS will lower our organization's response time, thus improving its performance in ability.

We describe a system offering a solution to the problem of Ambulance and Fire Brigade management and emergency incident handling in the prefecture of RAIPUR City in Chhattisgarh state. It is based on the integration of Geographic Information System (GIS), Global Positioning System (GPS) and Global System for Mobile Communication (GSM) technologies.

2. USES OF GEOGRAPHICAL INFORMATION SYSTEM (GIS)

Geographical Information System (GIS) is computer based tool that manipulates and present geographical information. There are number of data that could be displayed and inventoried with the use of GIS (Geographic Information System) such as from natural resources, emergency vehicles, fire hydrants, roads etc. The quantity and so the density of a certain item within a given area could be displayed and calculated. But there are still many things that one could do with the use of GIS technology. The word "Geography" means that some portion of the data is spatial.

3. USES OF GLOBAL POSITIONING SYSTEM (GPS)

The GPS system comprises of three parts .Space segment, User segment and Control segment. The satellites are the heart of the GPS which helps to locate the position by broadcasting the signal used by the receiver .To calculate the position, the signals of satellites should be locked. User segment comprises of a sensitive receiver which can detect signals and a computer to convert the data into useful information. GPS receiver helps to locate your own position but disallows being tracked by someone else. Control segment helps the entire system to work efficiently. It is essential that the transmission signals have to be updated and the satellites should be kept in their appropriate orbit.

GPS is being used for many promising applications, such as wireless location, and vehicular navigation. In these applications and technique, GPS receivers are generally integrated with other devices as location sensors and the signal environments, unlike that of conventional GPS, are challenging, such as foliage areas, urban area and indoors. In order to be able to use GPS receivers in these environments, high sensitivity technologies need to be used.

Compared to conventional hardware GPS receivers, software GPS receivers are more suitable for research and development and for deep integration with other sensors. Global Positioning System (GPS) is a space-based global navigation satellite system that provides time and location information to users anywhere on world.

4. USES OF GLOBAL SYSTEM FOR MOBILE COMMUNICATION (GSM)

GSM is together to other technologies and evolution of wireless mobile telecommunication that provide high speed circuit-switched data (HSCSD) GPRS is enhancing the data rate for GSM evolution (EDGE) and universal mobile telecommunication and service (UMTS).

GSM (Global System for Mobile communications: originally from Group Special Mobile) is the most widely used digital phone technology for transmitting mobile voice and data services in the world. It uses SIM (Subscriber Identity Module) cards, which acts as digital identity, and is tied to the cellular network by searching for cells towards the towers (bits) in the nearby source and destination location.

5. IMPLEMENTING OF AMEVs TECHNIQUE

Step –I Database Structure

Microsoft Access is a computer application used to create and manage computer-based databases on desktop computers and/or on connected computers (a network).

Created Databases are

(i) Data Table “Ambulance” contains

- Ambulance unique number
- GPS installed in AB --- (Yes or No)
- GSM installed in AB --- (Yes or No)
- Availability of Ambulance --- (Yes or NO)

(ii) Data Table “Fire brigade” contains

- Fire brigade unique number
- GPS installed in FB --- (Yes or No)
- GSM installed in FB --- (Yes or No)
- Availability of Fire brigade --- (Yes or No)

(iii) Data Table of ” Traffic Control Signal” contains

- Traffic Control Signal Number

(A unique number is given to each Traffic Control Signal available in Raipur City)

- Condition of Traffic Control Signal

(Working/Not Working)

(iv) Hospital Database

- Hospital number (unique)
- Hospital Name
- Address
- Bed capacity of hospital
- Doctor availability-(Yes or No)

(v) Police station Database

- A unique number of each police station
- Number of policeman in the police station
- Police availability-(Yes or No)

(vi) Data type of "RAIPUR CITY"

- Code for each colony
- Colony Name

Detail data information of above mentioned data tables are enclosed in Appendix I, II, III, IV, V and VI. All above mentioned six tables are static in nature and can be enhanced. But in AMEVS technique a real time database is created for movement of emergency vehicle. This real time table contain status of Traffic Control Signal as Red or Green.

- Keeps the information of emergency vehicle passed/crossed the signal-(Yes/No).
- Store the movement path (for temporary basis).

As the task completed the real time data table will be initialized.

6. CONFIGURATION OF PORTS IN MAIN SERVICE CENTRE

For implementation of proposed technique, the first requirement is to configure the hardware available at main service centre.

Main Service Centre is made ready for receiving SMS and phone calls from different places in Raipur. Helpdesk person has to facilitate with receiving SMS and phone calls.

Steps to configure port are main service centre are:

1. Plug your Modem in any USB slot of computer
2. Click on windows start button.
3. Go to my computer
4. Right Click on My computer windows.
5. Click on device manger
6. Select ports
7. Select communication port port1.
8. Right click on communication port port1
9. Select properties.
10. Click on port setting tab.
- 11 Set Bits per second rate 9600.

7. ROUTE PLOT METHOD

1. Help desk person ask set of question from informer:

- (i) place of accident,
- (ii) Number of people injured,
- (iii) Ambulance required
- (iv) Fire brigade required etc.

2. As soon as SMS received by helpdesk person the software with Google map open and available on the screen.

3. Using plot route button, plots shortest path and alternative route. The proposed software will show the shortest path.

A simulated model is created for checking the correctness of the proposed technique. The simulated model takes input from SMS send by the informer and help desk person.

Then using these data a graphical display is produced for the shortest path suggested to the vehicles by the proposed coding model.

In Fig 1 we plot some routes showing the source and destination point, nearest hospital, nearest police station.

In Fig 2 we display shortest path (in dark blue color) with traffic signal. And alternative path (in dark grey color) with traffic signal.

In Fig 3 we display running status and simulation process of emergency vehicle describes the cases. Routes are available on the screen and on the basis of Traffic Signal are directed to be green. A green corridor is created for the emergency vehicles.

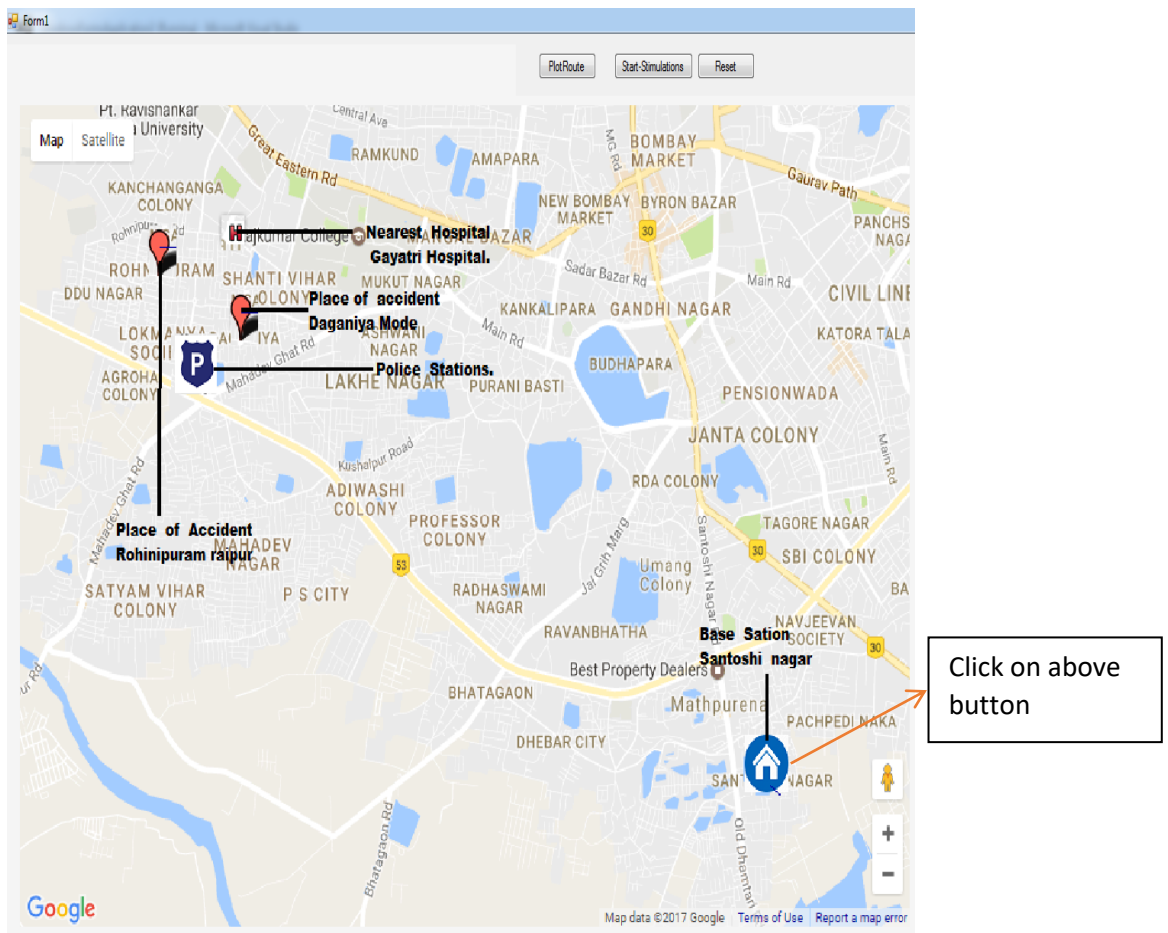


Fig: 1 Display plot route window

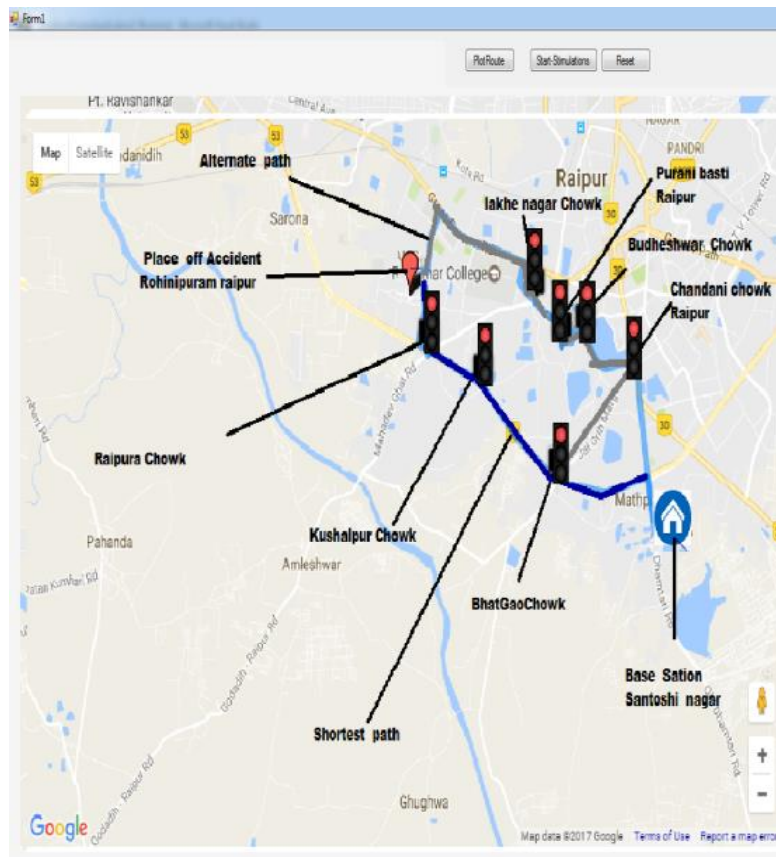


Fig: 2 Display shortest path and alternative path window

4. Click on Start simulation button which display running status of vehicle and start its running simulation as shown above.

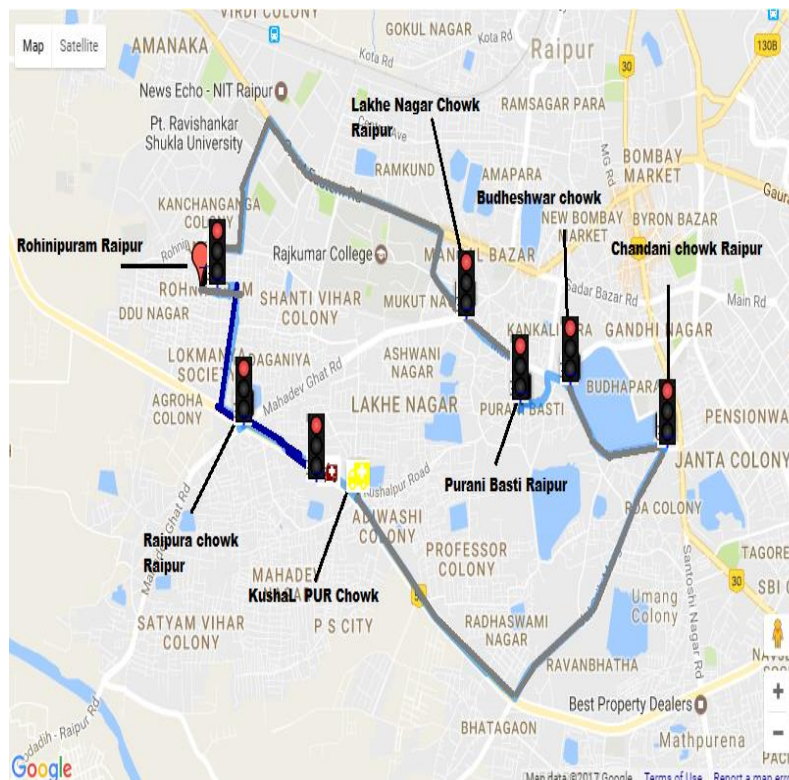


Fig:3 Display running status of emergency vehicle and running simulation process

8. CONCLUSION

In this research Dijkstra's shortest path algorithm is used to find out all shortest path, and as per requirement we check highest priority of emergency vehicle, automatic control traffic signal. In this technique we simulate our result with Google map result.

Explain the implementation process of automatic movement of emergency vehicle system (AMEVS) technique. Detail work explains of Geographical Information System, Global Positioning System, and Global system for Mobile Communication.

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