

AMBULANCE SYSTEM WITH SIGNALING AND HEALTH-CARE SYSTEM

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ABSTRACT

The proposed system presents the design of a surveillance system for emergency patient transport. India has the highest number of road accidents in the world, so this system will help you monitor the location of ambulances using Google Maps and GPS. To prevent this, it is possible to provide medical facilities to accident victims in a short time with the help of advanced wireless GPS technology. Continuous monitoring of ambulance location and patient condition during critical times of patient transport can help improve medical care. One of the problems in patient transport is transportation related issues. Therefore, high-speed, economical and efficient traffic control is required. You can view the location of the ambulance and the patient's heart rate and temperature status. After receiving the SMS, the hospital can prepare staff for the correct treatment of the next patient. The proposed system tracks the route of an incoming ambulance and turns all traffic lights in the same lane green after an ambulance is detected. The proposed system also preserves the patient's previous prescribing information and contributes to better treatment. Patient data can be obtained using biometric devices available in ambulances.

Keywords: Ambulance System, Health-care system, Internet of Things (IOT), Global Positioning System (GPS).

INTRODUCTION

The main concept behind the proposed system is to provide a smooth own for the ambulance to reach the hospitals in time and thereby minimizing the delay caused by traffic congestion. The ARDUINO system is used to alter the traffic lights upon their arrival at traffic light junctions which would save lives at the critical times[1]-[4]. To avoid unnecessary traffic signal changes. In the current situation itself, transportation of a patient to the hospital in emergency conditions seems quite simple but in actuality, it is very difficult during peak hours [6]-[8]. Moreover, the situation gets worse when emergency vehicles have to wait for other vehicles to give way at intersections with traffic signals. Studies show that if an ambulance can arrive at the hospital without traffic jams at this time, 95% of heart attacks can be treated. It may get worse in the future [9]. In this case, recovery measures should be taken immediately. So, in our overcrowded environment, this paper is really needed for society to facilitate daily transportation. This paper will help reduce the congestion of emergency vehicles on the road and enable immediate recovery. A mobile app for authenticating ambulance emergency and non-emergency conditions [10][11].

Uses GPS to track the pole of the traffic light closest to the ambulance and send the app's data to that particular traffic light pole [11]. The main goal is to exchange information between the patient and the hospital. This information includes the patient's medical data, current condition, and most importantly, the location of the ambulance. If the patient or his staff has an accurate idea of when the ambulance will arrive, they can take the right action based on the feedback they receive. If the hospital knows when the patient will arrive, it can be prepared efficiently [12]. The sensor can send the location of the ambulance to the hospital and a server accessible to the patient. This is a central part of the proposed ambulance tracking system "ATS", which provides real-time ambulance location information to hospitals and patients who request an ambulance. In addition, by sharing the patient's medical data with the hospital, appropriate measures can be taken in advance [13][14].

This system reduces frequent accidents at traffic lights when other vehicles have to be crowded to give way to emergency services. The proposed system will help you find important patient information easily. It provides information about the transport unit and patient health information to help doctors in further emergency treatment. Ambulance tracking systems can help save many lives. You can also use the GPS system to send your location to the server database. The server then sends location and status information to the doctor. Based on the same technology, surveillance units in various hospitals remain connected via GPS [15]-[17].

Review of Literature

Sr. No.	Title of the Paper	Year of Publication	Method Used	Advantages	Disadvantages	Research Gap

1	eEmergency System Support Emergency call Evaluation and Ambulance dispatch Procedures	2020	emergency medical system, ambulance management, emergency call handling, SSL communication, GPS	The main purpose of this study was to create an electronic system (eEmergency system) in order to support, improve and help the procedure of handling emergency calls.	Method is used only in Cyprus	Accessing medical data of patient is pending
2	Efficient Ambulance Service With Real Time Patient Monitoring System	2018	vital parameters, IOT, GPRS message, Intelligent traffic control system, Green Corridor.	Provide appropriate help to the patient in critical circumstances and to develop an efficient ambulance service. it reduces the time complexity and helps to provide faster medical services.	May or May not provides quality service to patient in ambulance.	Study on shortest path is pending
3	Requirement Analysis and Implementation of Smart Emergency Medical Services	2018	Internet of Things, emergency services, health information management, sensor systems, medical information systems, EMS, EMR	As an application of SEMS, an example service is introduced: lifelog connected EMS for stroke patients with a real-time location service for managing timeline of treatment.	Signalling system is missing	Signalling and route finding study is pending

4	IOT based Patient Health Monitoring System International Research Journal of Engineering and Technology	2017	Embedded Systems, AVR Microcontroller, Internet of Things, Patient Health Monitoring, Sensors	provides more medical instrument facility on single system on-chip	System size, cost and flexibility are more	Signalling and route finding study is pending
5	Prehospital Electronic Record with Use of Mobile Devices in the SAMU's Ambulances in Ribeiro Preto-Brazil	2016	Medical informatics, electronic health records, mobile technology, emergency medicine	Patients' health-related data is fetched effectively.	System is used in Brazil only.	A study on control signalling is pending

Research Methodology

The system consists of an end-to-end smart health application that can be building up from two functional building blocks. Main function of the first building block is to gather all sensory data that are related to the person's information by using the thumb impression, whereas the second block functions are to store, when the ambulance is going if in case the traffic is present than automatically signal goes blue so the ambulance can easily go to the hospital [1]-[4] . In the proposed system it saves the patient's time and in some accident person body not identified in this situation by using thumb impression we can find out person information. The function working is illustrated as, when the patient's heartbeat rate changes badly, the Arduino which recorded all the patient's information, GSM shield to send an SMS message containing this information, patient ID and the location of the patient which has been taken via GPS shield, to his doctor's mobile phone, who -by his turn send an ambulance to the patient's location [5][7][14][17] .

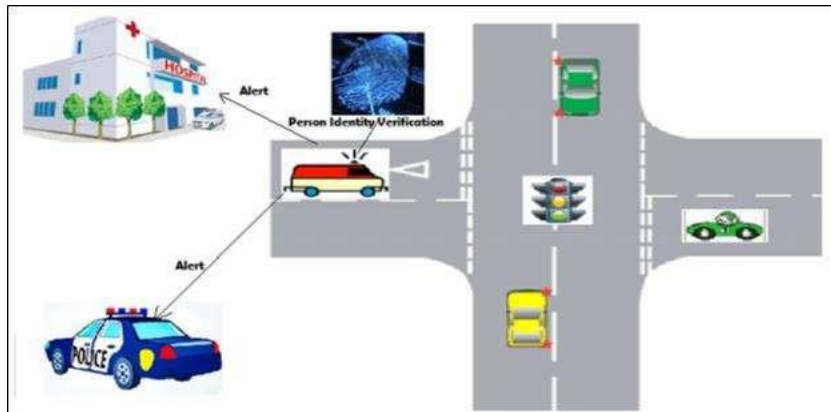


Fig. 1: Proposed System Architecture

In the registration first, all doctors, people, and patients register to the system. A fingerprint in its narrow sense is an impression left by the friction ridges of a human finger. In the system, we can use fingerprints for getting personal information like name, blood group, previous medical history, etc. By using thumb impression we can get patient's information easily [2][5]. The time between contacting the hospital and when the ambulance delivers the patient to the hospital is very crucial. In many cases, the doctors don't know what is wrong with the patient till he reaches the hospital or sometimes it happens that when the patient reaches the hospital it is found that some required medicine or tools are not present which are required for treatment. This is very much the scenario in developing countries [9]. This gap in information sharing can sometimes prove to be fatal. In such situations, it is better to utilize the time of transportation of a patient to gather information about him/her so that the hospital can prepare beforehand for any emergency. The doctors can know exactly what is wrong with the patient while he is being transported and procure any required tools or medicine during that time. Utilizing this gap in the exchange of information to do useful tasks can impact the lives of many, who might have suffered in case there was a delay in communication. In the proposed system we can easily monitor the patient [1].

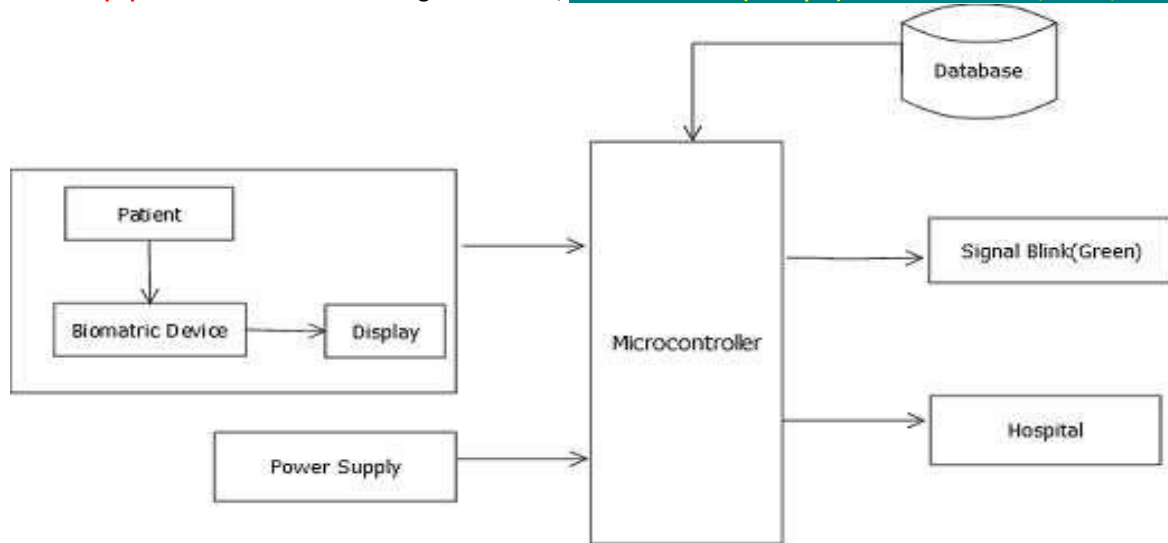


Fig. 2: Proposed System

Algorithms:

K-Means Algorithm for clustering:

Input : K- the number of clusters D: a data set containing n objects

Output: A set of k clusters

Steps 1: Randomly select k data objects from dataset D as initial cluster centers.

Steps 2: Repeat.

Steps 3: Calculate the distance between each data object d_i ($1 \leq i \leq n$) and all k cluster centers c_j ($1 \leq j \leq k$) and assign data object d_i to the nearest cluster.

Steps 4: For each cluster j ($1 \leq j \leq k$), recalculate the cluster center.

Steps 5: until no changing in the center of clusters.

The computational complexity of the algorithm is $O(nkt)$

n: the total number of objects k: the number of clusters

t: the number of iteration

Image Comparison Algorithm

Steps to find the similarity between two biometrics images Pseudo code:

Step1: for x = 0 to image.size

Step2: for y = 0 to image.size

Step3: diff += abs (image1.get(x, y).red - image2.get(x, y).red) **Step4:** diff += abs (image1.get(x, y).blue - image2.get(x, y).blue) **Step5:** diff += abs (image1.get(x, y).green - image2.get(x, y).green) **Step6:** End

Step7: end

Step8: return ((float)(diff)) / (x * y * 3)

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Results and Discussion: Experimental Setup:

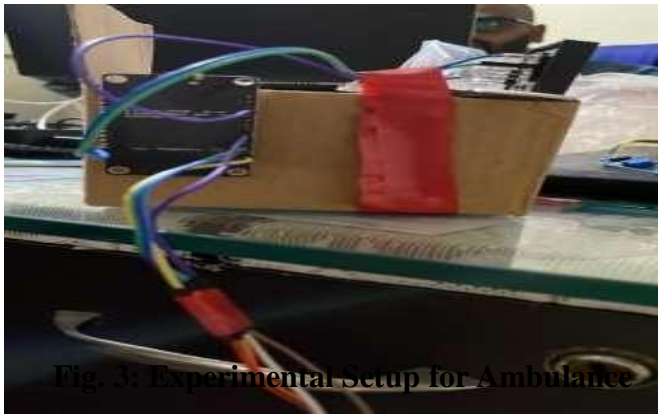


Fig. 3: Experimental Setup for Ambulance

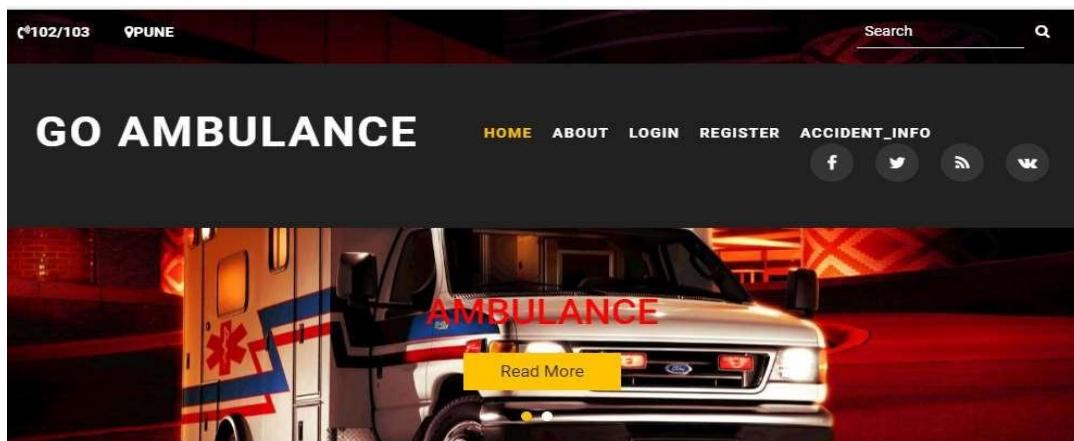


Fig. 4: Front Page for Ambulance Tracking System



Fig. 5: Registered Users

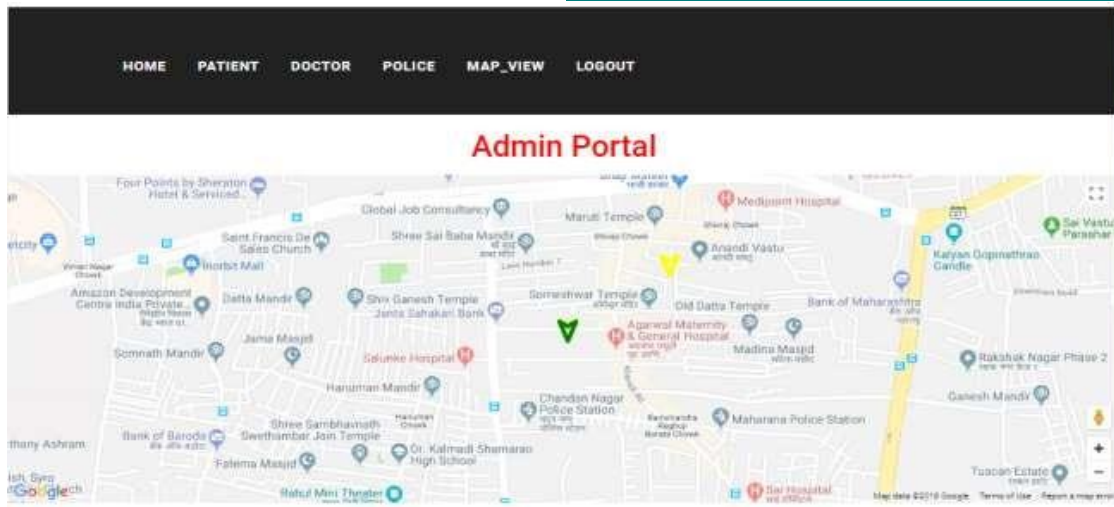


Fig. 6: Tracking Ambulance

In this system as soon as any emergency occurs due to accidents or any medical issue, the patient's health information is already stored in the system which can be accessed by a fingerprint scanner provided which will help us to get the complete medical history of a patient and doctor can take action accordingly.

The ambulance system will show the fastest route towards the hospital to reduce the time required to reach the hospital, during this the system will automatically inform the nearest hospital about the condition of the patient so the hospital can get ready according to the requirement. While traveling if the ambulance is going across traffic we have provided RFID readers near traffic signals which will change the lights and handle the traffic accordingly if the ambulance is detected and the ambulance will not have to wait till the traffic light changes.

Conclusion

This system reduces frequent accidents at traffic lights when other vehicles have to be crowded to give way to emergency services. The proposed system will help you find important patient information easily. It provides information about the transport unit and patient health information to help doctors in further emergency treatment. Ambulance tracking systems can help save many lives. You can also use the GPS system to send your location to the server database. The server then sends location and status information to the doctor. Based on the same technology, surveillance units in various hospitals remain connected via GPS.

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