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# Intelligent Emergency Response Next-Gen Ambulance Decision System

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**ABSTRACT:** Ambulance service which is one of the crucial services, it's get delayed very often. Because of this delay in ambulance service, patient may lose his life and number of these scenarios are increasing day by day. The main reason behind is increasing population which leads to increased number of vehicles, due to which emergency service like Ambulance get affected. Controlling the traffic becomes major issue when it comes to large intima delays between traffic lights/signals. Due to this, ambulance service which is one of the crucial services, it's get delayed very often. Because of this delay in ambulance service, patient may lose his life and number of these scenarios are increasing day by day. This paper proposes a solution to make such services easily available to those in need. The system provides a solution to the number of problems occurring in this world. The system provides a suggestion of the nearby hospital and also shares the patient information currently present in the ambulance. We developed this system which monitors the respiration level, Temperature and Pulse sensor. These values will be updated to hospital through SMS via GSM.

## I. INTRODUCTION

In today's fast-paced world, the efficiency of emergency services, particularly ambulance systems, is critical in saving lives. However, the increasing population and congestion on roads pose significant challenges, often resulting in delays in ambulance response times. These delays can have dire consequences, potentially leading to loss of lives due to delayed medical attention. Recognizing the urgency of addressing these challenges, this paper proposes a Smart Artificial Intelligence Ambulance with a Decision-Making System, aimed at revolutionizing ambulance services. By integrating advanced technologies and innovative solutions, this system aims to mitigate the delays in ambulance services and provide timely medical assistance to those in need. The proposed system utilizes a combination of real-time patient health monitoring and traffic analysis approaches to optimize ambulance response times. By incorporating sensors to monitor vital signs such as respiration level, temperature, and pulse, the system ensures continuous monitoring of the patient's medical condition during transit. Moreover, the system employs artificial intelligence algorithms to analyze traffic patterns and optimize route selection, ensuring that ambulances reach their destination swiftly and efficiently. Through the integration of GPS technology and traffic data, the system identifies the shortest and fastest routes, minimizing delays caused by congestion and traffic signals. Additionally, the system features a decision-making module that provides recommendations for the nearest hospitals based on the patient's location and medical condition. By leveraging real-time data and intelligent algorithms, the system facilitates seamless coordination between ambulances and healthcare facilities, ensuring that patients receive timely and appropriate medical care.

## II. LITERATURE SURVEY

**TITLE:** Improving the Performance of Ambulance Emergency Service Using Smart Health Systems.

**YEAR :**2021

**DESCRIPTION:**

In this paper, we use the smart health to improve the performance of ambulance service. In particular, we use the real-time traffic information and hospital waiting time to minimize the ambulance response time, ambulance travel time to hospitals, and waiting time at hospitals.

**TITLE:** Novel approach of Internet of Things (IoT) Based Smart Ambulance System for Patient's Health Monitoring.

**YEAR :**2021

**DESCRIPTION:**

Advancement in the IoT (Internet of Things) technology motivates to present the proposed work. Here using sensors and microcontrollers, a smart health monitoring system is proposed which can alert the hospitals in case of emergency

and further schedules ambulance facilities. This allows for proactive measures like rerouting traffic or deploying emergency responders beforehand.

**TITLE:** Ambulance Vehicles, Application Server, Convolutional Layers, Convolutional Neural Network, Difference of Gaussian, Emergency Vehicles, Face Dataset, Face.

**YEAR :**2021

**DESCRIPTION:**These features depend on the time, the position of the accident, ambulance and hospital, number of streets and injured person, type of accident, and age of the patient. With these features, the Ambulance can be decided to select the minimum route to find the nearest hospital.

**TITLE:** An Integrated Platform for Ambulance Routing and Patient Monitoring

**YEAR :**2019.

**DESCRIPTION:** This paper presents an integrated platform for smart ambulance routing and patient status monitoring during the ride. The main target of the platform is to increase the likelihood of the patient's survival by having the ambulance arriving to the hospital as soon as possible while allowing the responsible doctor to monitor the patient's biomedical data. This allows for proactive measures like rerouting traffic or deploying emergency responders beforehand.

**TITLE:** Real-time Traffic Management in Emergency using Artificial Intelligence

**YEAR :**2020.

**DESCRIPTION:** AI performs tasks as good as human brain does. It mainly focuses on developing machines that performs and studies the task from the surrounding and performs action which requires human intelligence. This paper presents a study on how artificial intelligence can play an important role in traffic management in the future time. Artificial intelligence (AI) is revolutionizing traffic management, especially in emergencies. AI systems can collect data from various sources like traffic cameras, GPS devices, and road sensors. This data provides real-time insights into traffic flow, congestion, and incidents. AI algorithms analyze traffic data to dynamically adjust traffic light timings. During emergencies, AI can prioritize signals for emergency vehicles, creating a green corridor for ambulances and fire trucks. AI can analyze camera footage to detect accidents and road closures in real-time. This enables faster response times for emergency services and helps disseminate alerts to drivers to avoid congested areas. AI can analyze historical traffic data and learn patterns to predict traffic congestion during emergencies. This allows for proactive measures like rerouting traffic or deploying emergency responders beforehand. AI-powered navigation apps can provide drivers with real-time traffic updates and suggest alternative routes to avoid congestion caused by emergencies.

### III. PROBLEM STATEMENT

Emergency medical services (EMS) play a critical role in saving lives during medical emergencies. However, there are several challenges in the current ambulance systems that hinder their efficiency and effectiveness. One significant challenge is the lack of an intelligent decision-making system within ambulances, which can lead to delays in reaching patients, inefficient allocation of resources, and suboptimal patient outcomes.

The problem statement aims to address the need for an Intelligent Emergency Response Next-Gen Ambulance Decision System. This system should integrate advanced technologies such as artificial intelligence, data analytics, and real-time communication to enhance the capabilities of ambulance services and improve emergency medical care delivery.

### IV. ARDUINO BOARD

The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega8U2 programmed as a USB-to-serial converter. "Uno" means one in Italian and is named to mark the upcoming release of Arduino 1.0. The Uno and version 1.0 will be the reference versions of Arduino, moving forward. The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform; for a comparison with previous versions.

V. PROPOSED SYSTEM

The proposed system is implemented to overcome the drawbacks and limitation of the existing system using an advanced methodology and technology. The proposed system consists of multiple sensors which helps in monitoring the essential parameters of a patient.

The parameters include monitoring heart rate, respiration and temperature of patient. If any deviation occurs, then an alert system is produced using buzzer. It'll process with the algorithm, and decide the patient falls under which categories he/she needs oxygen bed support, ventilator support, and MICU support by checking with the networked medical system.

It will automatically select the hospital according to the availability needs. So hospital can't deny or delay. By the AI categorization of medical sensors values, the patient can be categorized in suitable support. So, treatment is optimized and clear. All these parameters can be monitored using the help of a display device called LCD.

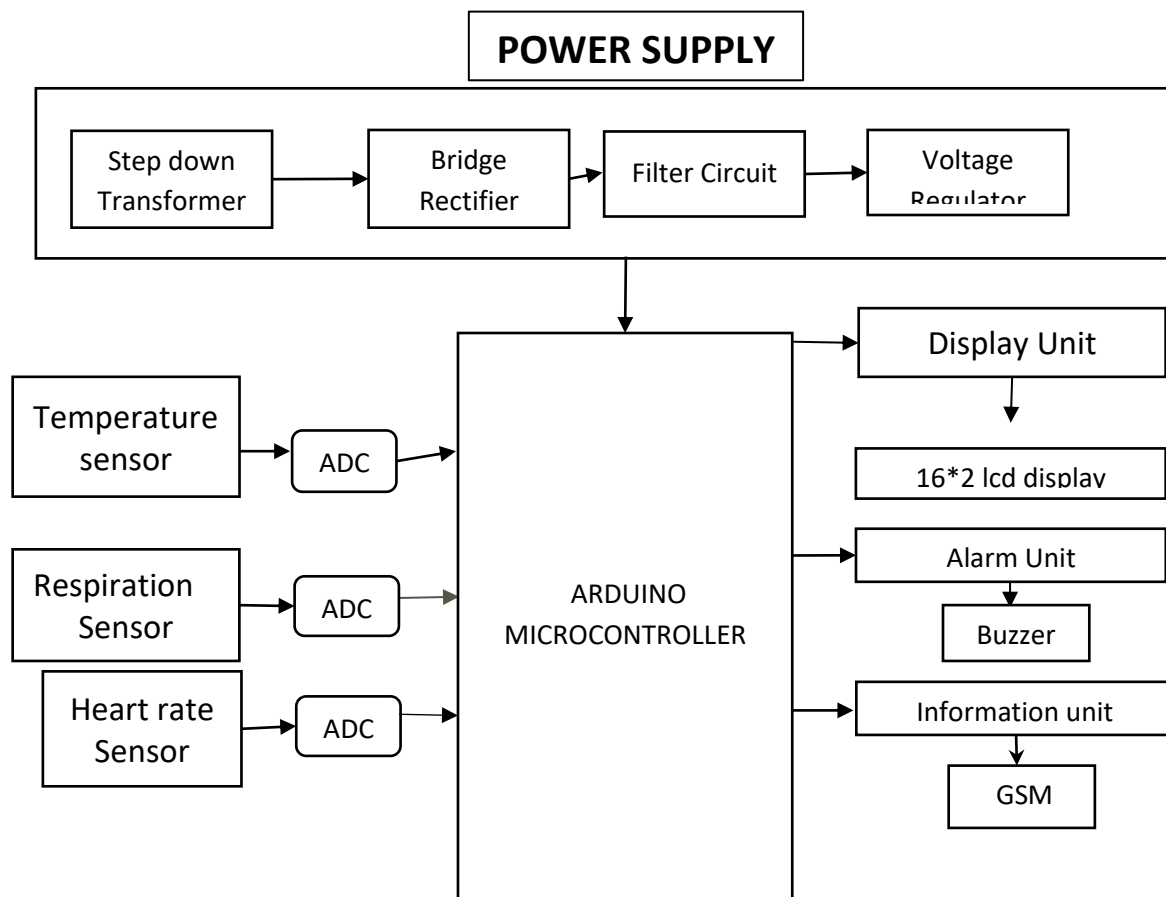


Figure 1 : Proposed System

VI. SYSTEM MODEL

- 6.1 Hardware Requirements
- Temperature Sensor
  - Heart Beat Sensor
  - Respiratory Sensor
  - Lcd
  - GSM Module
  - Buzzer



Arduino Board

## 6.2 Software Requirements

Arduino uno

## VII. EXPERIMENTAL RESULT

While seamless communication with nearby hospitals facilitates timely interventions and improves overall emergency response efficiency. Overall, the paper advocates for the adoption of such innovative solutions to enhance emergency medical services and save more lives.

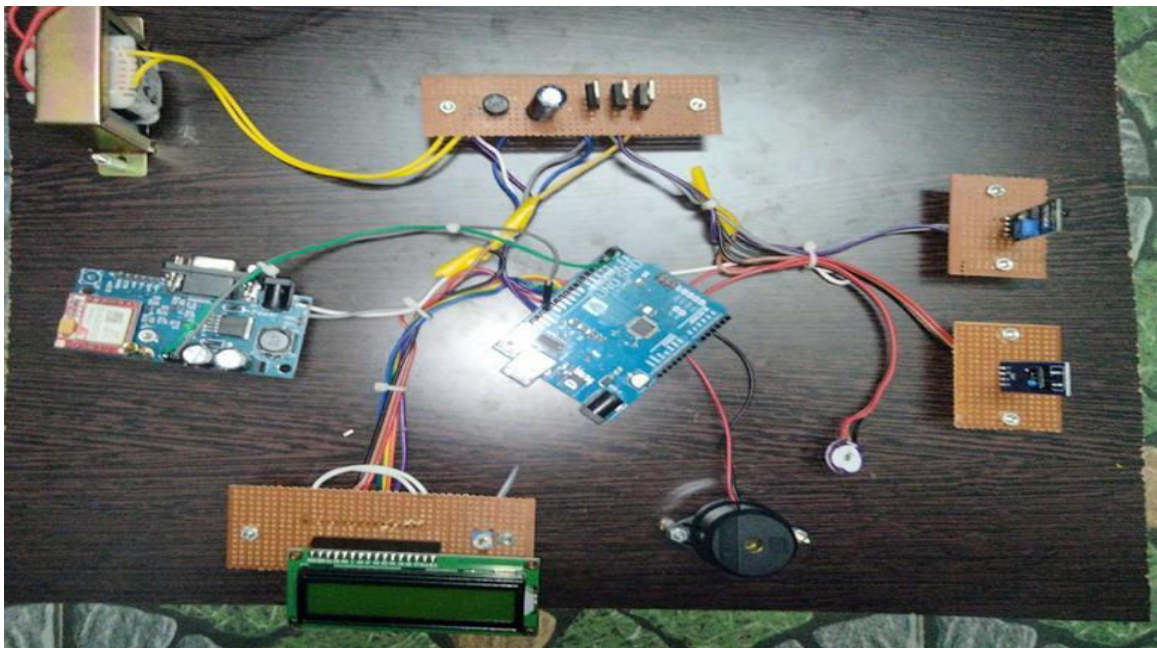


Figure 2: Hardware Screenshot

## VIII. CONCLUSION

In this paper we described the various techniques used to control traffic management and for the fast arrival of ambulance to the hospital. We also presented the review table about various technologies used till now for traffic management with their use and limitations, which helps us in finding that IoT is the best technique. The development of a smart artificial intelligence ambulance with a decision-making system presents a significant advancement in emergency medical services. By incorporating AI technology and advanced sensors, the proposed system addresses the critical issue of ambulance delays, which can be life-threatening for patients. Through real-time monitoring of vital signs and intelligent decision-making algorithms, the system ensures prompt and efficient allocation of medical resources, optimizing patient care and treatment outcomes. Furthermore, the integration of IoT technology enhances traffic management and streamlines the ambulance's route to the hospital, minimizing delays caused by congestion. The system's ability to communicate with nearby hospitals and provide relevant patient information ensures seamless coordination between emergency responders and healthcare facilities, facilitating timely interventions and improving overall emergency response efficiency.

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