# DEVELOPING A VISION-BASED HEART ATTACK DETECTION SYSTEM FOR VEHICLES, TO IMPROVE ROAD SAFETY AND PASSENGER WELLBEING

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***Branch*** ***:*** *Computer Applications*
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## Introduction

Across the world, traffic accidents cause major health problems and are of concern to health institutions; nearly 1.35 million people are killed or disabled in traffic every year. In 2019, 93% of road traffic injury-related mortality occurred in low- and middle-income countries with an estimated burden of 1.3 million deaths. This issue is growing; by 2030, road traffic injuries will be the seventh leading cause of death globally. Injuries that take place inside vehicles that are stuck in traffic need to be carefully handled.

The absence of an efficient system to address health-related risks, specifically heart attacks during travelling, poses a significant threat to both drivers and other road users. This motivates the development of a robust system that leverages computer vision and artificial intelligence to continuously monitor passengers' physiological indicators and promptly detect potential heart attacks

The implementation of such a system holds several potential benefits for road safety and passenger well-being. Firstly, it provides an additional layer of protection for drivers and passengers by enabling timely intervention in the event of a medical emergency. Secondly, it can help reduce the number of accidents caused by sudden incapacitation of drivers due to heart attacks, thereby minimizing injuries and fatalities on the road. Lastly, by fostering a safer driving environment, it contributes to overall public health and transportation infrastructure efficiency.

## Objective

1. To develop a reliable system capable of continuously monitoring passengers' physiological indicators, including facial expressions, eye movements, and vital signs.
2. To utilize deep learning models to analyze the real-time data streams from the physiological monitoring system for prompt detection of potential heart attacks.
3. To integrate an alarm system that activates upon the detection of a potential heart attack, resembling an ambulance siren, to alert the driver and surrounding vehicles.

## Methodology:

1. Data Collection: Adequate storage for collecting and storing large amounts of

image and sensor data.

2. Algorithm Development: Robust algorithms for real-time detection and decision-making. Frameworks for developing and fine-tuning deep learning models.
3. Integration: Compatibility with in-vehicle systems. APIs or middleware for seamless integration with existing safety mechanisms.
4. Testing and Validation: Simulation tools for testing the system under various driving scenarios. Real-world testing on diverse road conditions to ensure reliability.
5. User Interface: Design of a user-friendly interface for drivers and system administrators. Integration with existing in-vehicle displays or warning systems.

**Results And Conclusion**

The development of a vision-based heart attack detection system for vehicles holds tremendous promise in revolutionizing road safety and passenger well-being. By leveraging the synergy between computer vision and artificial intelligence technologies, this innovative system has the potential to detect physiological signs of heart attacks in passengers, enabling timely intervention and prevention of accidents. Through the integration of advanced deep learning algorithms, real-time physiological monitoring, and seamless integration with existing vehicle systems, the vision-based heart attack detection system offers a holistic approach to enhancing userr safety and reducing the risk of medical emergencies while travelling.

By working together, we can harness the power of technology to address critical challenges in healthcare and transportation, ultimately saving lives and improving the quality of life for individuals worldwide. As we continue to advance in this field, it is essential to prioritize ongoing research, validation studies, and real-world testing to ensure the accuracy, reliability, and effectiveness of the system across diverse driving conditions and user populations. Further, he vision-based heart attack detection system represents a significant step forward in leveraging cutting-edge technology to create safer and more secure travel environments for everyone on the road.

**Innovation In the Project**

There are several projects that utilize IoT-based systems to monitor heart rate, blood pressure, and ECG signs to predict heart attacks. However, the proposed system aims to predict heart attacks in travelers inside the vehicle based on physical gestures, facial expressions, or any abnormalities in behavior. Additionally, if the system predicts an emergency, it will trigger an alarm.

**Future Scope**

Integration of advanced sensors such as depth cameras, and multimodal biometric sensors to capture more nuanced and comprehensive data about passenger behavior and physiological responses. Development of sophisticated AI and deep learning models capable of analyzing complex patterns in passenger behavior and facial expressions to detect subtle signs of distress, discomfort, or medical emergencies with higher accuracy and reliability. Utilization of environmental perception technologies, including vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communication systems, to facilitate coordinated emergency response efforts. Also trying to connect to some nearby medical facilities for some medical assistance on the spot of emergency.