

Better and Faster Emergency Care During Accidents and Vehicle Impact

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Abstract- In India, road accidents contribute to a significant amount of deaths throughout the year. Around 1.5 lakh people have lost their lives due to road accidents in India in 2019. Most of the death are because these patients haven't received proper and immediate treatment after the accident has occurred.

So, introducing you to our idea-Smart Ambulance. When an accident will take place, an alert signal will be sent from the mobile of the driver to our system that will send an ambulance to the site of casualty. This system will be designed in such a way that will efficiently and seamlessly connect all three stakeholders that are involved during an accident which are the Driver, the Ambulance and the Hospital. This system will save lot of time as nobody has to call an ambulance when the accident would occur. Our system will do it on its own and save lot of time and indeed lot of lives.

Keywords: - Road Accidents, Proper and Immediate treatment, Smart Ambulance, save lot of time, Save lives.

1. INTRODUCTION

Science is working day in and out to find technologies and also in the field of pharmaceutical products to save lives of people. But one must also keep a track on the amount of lives lost on a daily basis on the connectors between the distend places that are the roads and highways.

About 1.5 lakh peoples have lost their due to any kind of road accident. Research found that a considerable amount of lives could have been saved if they have received the right kind of treatment.

The quick treatment includes the speedy arrival of the ambulance at the sight of accident and the right kind of treatment available in the hospital.

After extensive study on this issue, we have come up with a solution that has the potential to solve this problem at a considerable extent that can eventual save lots of lives.

Our solution consists of an application that will detect the accident and will automatically send the coordinates of the accident sight to the ambulance.

This complete operation will be atomized in just a way that the driver only has to do the initial set up that is the sign-up process of the app and the system is ready to perform all the later task that will have a lot of time and eventually have lot of lives.

1.1. Literature Survey

[1] An Arduino based automated vehicle accident detection and messaging system

Due to our growing population, one of our basic amenities which is the transportation is not able to fulfill the demands of the growing masses. This is one the common issues which people try to solve while vehicle purchasing. The increasing amount vehicle create mismanagement in controlling traffic leading vehicle accident. Although accident happen due to various factors other than traffic management such as unstable whether condition, reckless driving, faulty vehicles or maybe road condition. But most important part after accident is to detect the accident and take immediate action upon detection. We build

This system to solve these issues by detecting and confirming the accident using the MPU650 module, and notifying the proper authorities by sending the location of the incident using SIM808 module.

[2] An Automatic Car Accident Detection Method Based on Cooperative Vehicle Infrastructure system.

Car accidents are the leading cause of deaths in India solely because of lack of proper and immediate treatment. In this paper the author has proposed an automatic car accident detection method based on machine vision and Cooperative Vehicle Infrastructure Systems (CVIS). To start with, a novel image dataset CAD-CVIS is set up to enhance accuracy of accident detection based on smart and intelligent roadside devices in CVIS. To be precise,

CAD-CVIS consists of various kinds of accident types and weather conditions along with accident location, which can enhance self-adaptability of accident detection methods during different traffic situations.

Further in the paper the author has proposed to develop a deep neural network model YOLO-CA based on CAD-CVIS and deep learning to detect accident. In the model the author has propose to utilize Multi-Scale Feature Fusion (MSFF) along with loss function with dynamic weight to improve performance of detecting small object in the surrounding. In the end, the experiment study examines performance of YOLO-CA for detecting car accident and the result show of the experiment shows that the proposed model can detect car accident with 90.92% average precision within a span of 0.0461 second.

[3] Intelligent System for Vehicular accident detection and notification

Road accident are nothing but a human caused disaster. They lead to extreme human suffering, monetary costs in term of sudden deaths, lifelong injuries and loss of saving. There are many techniques like Antilocking Breaking System (ABS), Adaptive Cruise Control (ACC) and Anti-Collision System (ACS) to prevent accident and in spite of all this, we still hear about horrific accident stories on a daily basis. Due to these reasons the author of this paper has proposed to detect accident using flex sensor and accelerometer. Along with this, location of accident site will be notified to desired authorities such as nearest hospital, police station and owner of vehicle as well as the family members of that person. The proposed system consists a camera located inside the car that will transmit real time video information to detect current situation of post-accident system for detecting as well as informing about it to the concerned authorities.

2. METHODOLOGY

Our aim is to create a system software that reduces that amount of time wasted during an accidents sight that is the major cause that leads of deaths.

Our system will have the potential to connect the car of the driver with the cloud serves that will help to connect the car with the ambulances and hospitals.

Our aim is to use as much less components to integrate our product into the car and the mobile phone with an intention to save lives of people who might have lost their lives because of the small lack of concentration error of the driver.

Our idea comprises of developing an application that will effectively connect all the stakeholders that are involved during an accident the driver, the hospital and the ambulance.

The application will comprise of three operating modes namely the Driver, Ambulance and Hospital.

All those who have subscribed to this system will have to register in the application and then the following task will take place.

3. DATA FLOW

- When the accident occurs, the ABS preinstalled into the car will trigger a signal to the hardware module pre-installed in the car
- When the hardware module detects this signal, it fetches its location using the GPS module and send these fetched co-ordinates to the server system.
- The server software is a program which processes this information sent from the accident site and then finds and allocates the nearby hospital.
- After selecting the hospital, it then selects the available ambulance of the hospital and then sends this ambulance to the accident site.
- The allotted ambulance will reach the accident site with the exact co-ordinates send by the hardware and then admits the patient in the ambulance.
- After admitting the patient in the ambulance, the attendant present will take the complete information of the condition of the patient and upload it to the database.
- Once the information of the patient is uploaded the hospital will make the necessary arrangements to attend the patient.

4. HARDWARE COMPONENTS



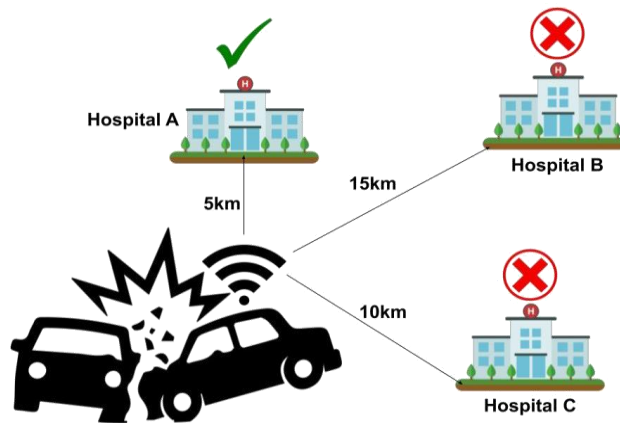
4.1 Node MCU:

Node MCU is a low-cost open source IoT platform. We use this component as it is low in cost and also has a Wi-Fi module preinstalled in it. The GPS module can also be integrated with this module to fetch the current location of the car.

4.2 GPS Module

The Global Positioning System (GPS) is a satellite-based navigation system that provides location and time information. The module outputs GPS data in NMEA0183 format.

We are using the GPS module to fetch the co-ordinates of the accident site and send this information to the server side.



Hospital Selection based on Shortest distance Algorithm

5. AUTOMATED HOSPITAL ALLOCATION SYSTEM:

- When an accident occurs the current location of the car is fetched. This is sent to the servers and then the shortest distance algorithm will start functioning.
- To calculate short distance between the accident location and hospital, we have used an algorithm to Calculate the short distance.
- In this first the accident location is fetched and store into database in the form of geolocation. In our application the details of all hospital are stored.
- First, we convert the geolocation of accident location and all hospital into kilometres and then stored in temporary database then we fetch minimum distance of accident location and that hospital and we notify through email.

6. INTERCONNECTIVITY BETWEEN STAKEHOLDERS:

- After the initial pre requisite set up of all stakeholders, our system is ready to function. All this includes the login and registrations of all the stakeholders into our system.
- Once the triggering signal is initiated from a particular car the location is fetches and send to the server. The server applies its algorism to allocate the hospital. The hospital will get a email and also its reflects the same on the personal login of the hospital on our website.
- The hospital allocated the ambulance and the ambulance is going to send the current status of the patient vie sending the pictures of the patient. A connectivity between the hospital and the ambulance is also established in which while filling the patient details in the ambulance the hospital to which it has to respond to already pre-defined.
- This same will be reflected on the website of the ambulance in a tabular form. After research and testing we are able to attain 100% accuracy in achieving the same.

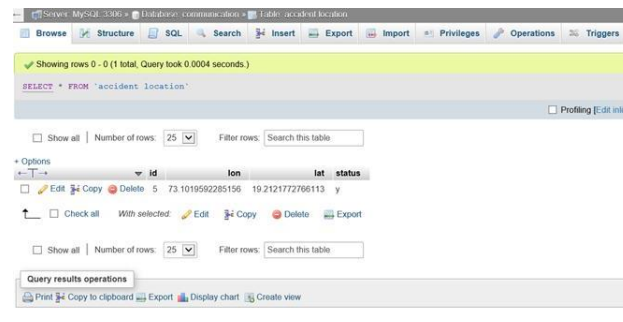
The results that we have come up with clearly show the smooth functioning of the proposed system with accuracy of unity.

7. RESULTS:




RESULT [1]

Initially the server database would be empty before receiving triggering signal along with the co-ordinates of the accident site.



RESULT [2]

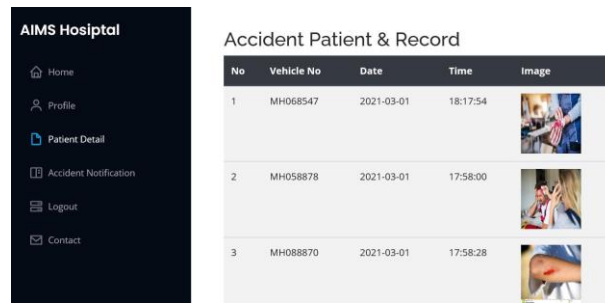
When the hardware would trigger, it fetches the accident location co-ordinates and send it to the server database which is evident from this result.



The screenshot shows a web form titled "Update Accident Record". It contains the following fields: "Enter Vehicle No:" (text input), "Hospital Id:" (text input with value "1"), "Upload Accident Image:" (file upload field with "Browse..." button), and "Upload Patient Image:" (file upload field with "Browse..." button). A blue "Submit" button is at the bottom.

RESULT [3]

Ambulance side interface: Hospital allocation successive by using unique hospital id.



RESULT [4]

Patient current status visible on hospital website which was uploaded by the ambulance.

8. CONCLUSION:

As per the research, smart ambulance system can be developed using the concepts of ML, Cloud Computing, IoT and Wireless Networking

The pre requisite required of the commencement of the system is nominal and can be easily done by all the stakeholders.

RESULT [1] shows the server side is ready to accept requests coming from any of the accident vehicles.

The functioning will begin when an unfortunate accident occurs. The hardware will send the triggering signal along with the co-ordinates of the accident site.

RESULT [2] shows successful reception of the triggering signal, that means the server will receive the co-ordinates on which it has to act upon.

The server will perform its allocated task of allocating the nearby hospital and then the available ambulance of the same hospital.

RESULT [3] shows that the connectivity between the allocated ambulance and allocated hospital is established by the system that will help a smooth connectivity between the hospital and the ambulance.

Thus, due to the great connectivity between all the components of the system, the ambulance will reach the sight of accident more quickly than usual that will allow initial treatment to the patients in the hospital.

Later when the patients are admitted in the ambulance the person in charge will send the current condition on the patient to the database of the hospital.

RESULT [4] show that all the details sent by the ambulance to its allocated hospital is successively visible on the hospital website.

This will help the doctors to arrange all the requirements for the treatment and also allocate operation theatres.

The smooth functioning of this system will ensure no time is wasted and the patient receives all kind of treatment that he/she requires that is live saving at that point of time.

REFERENCES

[1] Nazir Ahmmmed, Nusrat Jahan Jenny “VADet: An Arduino based automated vehicle” 2019 (ICASERT 2019)

- [2] DAXIN TIAN, (Senior Member, IEEE), CHUANG ZHANG, XUTING DUAN, AND XIXIAN WANG “An Automatic Car Accident Detection Method Based on Cooperative Vehicle Infrastructure Systems” publication September 11, 2019
- [3] Srikanth.S, Dhivya.S , Anisha.R “An IOT Approach to Vehicle Accident Detection using Cloud Computing” 2019 5th International Conference on Advanced Computing & Communication Systems (ICACCS)
- [4] Bankar Sanket Anil, Kale Aniket Vilas, Prof. S. R. Jagtap “Intelligent System for Vehicular Accident Detection and Notification” International Conference on Communication and Signal Processing, April 3-5, 2014, India
- [5] Aguinaldo Bezerra, Gisliany Alves, Ivanovitch Silva "A Preliminary Exploration of Uber Data as an Indicator of Urban Liveability.