Traveler Empowerment through IoT-Based Wearable Health Monitoring Gloves for Accident Prevention

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1. Abstract

MAAK is a sort of protective glove worn by the rider that increases the safety of motorcycling. The protection of the rider is the main purpose of this glove. This may be done by utilizing cutting-edge characteristics including heart rate, vehicle-to vehicle distance, and vehicle speed. This make it not only smart glove but also a feature of a smart bike. TFT display show the output of the rider`s Heartrate and speed of the vehicle continuously. The output of the rider's heart rate and the vehicle's speed are continually shown on a TFT display . The vehicle's speed is determined by an IR (infrared) sensor, the distance between the cars is determined by an ultrasonic sensor, and the rider's heart rate is continually monitored by a heart rate sensor.

Keywords: Heart rate monitoring, Infrared sensor, Ultrasonic sensor, Wearable devices.

2. Introduction

India has seen an annual increase in traffic accidents. Everyone operating a two-wheeled vehicle is required to wear protective riding gear that complies with BIS (Bureau of Indian Norms) standards under Section 129 of the Motor Vehicles Act of 1988. Under India's 1939 Motor Vehicle Act, driving while drunk is a crime. This implies that the cyclist will suffer a penalty. In this day and age, bike riders may easily elude the cops. These three main problems have motivated us to develop this project. The purpose of this project is to develop a glove-based safety system for bike riders.

The smart glove that we created is equipped with sensors that detect the distance between the riders. The goal of this project is to create a protective mechanism in a glove for bike rider safety. The smart glove is equipped with several sensors that are responsible for detection. To detect the danger of heart issues, driving or cycling in high traffic presents an increased risk of provoking a heart attack. The heart rate sensor is used to continually display the rider's heart rate, and the IR and ultrasonic sensors are used to continuously monitor the speed and distance between the vehicles when the vehicle is in motion.

1.1 Background

These smart gloves integrate cutting-edge sensors and connectivity features to continuously monitor vital health parameters, such as heart rate, body temperature, blood oxygen levels, and even stress levels. The data collected from these gloves is seamlessly transmitted to a user-friendly mobile application or a cloud-based platform, allowing travelers to access their health insights and track their well-being throughout their trips.

These state-of-the-art gloves combine comprehensive health monitoring capabilities with the power of Internet of Things (IoT) technology. These gloves continually gather and examine the wearer's real-time health data thanks to a variety of sensors, including heart rate monitors, temperature sensors, blood oxygen level detectors, and even fall warning devices.

1.2 Objectives

The objective of this project is to enhance traveler safety by developing IoT-based wearable health monitoring gloves. These gloves will enable real-time health monitoring for travelers, providing crucial data and alerts in case of accidents or medical emergencies. The goal is to revolutionize health monitoring in the travel industry and empower travelers with an advanced safety solution that can potentially save lives and improve overall well-being during their journeys.

3. Literature Review

3.1. A Wearable Smart Glove and Its Applicationof Pose and Gesture Detection to Sign Language Classification

(IEEE ROBOTICS AND AUTOMATION LETTERS, VOL. 7, NO. 4, OCTOBER 2022)

Even better wearable technology is now possible because to developments in machine learning and soft sensors. Because hand motion, in particular, may convey crucial information for designing user-friendly interfaces, glove-based systems have a significant impact on a variety of application areas. A significant challenge for wearables is the real-time data collecting, processing, and analysis from the high degree of flexibility of the hand. We suggest using a commercially available conductive knit to build a discrete network of resistive sensors covering all hand joints, combining it with an accelerometer, and employing a concealed microcontroller to interpret and categorize the resulting data. As a consequence, a wearable gadget that is self-contained and fitted with cutting-edge sensors for hand attitude and orientation as well as integrated activity prediction is quickly constructed .It is used in ASL to distinguish between static and dynamic gestures. A long short-term memory (LSTM) neural network that was pre-trained and installed in an embedded environment using tools allows the glove with a ST microcontroller to categorize 12 ASL letters and 12 ASL phrases in real time. Using a leave-one-experiment-out cross validation method, networks effectively classify 96.3% of segmented instances, and in 92.8% of real-time streaming trials, they provide accurate rolling predictions.

3.2. **IOT BASED HEALTH MONITORING SYSTEM**

(**Journal of Critical Reviews** ISSN- 2394-5125   Vol 7, Issue 4, 2020)

The best method for containing such an outbreak is an IoT-based health monitoring system. The Internet of Things (IoT), a recent internet revolution with particular importance to the healthcare sector, is a burgeoning topic of research. Remote health care monitoring has evolved so quickly because more people are using cellphones and wearable sensors. IoT health monitoring aids in illness prevention and accurate identification of medical conditions even when a doctor is a long way away. a continuous monitoring and management tool that checks the patient's health and remotely connects to a server to store the patient's data using a Wi-Fi module. We outline a platform built on the internet of things (IoT) for remote health monitoring, where authorized users can access data stored on any IoT platform and remotely diagnose ailments based on the findings.

4. Existing System

There are a lot of benefits to using wearable health monitoring gloves for accident prevention that are IoT-based, but there are also a number of drawbacks and challenges. The following are some drawbacks :

The precision and dependability of the data gathered by the wearing gloves are critical to the success of accident prevention. False alarms or missed notifications might result from unreliable sensors or algorithms employed in the gloves, which could undermine public confidence in the device.

IoT-based wearable glove deployment might be pricey on a wide scale. The price of creating, installing, and maintaining these devices might prevent their widespread use, especially in low-income areas or among tourists on a tight budget.

5. Proposed Methodology

The proposed strategy aims to empower travelers by utilizing Internet of Things (IoT) technologies and wearable health monitoring gloves for accident avoidance. Travelers typically encounter a variety of health and safety risks on their excursions, and accidents can occur abruptly with dire consequences. This study proposes a way for improving the safety and wellness of passengers through the use of wearable gloves equipped with cutting-edge health monitoring sensors and IoT capabilities.

5.1 Software Requirements

Arduino UNO

Python IDLE

5.2 Programming Language

Embedded 'C'

Python

5.3 Benefits

The IoT-based wearable gloves enable real-time monitoring of the traveler's health status. This constant monitoring provides travelers with valuable insights into their physical condition, allowing them to make informed decisions about their travel activities and adjust their plans accordingly. In case of any critical health issues or emergencies, the gloves can send immediate alerts to both the traveler and relevant authorities. This ensures prompt medical attention, minimizing the severity of accidents and potentially saving lives.

5.4 Scope

The gloves can automatically convey distress signals to emergency agencies in the case of an accident or medical emergency, allowing quicker and more efficient responses.
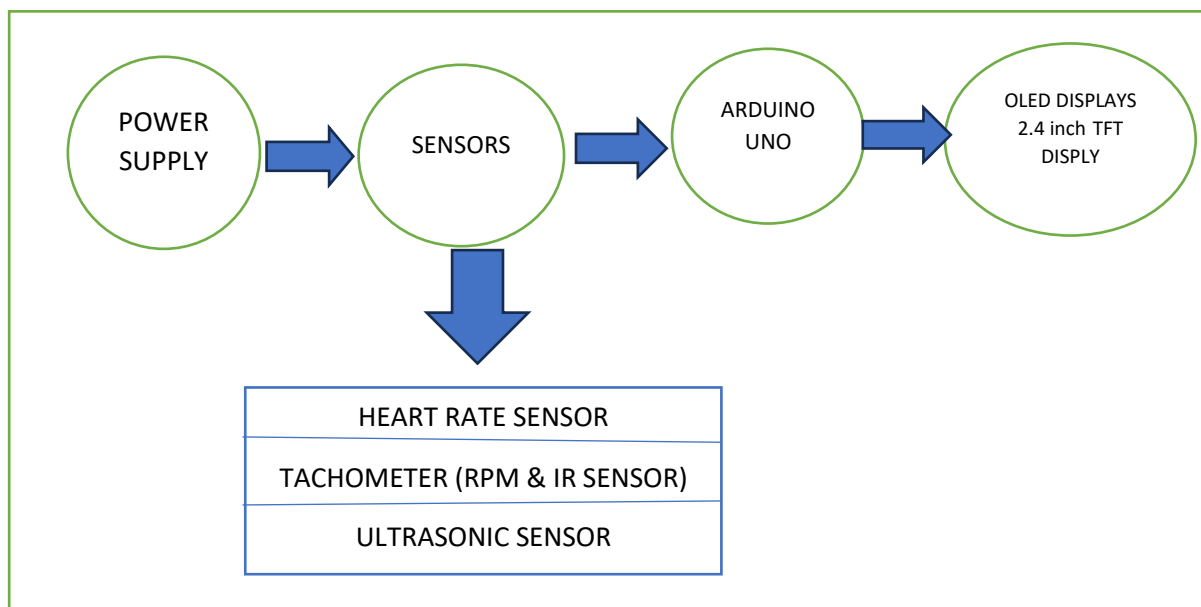
5.5 Block Diagram Of Methodalogy

Fig : Methodalogy Block diagram
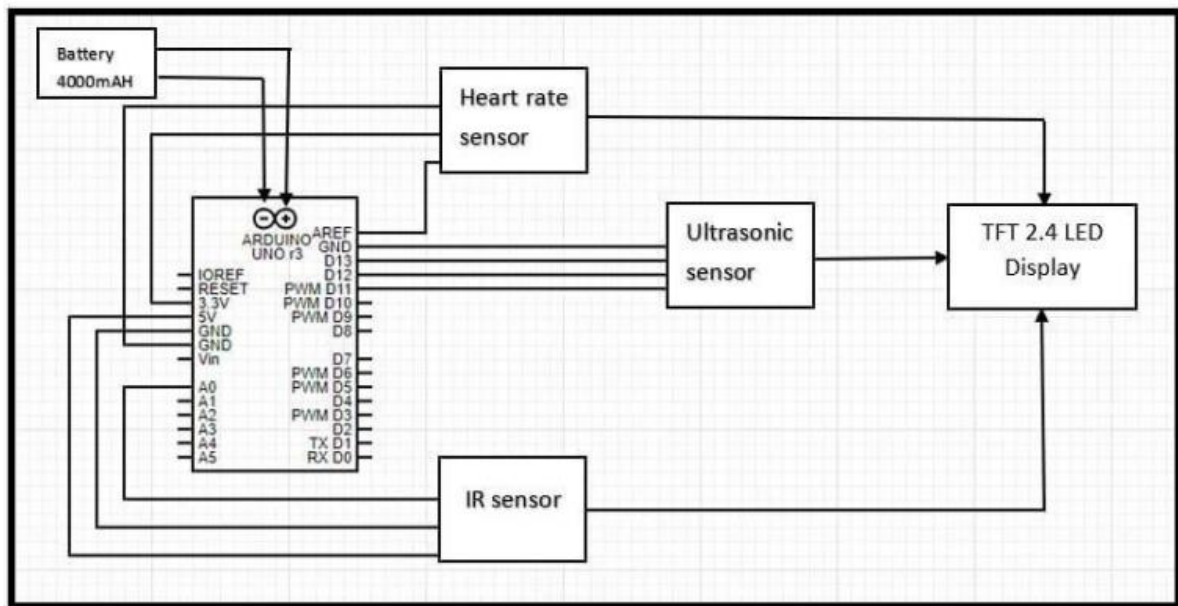
5.6 Hardware Block Diagram

Fig: Hardware Block diagram

7. Result & Discussion

Wearable Health Monitoring Using IoT Gloves to Prevent Accidents a system that continually gathers sensor signal data and displays sensor output on a TFT touchscreen display. If sensor output values exceed the safety standard, a vibration sensor is utilized to warn the rider and help him avoid an accident.

The sensors gather the rider's data and display it. For example, Heart rates between 60 and 100 beats per minute are measured via a heart rate sensor in the hand. An ultrasonic sensor is placed near the vehicle's license plate to measure the distance between the two, and if the rider is within four meters of the vehicle, the rider is detected by the sensor. An IR (infrared) sensor is installed in the tyre of the vehicle to continuously calculate the vehicle's speed.

8. Conclusion

In conclusion, the introduction of wearable health monitoring gloves powered by the Internet of Things for travelers is a huge advancement in guaranteeing their safety and wellbeing while traveling. With the help of these cutting-edge gloves, travelers may continuously check their vital signs and general wellness during their journeys. These gloves give users immediate notifications and practical insights, enabling them to take preventative action in the event of accidents or medical situations. IoT technology integration improves the effectiveness of medical procedures and emergency actions, potentially saving lives in dire circumstances. Additionally, the information gathered by these wearable gloves may be utilized to examine patterns and trends in health, giving medical practitioners the ability to create individualized suggestions for improving passengers' health.

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