International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 6.887
Volume 6 Issue IV, April 2018- Available at www.ijraset.com

Real Time Communication for Emergency Ambulance System: Application for Healthcare

Pratiksha Bhegade[1], Prajkta Dhore[2], Prachi Mane[3], Namdev Mansukh[4], Prof. Deepali Patil[5]
[1, 2, 3, 4, 5]*NMIET*

Abstract: ***The Internet of Things (IoT) has been generally used to interconnect the accessible restorative assets and offer savvy, dependable, and viable social insurance administration to the general population. Wellbeing observing for dynamic and helped living is one of the ideal models that can utilize the IoT points of interest to enhance the elderly way of life. We represent an architecture which is customized for healthcare applications. The system gathers and transfer the data it to the cloud where it is processed and analysed. Feedback actions based on the analysed data can be sent back to the user. A prototype of the proposed architecture has been built to demonstrate its performance advantages. This proposed system is able to send emergency information from an ambulance to nearby hospital after searching and checking availability. Most important feature of system is when an ambulance meets accidental person the system takes some of its initial details using thumb scan and starts searching nearest hospital as per patient situation and Send request to hospital about availability. If availability is there then send details.***
Keywords: Wireless Communication, Mobile applications, Hospital management system, Print Data Access, Blood Management, Nearest Search etc.

I. INTRODUCTION

Currently due to technology growth, human life getting to much fast and developed which get busy schedule in daily life. So, human doesn't take care about own health just focusing on work and having emergency work. So new type of health issue rapidly increases and also accident level increases so at the emergency level doesn't having real time communication, so within an ambulance facility and hospital doesn't providing immediate care to victims of accidents before trained medical workers arrive. As per the Victims Current situation, there is nothing facility available in ambulance which suggest the care taker nearest hospital searching and Doctor availability. doesn't having victim personal details which gives the victim blood group and Other things which give information to hospital management for blood if required. We proposed Effective real-time communication and location tracking system using android application. Which gives real time communication in between ambulance and Hospital.

A. Problem Statement

At the emergency level, with in ambulance facility doesn’t having immediate care given to victims of accidents before trained medical workers arrive. As per the Victims Current situation, there is nothing facility available in ambulance which suggest the care taker nearest hospital searching & Doctor availability. Doesn’t having victim personal details which gives the victim blood group & Other things which give information to hospital management. Ambulance Tracking System (ATS) is a specialized GPS tracking solution aimed at the efficient management of Ambulance fleet. This solution focus to make the ambulance available to a needy patient in the shortest possible time by redirecting the ambulance from a nearby location and in a shorter path, than the conventional way of sending the ambulance all the way from hospital to a critical spot.

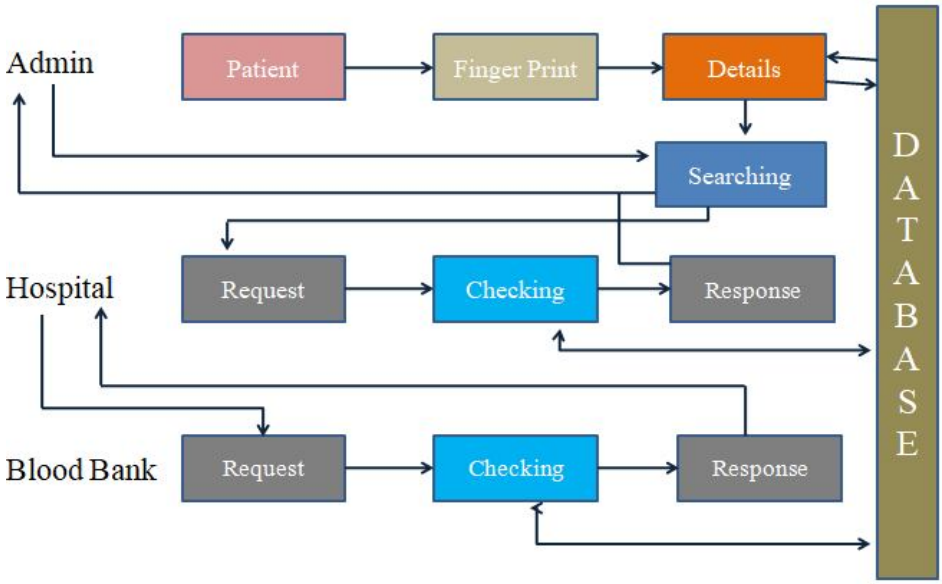
B. Project Idea

Ambulance tracking System comes with the following features: Live tracking and status information of all available ambulances in a map which helps for quick redirection of the ambulance to a critical spot Remote Medical Assistance from doctors / medical staff on emergencies via dedicated SOS button and two way voice communication Helps hospital authorities to predict the arrival time of emergency cases and to do prior preparations Provision for live data transfer between hospital and the medical monitoring equipment’s installed in the ambulance. Better management and accountability of ambulance operations In daily life, human doesn’t take care about own health just focusing on daily work. So don’t care about health or extend or ignore health issue so they affected or created new type of health issue rapidly increases. That time including real time communication there is no emergency level facility available, so with in an ambulance facility and hospital doesn’t providing immediate care to patients of accidents before trained medical workers arrive. As per the patient current situation, there is no any facility available in ambulance which suggests

the care taker nearest hospital searching and Doctor's availability. Using android application develop effective real-time communication and location finding system. This gives real time communication in between ambulance and hospital.

C. Architecture Diagram

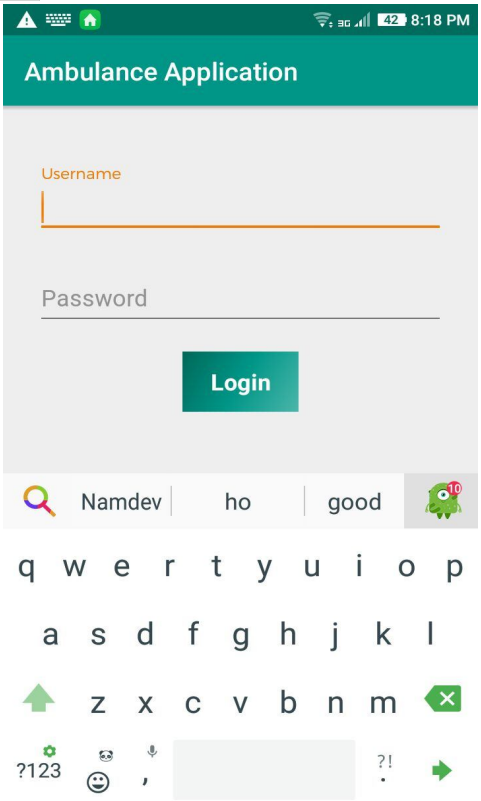
In our system there are three modules i.e. Admin, hospital and blood bank. In one scenario ambulance already present in the accident position. then admin first searches nearest hospital from accident possion he will concurrently gives the patients figure print and get its personal information from database. and sends that detail to selected hospital. It will also checks the doctors availability ,blood arrangement, vacancy for patient etc This system is works on real time communication. The hospital also track the exact position of an ambulance. for finding the nearest hospital we uses the knn algorithm it will find with the help of GPS technology.



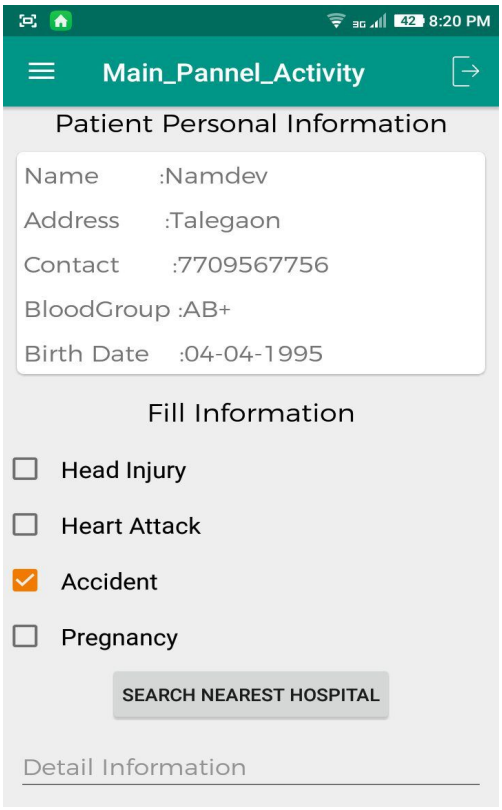
D. Modules

1) *Ambulance Admin:* When any accident happened on road and ambulance admin receive the request for help. Ambulance admin goes to the accident location and take figure print of accidental person. See the details of accidental person and check his condition. Search nearest hospital and send request and wait for hospital response.
2) *Module 2: Hospital Admin:* In this proposed system hospital admin play important role he sees patient condition details, his condition and also requirement of facility (Like medicine, doctors and instruments). If patient required blood then hospital admin send requests to blood bank admin.
3) *Module 3: Blood Bank Admin:* In this module blood bank admin receive request and check availability of particular blood group or blood downer and send response.
4) *Mathematical Module:* System Description: Mathematical Model for Proposed System

Let S be a system that describes patient details. S= {…..}
Identify input as I S= {I, ..} Let I={i} The input will be accidental person figure prints
Identify output as O, S = {I,O,…} O= The hospital admin will receive the patient all details which is given at the time of aadhar card registration and details which is added by admin.
Identify the processes as P S= {I, O, P, …..} P= {E, D} E= {parameter, Patient Information, Availability Of Nearest hospital} D={parameter, Availability Of Blood group }
Identify failure cases as F, S={I,O,P,F,….} F=If data is access by unauthorized user then failure occurs.
Identify success as s. S={I,O,P,F,s,…} s=When data is accessed by authorized user.
Identify the initial condition as Ic, S={I, O, P, F, s, Ic, …} Ic=GPS System tracking.



(Admin Login page)



(Patient Information)

E. Algorithms

1) *K-NN algorithm:* In pattern recognition, the k-nearest neighbours algorithm (k-NN) is a non-parametric method used for classification and regression. In both cases, the input consists of the k closest training examples in the feature space. The output depends on whether k-NN is used for classification or regression: In k-NN classification, the output is a class membership. An object is classified by a majority vote of its neighbours, with the object being assigned to the class most common among its k nearest neighbours (k is a positive integer, typically small). If k = 1, then the object is simply assigned to the class of that single nearest neighbour. In k-NN regression, the output is the property value for the object. This value is the average of the values of its k nearest neighbours. K-NN can be implemented using following formulae: Accuracy = (# of correctly classified examples / # of examples) X 100 ¨ Standard Euclidean Distance d(xi ,xJ) = √(For all attributes a ∑ (xi,a – xJ,a) 2) In this system KNN is used to allocate nearest mechanics to the customer request regarding customers current location

F. Haversine Formula

The haversine formula determines the great-circle distance between two points on a sphere given their longitudes and latitudes. Important in navigation, it is a special case of a more general formula in spherical trigonometry, the law of haversines, that relates the sides and angles of spherical triangles. These names follow from the fact that they are customarily written in terms of the haversine function, given by haversin(θ) = $\sin^2(\theta/2)$. The formulas could equally be written in terms of any multiple of the haversine, such as the older haversin function (twice the haversine). For any two points on a sphere, the haversine of the central angle between them is given by

$$\operatorname{hav}\left(\frac{d}{r}\right) = \operatorname{hav}(\varphi_2 - \varphi_1) + \cos(\varphi_1)\cos(\varphi_2)\operatorname{hav}(\lambda_2 - \lambda_1)$$

Where hav is the haversine function

$$\operatorname{hav}(\theta) = \sin^2\left(\frac{\theta}{2}\right) = \frac{1 - \cos(\theta)}{2}$$

d is the distance between the two points (along a great circle of the sphere; see spherical distance),

r is the radius of the sphere, φ_1, φ_2: latitude of point 1 and latitude of point 2, in radians λ_1, λ_2: longitude of point 1 and longitude of point 2, in radians

On the left side of the equals sign d/r is the central angle, assuming angles are measured in radians (note that φ and λ; can be converted from radians to degrees by multiplying by 180/as usual). Solve for d by applying the inverse haversine (if available) or by using the arcsine (inverse sine) function:

$$d = r\,\mathrm{hav}^{-1}(h) = 2r\arcsin\left(\sqrt{h}\right)$$

where h is hav(d/r), or more explicitly:

$$d = 2r\arcsin\left(\sqrt{\mathrm{hav}(\varphi_2 - \varphi_1) + \cos(\varphi_1)\cos(\varphi_2)\,\mathrm{hav}(\lambda_2 - \lambda_1)}\right)$$
$$= 2r\arcsin\left(\sqrt{\sin^2\left(\frac{\varphi_2 - \varphi_1}{2}\right) + \cos(\varphi_1)\cos(\varphi_2)\sin^2\left(\frac{\lambda_2 - \lambda_1}{2}\right)}\right)$$

II. CONCLUSION

This system able to send information from ambulance to nearby hospital after searching and checking availability. Most important feature of system is when an ambulance meets an accidental patient the system takes some of its initial details using thumb scan and starts searching nearest hospital as per patient situation and Send request to hospital. After that hospital admin check availability of doctors, medicine and other facility. If availability is there then send details them immediately to the hospital room. By using this system graph of saving life of accidental person increase.

REFERENCES

[1] Yin, Y., Deng, Y., Chen, X., Fan, Y.”The Internet of Things in Health care: an overview Publish Year”,2016.
[2] M.A run Era,R.Swinish,M.Santayana,K.R.Gathering Dee pa,M.Paperhanging" HEAL healthful monitoring in Emergency vehicles with their Authentication by RFID and Location tracking by GPS."20 15.
[3] Wang, X., Wang, J.T., Chang, X., Song, J,”A multiple communication standards compatible IT system for medical usage”,2013.
[4] Au, B., Au, L.D., CAI, H., Die, C., Cu, J., Bu, F.,Ubiquitous data accessing method in IT-based information system for emergency medical services, 2014
[5] Sheffield University, “Building the evidence base in pre hospital urgent and emergency care: a review of research evidence and priorities for future research,” Sheffield University 2010
[6] Sahai, G. Goulart, A. and Wei Zhan Arnold, R. “Optimal Selection of wireless channels for real-time communication in ambulances”. Proceedings of 2008 IEEE Radio and wireless Symposium, Orlando, Jan 2008.
[7] Pei-Chun Cheng, Jui-Ting Weng, Lung-Chih Tung, Kevin C. Lee, MarioGerla, Jerome Haerri, “GeoDTN+Nav: a hybrid geographic and DTN routing with navigation assistance in urban vehicular networks”,in:MobiQuitous/ISVCS 2008, Trinity College Dublin, Ireland, July 2008.