Industrial Engineering Journal
ISSN: 0970-2555
Volume : 52, Issue 11, No. 3, November : 2023

CAMERA VISION BASED ROAD MONITORING ALERT SYSTEM TO DRIVER

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Abstract
The innovative Camera Vision-Based Road Monitoring and Alert System for Drivers is made to improve road safety by giving drivers real-time monitoring and alerts.In order to ensure that drivers make timely and informed decisions while driving, the system uses camera vision technology to detect and analyze road conditions, potential hazards, and traffic signs. It also communicates pertinent information to drivers. The goal of the project is to create a reliable and effective camera-vision-based road monitoring alert system that helps drivers drive safely.The system's goal is to give drivers access to real-time information about weather, traffic signs, accidents, and congestion on the roads so they can make educated decisions and stay safe**.**

Keywords:
PI-CAM, Rasberry PI, Buzzer, LED and LCD

I. Introduction

By giving drivers real-time monitoring and alerts, the Camera Vision-Based Road Monitoring Alert System for Drivers is an innovative technology that aims to improve road safety. In order to ensure a safer driving experience, this system uses closed-circuit television technology to record and analyze the road environment, identify potential hazards, and communicate pertinent information to drivers. However, it can be challenging to successfully apply traditional computer design methodologies and tools to embedded applications due to a combination of factors like cost pressure, long life cycle, real-time requirements, reliability requirements, and design culture dysfunction. Embedded systems frequently need to be tuned for business-driven criteria and life cycle stages rather than peak computing throughput. Expanding embedded computer design to encompass holistic embedded system design currently has limited tool support. But by understanding the advantages and disadvantages of the current strategies, one can properly set expectations, point out risk areas to tool adopters, and offer solutions for tool builders to satisfy industrial demands. Looking around us, we can see many items that we use on a daily basis these days, such as our cars, PDAs, microwaves, and refrigerators. Today, most appliances are powered by something. Below the exterior that compels them to act in certain ways. These are minuscule microprocessors that react to different inputs or keystrokes. The appliances' tiny microprocessors, which operate on simple assembly languages, are their central component. It's known as embedded systems. The embedded systems market is the most conservative in these semiconductor industries, and engineering decisions here typically favor tried-and-true, low-risk solutions.

II.EXISTING SYSTEM

Under the current system, drivers evaluate road conditions, recognize hazards, and react to environmental changes primarily through their own visual observation and interpretation.But this approach is vulnerable to human error, distractions, and constraints, which can result in mishaps and dangerous driving conditions.Furthermore, drivers might not be aware of potential hazards outside of their immediate field of vision or have access to real-time information about road conditions.

III.PROPOSED SYSTEM

By utilizing camera vision technology to deliver real-time monitoring and alerts to drivers, the proposed Camera Vision-Based Road Monitoring Alert System seeks to address the shortcomings of the current system.By offering real-time monitoring and alerts that boost situational awareness and help drivers make wise decisions while driving, the proposed system seeks to increase driver safety. It overcomes the limitations of human perception and attention by using camera vision technology, ensuring drivers are aware of potential hazards and changes in road conditions.

IV. BLOCK DIAGRAM

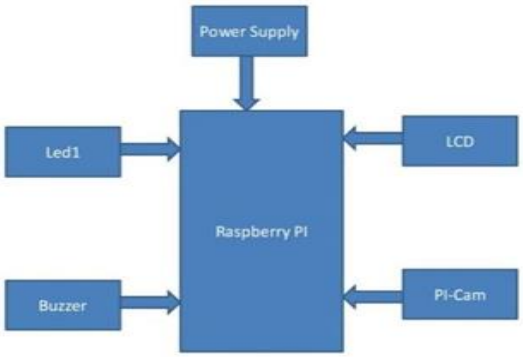

FIG4 BLOCK DIAGRAM

4.1 LCD

liquid crystal display using a reflector or light source. A column of liquid crystal molecules suspended between two transparent electrodes makes up each pixel, as do two polarizing filters with perpendicular polarity axes. Light traveling through one would be blocked by the other if there were no liquid crystals separating them. To enable light to pass through one filter, the liquid crystal twists the polarization of the light entering the other**.**

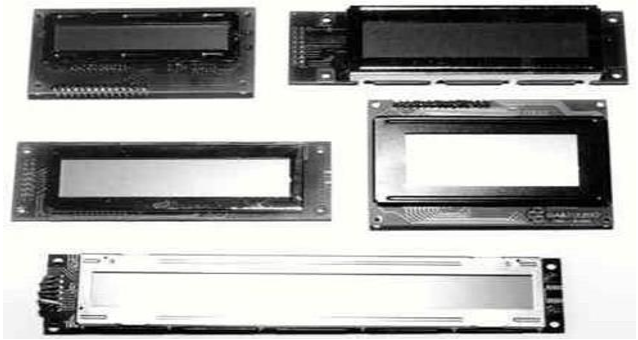

FIG 4.1 LCD

4.2 POWER SUPPLY

A power supply is an electrical power source. A power supply unit, or PSU, is a device or system that provides an output load or group of loads with electrical or other types of energy. The term mostly refers to electrical energy sources; it is used less frequently to mechanical ones and infrequently to

Industrial Engineering Journal
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other types.A power supply could consist of primary or secondary energy sources in addition to a power distribution system.

FIG 4.2 POWER SUPPLY

4.3 BUZZER

A buzzer is a signaling device that is not a loudspeaker, as they are commonly called.It may be an electronic (a piezotransducer), mechanical, or electromechanical device.BeStar creates buzzers in every configuration that is possible for a broad range of uses. The sound for panel mount buzzers, home goods, medical equipment, and even extremely loud sirens can be produced by a piezo transducer. An electromagnetic buzzer can be used when a lower frequency is needed. They are highly common in higher-end clinical diagnostic devices and automobile melodies.The BeStarbuzzer line consists of external drive units that provide the designer the freedom to create custom sound patterns, or self-drive units with their own drive circuitry (indicators).

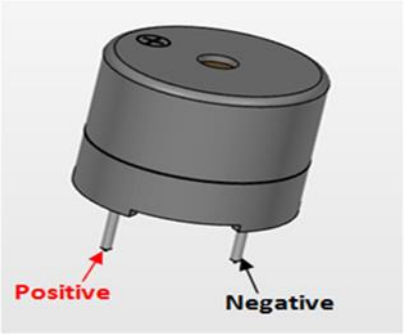
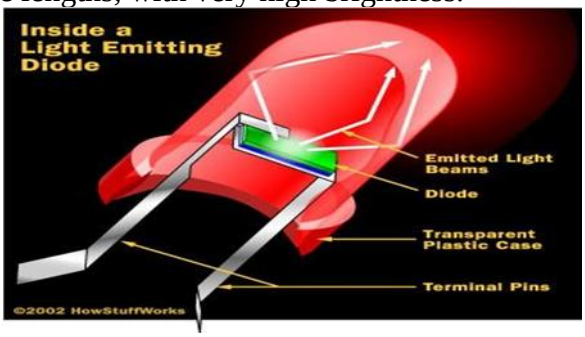


FIG 4.3 BUZZER

4.4 LED

Light emitting diode (LED)is a semi conductor light source. LEDs are used as indicator lamps in many devices, and are increasingly used for lighting. Introduced as a practical electronic component in 1962, early LEDs emitted low-intensity red light, but modern versions are available across the visible, ultraviolet and infrared wave lengths, with very high brightness.



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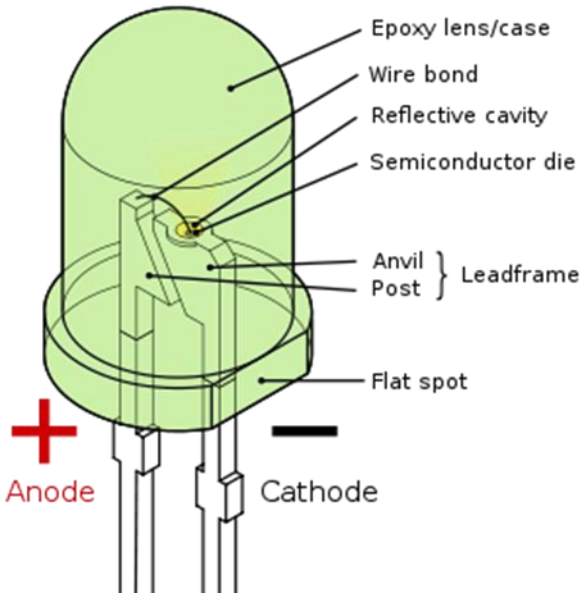

FIG 4.4 LED

4.5 PI-CAM

The "Pi Cam" module refers to the camera moduled signed specifically for use with the Raspberry Pi, a popular single-board computer. The official camera module developed by the Raspberry Pi Foundation is commonly known as the "Raspberry Pi Camera Module" or "Raspberry Pi Cam."

The Raspberry Pi Camera Module is a compact and versatile camera that can be easily attached to the Raspberry Pi board through its dedicated camera connector. It allows users to capture both stillimages and videos, making it a valuable tool

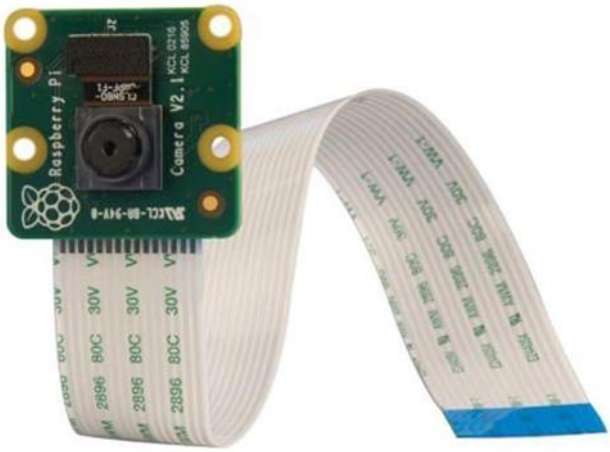

FIG 4.5 PI-CAM

for various projects that require visual data. The Raspberry Pi Camera Module finds applications in various fields, including home automation, security systems, robotics, computer vision, and photography.

4.6 RASBERRY PI

Raspberry Pi is a small single board computer. By connecting peripherals like Keyboard, mouse, display to the Raspberry Pi, it will act as a mini personal computer.

Raspberry Pi is popularly used for real time Image/Video Processing, IoT based applications and

Robotics applications.

Raspberry Pi is slower than laptop or desktop but is still a computer which can provide all the expected features orabilities, at a low power consumption.

Raspberry Pi Foundation officially provides Debian based Raspbian OS. Also, they provide NOOBSOS for Raspberry Pi. We can install several Third-Party versions of OS like Ubuntu, Archlinux, RISCOS, Windows10IOTCore, etc.

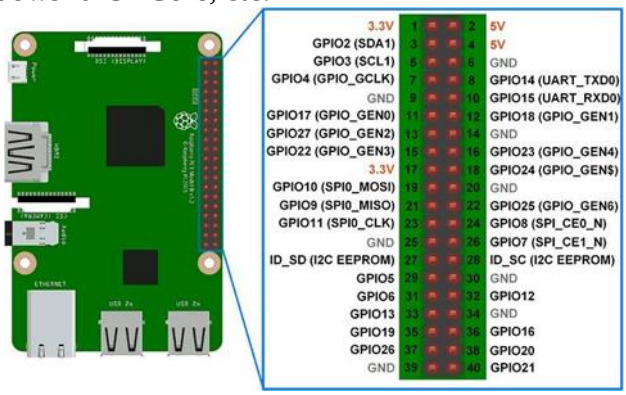

FIG 4.6 Raspberry PI

5.WORKING:

Cameras Sensors: High-resolution cameras are installed in strategic positions on the vehicle to capture live video foot age of the road ahead. The secameras provide a continuous feed of the road environment.

Image Processing Unit: The captured video feed is processed in real-time using advanced image processing algorithms. The image processing unit analyzes the video frames to detect and identify potential hazards, road conditions, and traffic signs.

Hazard Detection and Analysis: The system utilizes computer vision techniques to identify hazards such as pedestrians, cyclists, vehicles, road obstacles, or adverse weather conditions. It can also detect and interpret traffic signs, including peed limits, stop signs, and lane markings.

Alert System: Once a potential hazardor relevant information is detected, the system generates visual and auditory alerts for the driver. These alerts can be displayed on a dash board screen or heads-up display(HUD),accompanied by audio warnings to draw the driver's attention.

Communication Module: The systemmay include a communication module to connect with external data sources or networks. This module can provide additional information, such as real-time traffic updates, road conditions, or emergency alerts, further enhancing driver awareness.

6.RESULT

The Camera Vision-Based Road Monitoring Alert System offers a promising solution to enhance road safety by leveraging camera vision technology. By providing real-time monitoring, hazard detection, and alerts to drivers, this system aims to improve driver awareness, reduce accidents, and create a safer driving environment.

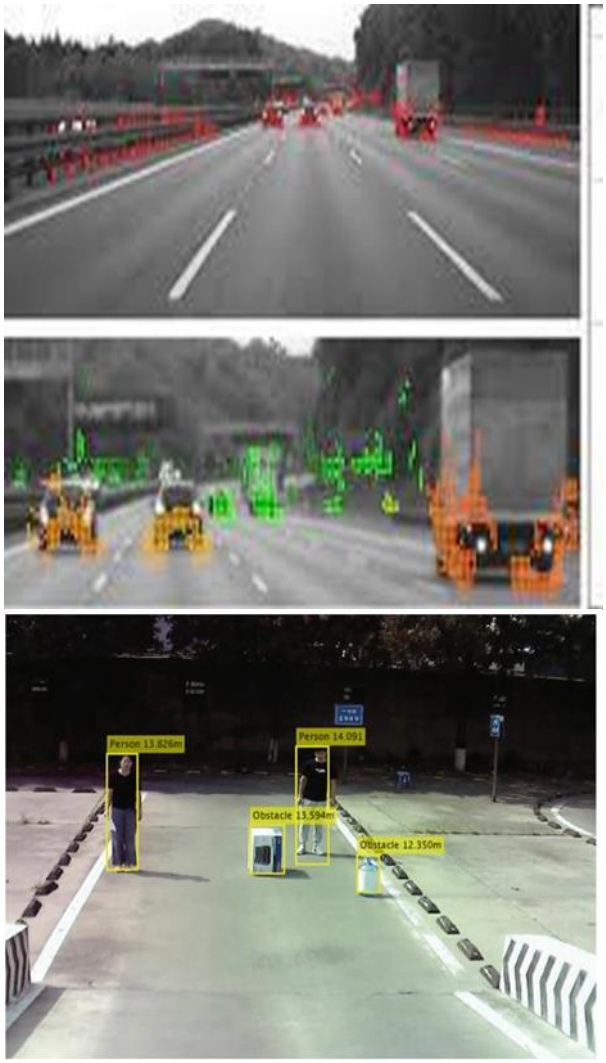

FIG 6.1 Road monitoring

Conclusion

By giving drivers real-time monitoring and alerts, the CameraVision-Based Road Monitoring Alert System for Drivers is an innovative technology that aims to improve road safety. Through the utilization of sophisticated image processing algorithms and camera vision technology, the system is capable of identifying potential hazards, road conditions, and traffic signs, and relaying pertinent information to drivers.By giving drivers timely alerts and enhancing their situational awareness while driving, this system addresses the limitations of human perception and attention.

FUTURE SCOPE

We may add cloud later on. Videos and photos are stored on the cloud.

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