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Automatic Accident Detection And Ambulance Rescue System – Smart Bios Services Using Arduino

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Abstract: The rapid growth of technology and infrastructure has made our lives easier. The advent of technology has also increased the traffic hazards and the road accidents take place frequently which causes huge loss of life and property because of the poor emergency facilities. Our project will provide an optimum solution to this draw back. According to this project when a vehicle meets with an accident immediately Vibration sensor will detect the signal and sends it to Microcontroller. Microcontroller find the location coordinates of accident spot using GPS and sends the alert message including geographic allocation coordinates through the GSM Module to ambulance unit. So the rescue team in the ambulance can immediately trace the location by putting geographical location coordinates in Google earth application or any other Geographic location finder application. After conforming the location of accident spot the ambulance unit will starts its rescue operation. This system also controls the traffic signals in the path of ambulance and helps ambulance to reach hospital in minimum time.

Index Terms **– Arduino Uno, Servo motor, G-Code Software, Control Unit**

I. INTRODUCTION

The population of the world has been increasing, with China and India being the two most densely populated countries. Road traffic has also been getting more and more congested, as a higher population and increased business activities result in greater demand for cars and vehicles for transportation. This increased vehicle density leads to many road accidents. In road accident due to lack of emergency services people lose their lives. The main aim of this project is a scheme to detect accident, location and provide a smooth flow for ambulance to reach hospital in time in emergency. In proposed system the unit installed in vehicle automatically informs accident to the prep programmed numbers of rescue team of ambulance. In this system vibration sensor and GPS tracking system are used. When accident occurs, this system sends short message to rescue team in the ambulance via GSM modem. From these location coordinates accident can be determined. So the rescue team in the ambulance can immediately trace the location by putting geographical location coordinates in Google earth application or any other GPS viewer application. After conforming the location of accident spot the ambulance unit will starts its rescue operation. If there is no serious threat to anyone`s life, then the alert message can be terminated by the driver by a switch provided in order to avoid wasting the valuable time of the medical rescue team. At present criteria, we cannot detect where the accident has occurred and hence no information related to it, leading to the death of an individual.

II. EXISTING SYSTEM

There is a loss of life due to the delay in the arrival of an ambulance to the hospital in the golden hour. The ambulance in the traffic signals. It would be of nice use to the ambulance if the traffic signals within the path of the hospital are ON. Post Accident Detection Systems Lack of Intelligence within the detection systems. Fails to trace the collision and pre-damage status. method of observation folks to be manual time delay (first aid).

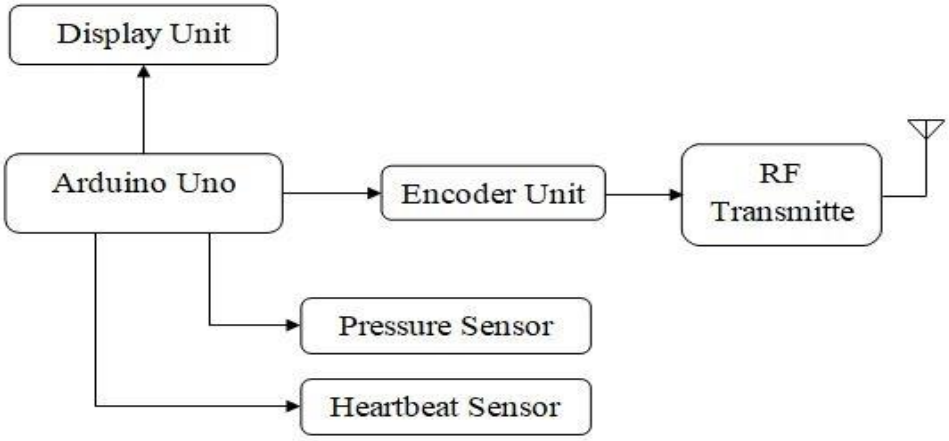
III. PROPOSED SYSTEM

To overcome the drawback of existing system we will implement the new system in which there is an automatic detection of accident. A sensor, GPS, GSM unit fitted in the vehicle detects the accident and sends the accident location to a main server unit which houses the database of all the nearby hospitals. An ambulance is rushed to the accident spot and simultaneously monitors the vital parameters like temperature and pulse rate and conveys them to the concerned hospital. Also there is control of traffic

light signals in the path of the ambulance via RF communication to provide a clear path for the ambulance. This will minimize the time required by the ambulance to reach the hospital.

IV. METHODOLOGY

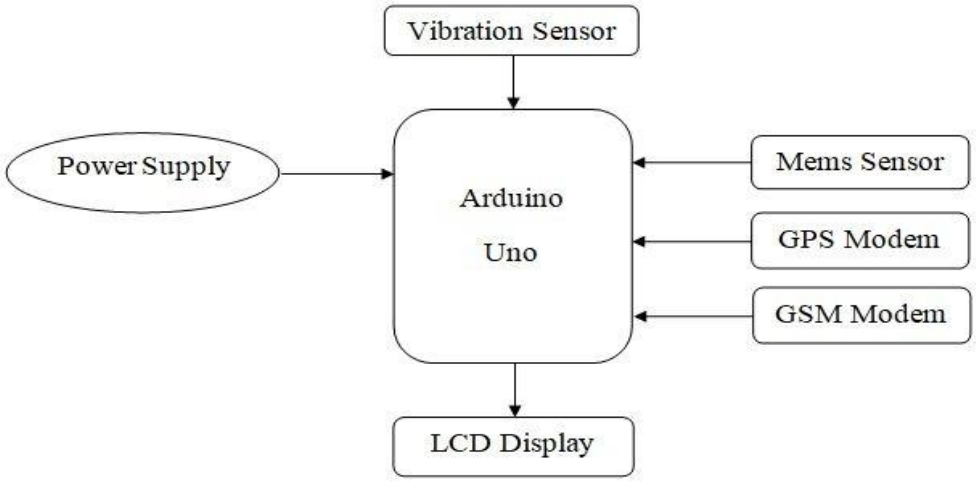
4.1 Ambulance Section



Block Diagram Of Ambulance Section

Control unit sends the ambulance to the accident location. Ambulance collects the victim from the accident location. While in the ambulance the vital parameters of the patient temperature and pulse rate are continuously monitored and conveyed to the concerned hospital. We are using LM35 temperature sensor whose output voltage is linearly proportional to the Celsius (centigrade). For measuring pulse rate we are using IR based obstacle sensor. Normally there is delay in ambulance reaching the hospital due to traffic congestion. To overcome this delay, the traffic signals in the path of ambulance are controlled via RF communication. The ambulance section consists of an RF transmitter and the traffic unit will consist of the RF receiver. The RF transmitter on the ambulance will communicate with the RF receiver of the signal section and make the signal green whenever it is within a 100m radius. As a result of which the ambulance will have a clear path all along its way to the hospital without any traffic congestion**.**

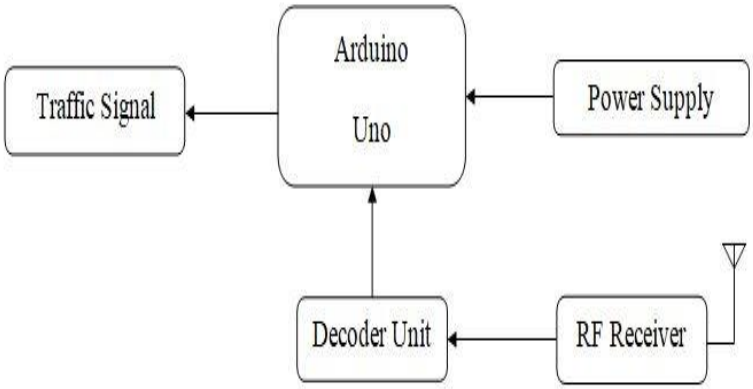
4.2 Vehicle Section



Block Diagram Of Vehicle Section

For implementation of this project, vehicle unit should be installed in every vehicle .It consists of microcontroller along with the accelerometer, GPS and GSM module and sensors to sense the accident. On impact on the vehicle, information about accident is send to the main server. This information consists of the location of accident detected by GPS module installed in vehicle. The GPS system finds out current position of vehicle (latitude and longitude) which is the location of accident spot and gives that data to GSM module. This information to the main server is conveyed by GSM module.

4.3 Signal Section



Block diagram- Signal section

Whenever the ambulance reaches to the traffic signal (approximately 10m) the traffic signal will be made to green through RF communication. Thus the ambulance will have clear path to reach the hospital without any traffic congestion along the way. This system is fully automated, thus it finds the accident spot, controls the traffic lights, helping the victim to reach the hospital in time.

V. ARDUINO UNO

Arduino is a prototype platform (open-source) based on an easy-to-use hardware and software. It consists of a circuit board, which can be programed (referred to as a microcontroller) and a ready-made software called Arduino IDE (Integrated Development Environment), which is used to write and upload the computer code to the physical board.

Arduino provides a standard form factor that breaks the functions of the micro-controller into a more accessible package.

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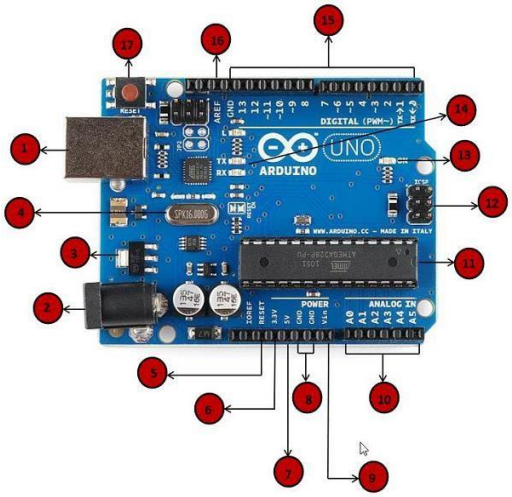

Arduino Uno

VI. SERVO MOTOR

A servomotor is a linear actuator that allows for precise control of angular or linear position, velocity and acceleration. It consists of a suitable motor coupled to a sensor for position feedback. It also requires a relatively sophisticated controller, often a dedicated module designed specifically for use with servomotors. Servomotors are not a specific class of motor although the term servomotor is often used to refer to a motor suitable for use in a control system. A servomotor is a closed-loop servomechanism that uses position feedback to control its motion and final position. The input to its control is a signal (either analogue or digital) representing the position commanded for the output shaft.

The motor is paired with some type of encoder to provide position and speed feedback. In the simplest case, only the position is measured. The measured position of the output is compared to the command position, the external input to the controller. If

the output position differs from that required, an error signal is generated which then causes the motor to rotate in either direction, as needed to bring the output shaft to the appropriate position. As the positions approach, the error signal reduces to zero and the motor stops.

VI. G-CODE SOFTWARE

G-Code is the language used to control CNC machines. It's one type of CNC programming that CNC programmers use, the other type being CAM programming. CAM programs will generate g-code from a CAD drawing, but the end result is still g-code.

Your machine's CNC controller probably executes g- code, although there are other possibilities– Heidenhain, Mazak, Shopbot, and others have proprietary formats. Some machines with proprietary formats can also run g-code. It is the Lingua Franca (working language) of CNC.

CNC Machines are programmed using one of three methods:

- CAM Software
- Conversational Programming
- G-Code Programming

Often, it's advantageous to use multiple methods together. For example, you might create an initial CNC program using CAM Software and then edit the g-code from the CAM Software using G-Code Programming to make the program manufacture a part faster.

VII. CONCLUSION

In this paper, a novel idea is proposed for controlling the traffic signals in favor of ambulances during the accidents. With this system the ambulance can be maneuvered from the ITLS can be proved to be effectual to control not only ambulance but also authoritative vehicles. Thus ITLS if implemented in countries with large population like INDIA can produce better results. The ITLS is more accurate with no loss of time. But there may be a delay caused because of GSM messages since it is a queue based technique which can be reduced by giving more priority to the messages communicated through the controller.

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