



Design of Emergency Medical Services

Shubham Kulkarni¹, Mr. S. K. Patil², Ms. Meghali Waghmode³, Hrishikesh Zanjad⁴, Omkar Kulkarni⁵

^{2,3}Assistant Professor, Dept. of E&TC Engg., SKNCOE, SPPU, Pune.

^{1,4,5}UG Student, Dept. of E&TC Engg., SKNCOE, SPPU, Pune.

¹shubhamskulkarni54@gmail.com

²skpatil_skncoe@sinhgad.edu

³meghali.waghmode_skncoe@sinhgad.edu

⁴hrishikeshzanjad98@gmail.com

⁵omkarkulkarni984@hotmail.com

Abstract— Nowadays in Emergency Medical Services (EMS), time is much more than a matter of money, it's a matter of life and death. An ambulance-to-hospital fog computing based system is the best example of how mobile technology can help save lives, by providing real time patient information to the hospital via wireless communications and also to improve the hospital OPD response time till patient arrives at the hospital. So for the sake of simplicity of safety, feasibility and reliability and latency response we put this idea into practice. This project mainly consists of three units which are Ambulance unit, fog computing system based unit and hospital unit. All the basic health parameters such as body temperature, heart rate are collected through the sensors in the ambulance unit and sent to the hospital unit via a fog computing node. There is another GPS sensor attached which keeps on sending the real time location of the ambulance hence the doctors can know the exact arrival time and plan things accordingly.

Keywords:wireless datatransfer,Fog Computing,Emergency Medical Service,Cloudserve.

1. INTRODUCTION

Tele monitoring is not a new term, in information technology (IT), which has been employed to,remotely monitor the health of patients that are located in common places, such hospitals or medical centers. For that, wearable medical sensors, such as electrocardiography sensors, blood pressure sensors, and glucometer, have commonly been used to make possible to acquire the real-time information from the remotely located patients; therefore, the medical information is further carried, via the Internet, to perform medical diagnosis and the corresponding treatments. The proposed work is also a piece of enhancement made to track and monitor the real-time medical information, bounded in authorized area, through the modeling of web application. The hardware will assemble in the ambulance that continuously monitors the patient's body-state and send the data in real time to the doctor's in the hospital.In the proposed system some sensors are used like Temperature Sensor, pulse sensor, GPS, LCD Display and LED.

2. LITERATURE SURVEY

A. This paper proposes an IOT-based live monitoring system for patients with the risk of Heart attack and uneven body temperature. If the condition is critical an alert notification will be sent to the hospital monitoring website. We also implemented a live trafficking system using Google map so that the ambulance will reach on time. To avoid accidents, integrated hardware is made so that the ambulance will reach the patient's location on Time.

B. The primary plan to develop this system is to provide appropriate help to the patient in critical circumstances and to develop an efficient ambulance service which reaches the hospitals without any problem in traffic. The live feed data sent through the Ambulance to the hospital helps to keep track of patient's health details. Sending a patient's health information to the hospitals helps the hospital staff to get necessary prerequisites regarding the patient's treatment.

C. Study introduces an efficient smart ambulance with patient health monitoring. With the help of this project a critically ill patient or an accident victim carried by an Ambulance gets immediate medical attention from the hospital. The doctors are well aware of the patient present condition from the ambulance. So, the hospital staffs can make necessary arrangements for treating him. We implement the patient health monitoring using IoT and the traffic control using wireless transmission technique.

D. This system has been built around the MySignals hardware platform, and it uses the IoT and prevalent cellular network infrastructure to facilitate the transfer and display of vital signs. The system can be enhanced with data mining algorithms to issue push notifications for patients whose conditions deteriorate on the way to the hospital. Another suggested feature is to transfer the data of a patient with encryption or without patient identification information to a central database on arrival to the hospital.

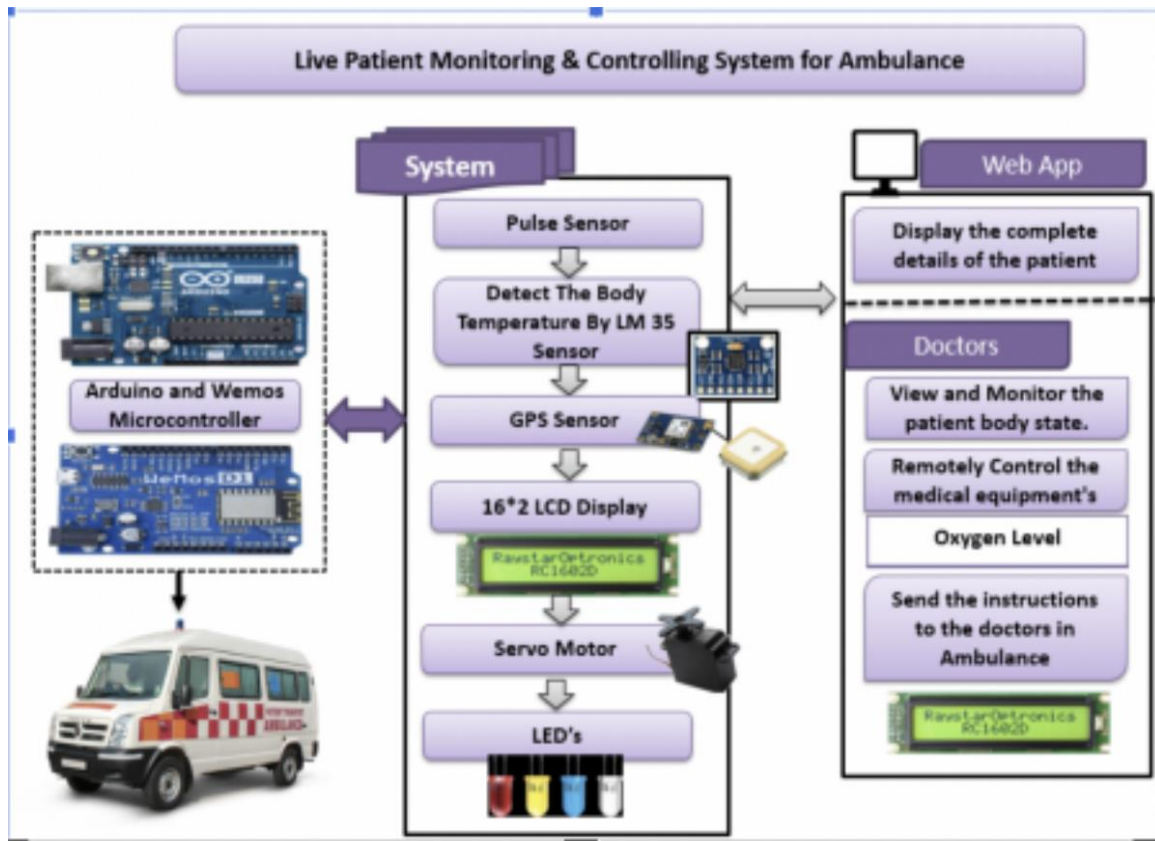
E. This paper reviewed remote patient monitoring systems in the current literature. Heart and blood related systems, fall detection systems, brain and nervous system related systems, diabetics and mental health research have been discussed. Most recent development in contactless camera-based methods has also been discussed here. Based on many categories the existing research has been presented.

Sr.no.	Paper Name	Author Name	Technology used	Result
1	An IOT-based live monitoring system for patients with the risk of Heart attack and uneven body temperature ^[1]	Himadri Nath Saha, Neha Firdaush Raun, Maitrayee Saha	Microcontroller consists of an inbuilt Wi-Fi module.	Easy to implement as interfacing is required is much less.
2	To develop this system is to provide appropriate help to the patient in critical circumstances and to develop an efficient ambulance service ^[2]	P.Ponsudha, Haritha.K, Gayathri.D, HarshithaShree.P, Swetha.C		Explains working of standard Wemos Different parameters and functions carried out Wemos
3	Study introduces an efficient smart ambulance with patient health monitoring ^[3]	Aryamol K S1, Febin Joe Kurian, Albin Shaji, Adarsh Venkatesh, Merlin Mary James		Data memory partitioning in order to use Bootloader
4	http://localhost:8080/AmbulanceMonitoring/pages/adminlogin.jsp			Interfacing of microcontroller with arduino -uno in order to perform communication operation
5	Reviewed remote patient monitoring systems ^[5]	Lakmini P. Malasinghe, Naeem Ramzan & Keshav Dahall		Implement an interface to upload and download patients data.

3. PROPOSED SYSTEM

A. BLOCK DIAGRAM

This project mainly consists of three units which are Ambulance unit, fog computing system based unit and hospital unit. All the basic health parameters such as body temperature, heart rate are collected through the sensors in the ambulance unit and sent to the hospital unit via a fog computing node. There is another GPS sensor attached which keeps on sending the real time location of the ambulance hence the doctors can know the exact arrival time and plan things accordingly.



B. WORKING

Hardware kit will be at a remote place (scenario: in ambulance) monitoring patient body state. Integrating a wearable sensor with web technology is to remotely monitor the patient in the ambulance. Here the doctor can view the patient's data, Monitor the data from the remote location. The doctor also can control the medical devices from the ambulance remotely like; oxygen level of the patient and so on. Doctors can send the instructions from the web page to the ambulance. On the other side, messages will be displayed on the LCD display on the kit. Here the doctor can also get the location of the ambulance. At the hospital side, emergency room physicians and doctors can receive and review the incoming data at a desktop PC from FOG or on a mobile device such as a tablet or Smartphone, and make preliminary assessments before the arrival of the patient. The emergency room physicians and doctors can also know the real time location of the patient so they can make all the arrangements for the patient before his/her arrival. EMS system is on-board an ambulance having lifesaving capabilities, the vital parameters can be measured and uploaded on FOG instantly via a wireless (Wi-Fi) communication network. Additionally, a gps system is installed so the exact time of arrival of the patient will be known. It's installed in an ambulance and can be sent to the hospital in real-time using wemos. The different parameter that has to be measured with the help of respective sensors is connected to the Arduino and wemos. Wemos has on-chip WIFI which will be used for wireless data sending to the Fog. So that continuous monitoring of the patient's health is recorded and in real time base it is sent to the Fog. Because of this doctor at remote location can monitor the current situation of the patient by accessing the data from Fog (i.e. Live streaming)

4. CONCLUSION

Fog computing has emerged a new computation paradigm in which the computational resources have been deployed along the edge of the network with the aim of reducing latency. In accordance with the resources restriction of fog computing , a limited number of clients are able to use the fog computing simultaneously, because of this advantage traffic on the network reduces which results in fast data transfer. In this project, by observing health parameters of patients through sensors, we aim to provide real time patient information to hospitals using FOG computing. Hence we aim to provide an improved emergency care in the prehospital arena.

REFERENCES

- [1] Himadri Nath Saha, Neha Firdaush Raun, Maitrayee Saha, "Monitoring patient's health with smart ambulance system using Internet of Things", 2017 Industrial Automation and Electromechanical Engineering Conference (IEMECON).
- [2] P.Ponsudha, Haritha.K, Gayathri.D, HarshithaShree.P , Swetha.C," Efficient Ambulance Service With Real Time Patient Monitoring System" 2019 International Journal of Applied Engineering Research .
- [3] Aryamol K S1, Febin Joe Kurian, Albin Shaji, Adarsh Venkatesh, Merlin Mary James," Smart Ambulance with Patient Health Monitoring ",2020 International Journal of Advances in Computer Science and Technology.
- [4] Syed Misbahuddin, Junaid Ahmed Zubairi, Abdul Rahman Alahdal and Muhammad Arshad Malik "IoT-Based Ambulatory Vital Signs Data Transfer System", Journal of Computer Networks and Communications.
- [5] Lakmini P. Malasinghe, Naem Ramzan & Keshav Dahal," Remote patient monitoring: a comprehensive study" 2017 Springer.

