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# **Smart Ambulance Rescue System with Patient Health Monitoring Using IoT**

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**ABSTRACT:** With the increasing traffic on the road, ambulance have a tough task in taking the patient to hospital on time this leads to patient loss due to the heavy blood loss declining heart beat rate etc, which leads to the cause of death also the fact is that Thousands of people are dying because ambulances take too long to response to a emergency situation. We address this issue by proposing a solution using the Internet of Things which is an evolving technology. Here, we are connecting the ambulance with the IOT which has biomedical sensors like heartbeat rate sensors, temperature sensors, ECG sensors that will sense and detect the injured person's health conditions and update these information to the nearby hospital server. And also there is a finger print scanner that takes the finger print of the injured person and sends to the hospital server and the server will search for the injured person's fingerprint in the cloud and fetch the personal details of the person then automatically registers the patient's admission form.

**KEYWORDS:** Arduino Microcontroller, IoT, ECG Sensor, Heartbeat Sensor, Temperature Sensor, Fingerprint Scanner, GSM, GPS.

## **I. INTRODUCTION**

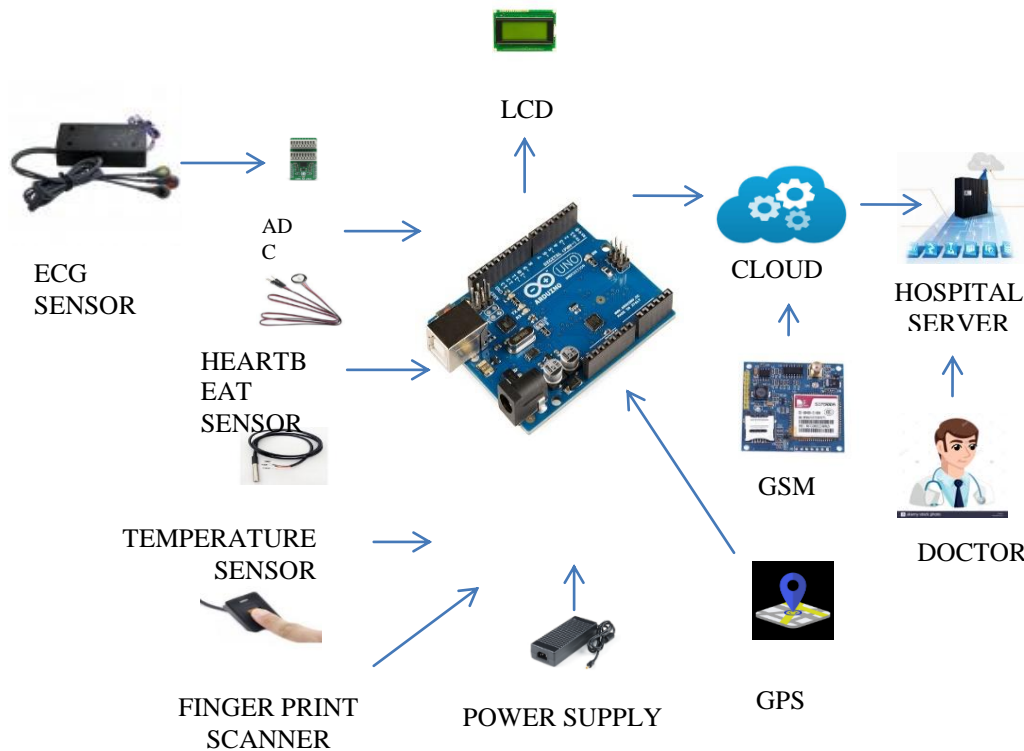
Now-a-days, road accidents are generally increasing due to high population and do not obeying the traffic rules in our country. It is reported that in India more than 150,000 people are died each year in road traffic accidents which is really distraught. So, due to these accidents people are dying but we need to consider other factors like delay in the response of the emergency vehicle like ambulance at the time of accident took place and also delay in the treatment provided to the victims of the accidents in the hospital since the hospital will start to prepare for treatment only after analysing the health condition of the victim. So, these factors also play a vital role in rescuing the life of the victim of the accident. Overall, time is wasted here which is a critical issue that leads to the patient loss. This paper addresses the problem of increasing the chances of saving the bleeding person by using an emerging technology Internet of Things which is connecting more devices exponentially to the internet. IOT affirms to make our global society more efficient and productive than we ever imagined possible. Hence, we are connecting ambulance with IOT by making it smart ambulance that can collect and transmit the bleeding person's health status to the nearby hospital through the internet. So, the doctors can know the physical conditions, whether the condition of the victim is really critical before the victim arrives to the hospital itself. If so, the arrangements for the treatment can be made sooner by the hospital and the health status can be send to the hospital by using the sensors that only detect the parameters like heartbeat rate, amount of blood loss, temperature etc.

## **III. LITERATURE SURVEY**

In the literature work, one has proposed an IoT based live monitoring system for patients with the risk of heart attack and uneven body temperature [1]. The patient purchases a device that continuously monitors vitals and then alerts the hospital if the patient's condition becomes critical. The hospital then dispatches an ambulance. In another paper Homan samani al [2], has proposed an AED (Automated External Defibrillator) which is an ambulance robot termed as ambubot. When a person suddenly gets cardiac attack the nearby ambubot arrives and check the pulse rate and if it perceive the pulse rate is less it suddenly gives a intimation to press a button and it provides a shock to the cardiac captured individual so the pulse would become better and rescue the person. In another system, Arif Shalik [3], has proposed GPS sensor are consequently sent to the cloud and from that point, an alarm message will be gotten by whoever is bought in to that vehicle. The flag will show the seriousness of the mishap and the GPS area. The rescue vehicle will utilize the GPS directions to get to the scene rapidly.

**III. PROPOSED SYSTEM**

In our paper the body condition of the injured individual is been fetched through a sensor and this device is to avoid the lateral arrangements in the hospital for the treatment until the arrival of the ambulance and informing the accidents to the doctor as well the injured patients family.



**Fig 3.1: SYSTEM ARCHITECTURE**

**IV. TRANSMITTING DATA**

Fig 4.2 depicts Arduino is a solitary board microcontroller which is use to make the application progressively available. The Arduino Uno board depends on the ATmega328. So as to begin, they are basically associated with a PC with a USB link or with an AC-to-DC connector or battery. The sheets are outfitted with sets of computerized and simple information/yield (I/O) sticks that might be interfaced to different development sheets or breadboards (shields) and different circuits. The sheets highlight sequential interchanges interfaces, including Universal Serial Bus (USB) on a few models, which are likewise utilized for stacking programs from PCs.

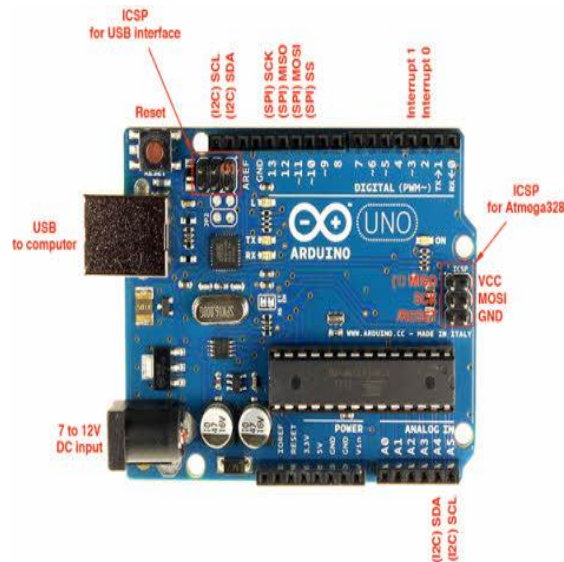
**Fig 4.2: Arduino UNO****V. SENSING THE HEALTH CONDITION****A) MEASURE BPM**

Fig 5.1 represents The Heart beat sensor is used to measure the heart beat in real time. The heart beat sensor is connected with microcontroller to measure the BPM (Beats per Minute rate).

**Fig 5.1: Heartbeat Sensor****B) ACCUMULATE ELECTRICAL ACTIVITY**

Fig 5.2 represents ECG Sensor is the one that collects the electrical signals generated by the heart.

**Fig 5.2: ECG Sensor**

**C) ESTIMATE TEMPERATURE**

Fig 5.3 represents Temperature sensor is used to quantify the temperature in blood vessels and to estimate the cardiac output.

**Fig 5.3: Temperature Sensor****D) READ THE FINGERPRINT**

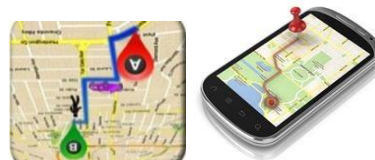
Fig 5.4 depicts the finger print scanner scans and fetches the finger print of a person which is generally used for security purpose. The finger print is used to gather the personal details of the victim.

**Fig 5.4: Fingerprint sensor****VI UPDATE THE SERVER**

The current health status like heart beat rate, temperature is sended to the web server of the nearby hospital. The admin of the hospital informs this information to the doctor.

**GPS**

Fig 6.1 depicts GPS (Global Positioning System) is used to track the live location of the smart ambulance by the hospital server in order to make the facilities for the treatment quicker.

**Fig 6.1: GPS****GPRS**

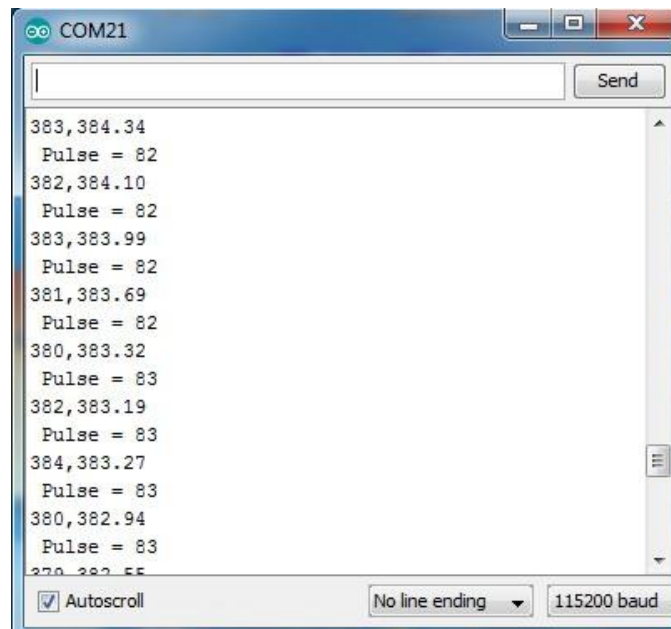
It is a parcel arranged remote information correspondence administration for portable interchanges on 2G and 3G cell correspondence frameworks. It is non-voice, rapid parcel exchanging innovation expected for GSM systems.

**Fig 6.2: GPRS**

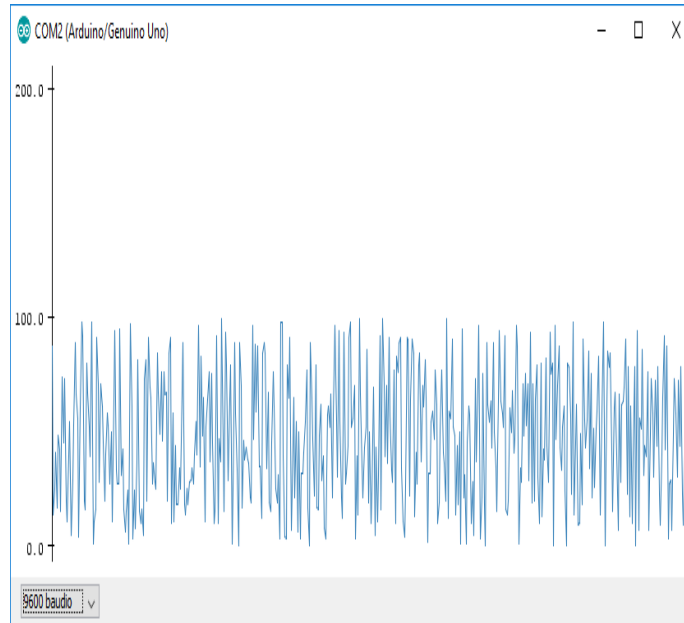
### VII. FETCHING THE VICTIM DETAIL

The finger print is obtained from the patient then, the admin of the server will check for the victim finger print from the centralized database that contains the general details of the patients e.g. Name, Mobile number, Blood group, Family details and the finger print matches with the injured patient's finger print. Once the finger print matches, the server automatically fetch the details of the injured patient and register the details in the Admission Form of the hospital, and then an insinuation about the occurrence of the accident of patient's family is sent through a message through GSM.

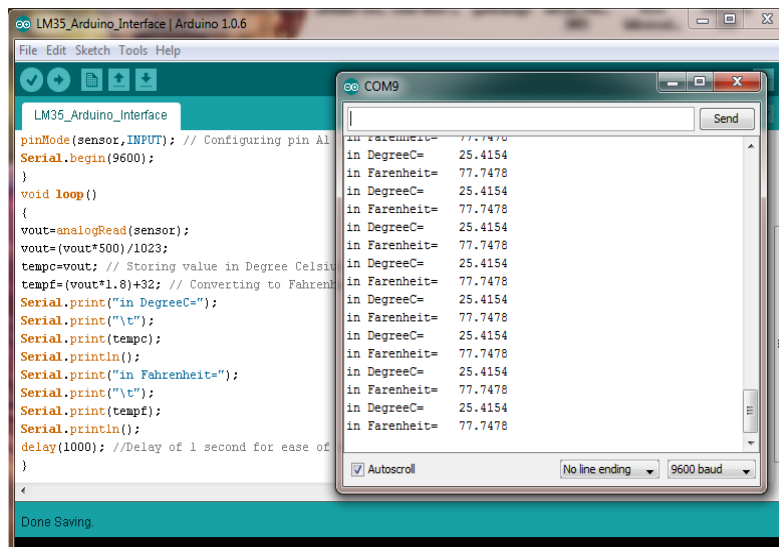
### VIII. RESULTS

**Fig 8.1 Result of Heart beat Sensor**

When the Heart beat sensor is connected to the person's finger, It will sense the rate of the heartbeat and display the Heart rate per 30 seconds and calculate it for one minute that gives the accurate heart beat per minute as shown in the figure (Fig8.1).

**Fig 8.2: ECG Sensor Results**

Once when the heart rate is calculated then ECG sensor will fetch the muscular functioning of heart, the three electro pads are connected to a patient's Right arm, Left arm and Right leg it will sense the person and display the results in a wave form as shown in the figure (Fig 8.2)

**Fig 8.3: Temperature Sensor Results**

To calculate the temperature of the body, the temperature sensor is fixed once the sensor is hold tightly by patient's hand for a minute it will sense the temperature and provide results as shown in the Figure (Fig 8.3)



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## VIII. CONCLUSION AND FUTURE WORK

IoT is a rapidly growing area of technology, and it has been successfully deployed in an ambulance. Generally, accidents occur in so many places; due to the delay in the response of the ambulance and delay in the treatment the chances of survival may lead to danger. This proposed device is developed to avoid lateral arrangements in the hospital. By fetching the body condition of the victim through the sensor and GPS location were automatically sent to the cloud and the admin server. By the biometric system the details are collected from the centralized database. The occurrence of the accident notification is sent to the doctor for the arrangements as well the victim's family. Our future effort is to fetch aadhar card details by using the fingerprint sensor of the victim in real time using the fingerprint of the injured person so that directly without the prior knowledge of the patient we can fetch the details of the injured patient and send the notification to their family.

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