IOT Based Two Wheeler Safety System

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ABSTRACT

As per the government data, almost 1.5 Lakh people lost their lives in road accidents, which means every hour 17 people died on the road due to an accident. The number of fatalities is one third of the number of accidents, which amounts to 53 road accidents every hour. In which, majority of deaths are of two-wheeler riders because of head injuries. These death ratio can be avertible by obligatory use of helmets. While the death toll of two-wheelers riders not wearing a helmet was extremely high, it is also important to note that those who survived faced injuries.In 91 per cent cases of two-wheeler accidents, a non-helmet rider was hurt, ie; they either died or were grievously injured or faced minor injuries. Ultimately, the project focuses on safety of the bikers. An attempt to reduce the probability of two-wheeler accidents ,theft and drunk and drive cases.

Keywords: Alcohol detection, Accident detection, Rider's Safety, Anti-Theft, Ignition Module.

1. INTRODUCTION

Safety is one of the most important aspect in everyone's life. Every person hopes to reach home safely. Despite of having all the safety rules while riding, many of the riders fail to follow them and this leads to road accidents and there are very less chances of survival. The accidents are fatal due to the common negligence of not wearing the helmet and lack of medical attention needed by the injured person in time. Another major cause for the accidents is the drunk and drive cases and over speeding. Hence our objective is to develop a two-wheeler safety system which aims for accident prevention, detection and to reduce the probability of two-wheeler accidents and the probability of 00two-wheeler theft. Internet is different from IOT such a way it transcends Internet connectivity by enabling every object that utilizes embedded circuits to interact with each other utilizing the current Internet infrastructure. Since the scope of IOT has grown by ever green tremendously as currently everything will be based on IOT. At the end of 2020, the technology will reach to the top. In this paper, we propose a very low-cost personal use VAT (**Vehicle Anti-Theft Tracking**) system using the IoT cloud platform. This system allows people in developing countries to be easily installed into their vehicles at any time. This system has the following features: (1) The vehicle theft is detected using an Arduino-connected GPS (Global Positioning System) module. (2) The alarm message is sent to the mobile phone of the vehicle owner by the SMS (Short Message Service) on GSM (Global System for Mobile Communications). (3) The conditions of GPS/GSM modules are always monitored where the alarm is sent to the owner if they are not live, and (4) The location data of the vehicle is periodically stored in the IoT cloud platform called Blynk. We implement this system and confirm the correctness of the designed functions through trial applications.

LITERATURE SURVEY

LITERATURE SURVEY 1

CONCEPT USED

The system provides the design which consists of accelerometer sensor, GPS and GSM, interfacing which reduces the accident .It has lot of problems of automated system for accident location detection. Consequently, it used ultrasonic sensor to find the obstacles that is presented in certain distance. Main motto of the proposed paper is to decrease the chances of casualties in such accident. This device invention is much more useful for the accidents occurred in deserted places and those occurring at night time.

LITERATURE SURVEY 2

CONCEPT USED

This system developed a smart helmet which was designed to help local people get benefitted from wearing a helmet while riding. The user can listen to music, navigations, send SOS messages in case of emergency and even answer calls. All these functions are achieved using android app and Bluetooth sensors. Bluetooth sensors send data between the mobile and the helmet. The android app analyzes data and performs specific actions.

LITERATURE SURVEY 3

CONCEPT USED

In this paper the two-wheeler safety system was developed with smart helmet and intelligent biking system is reliable and aims to help in the prevention, detection and reporting of accidents also reducing the probability of the drunk and drive cases. Our proposed system gives the primary importance of preventing the accidents and ensures safety for a greater extent in two wheelers.

LITERATURE SURVEY 4

CONCEPT USED

This paper presented the very low-cost and personal use vehicle anti-theft tracking system using the cloud IoT platform called ThingSpeak. The anti-theft device for a vehicle is implemented with the Arduino microcontroller, the GPS module, and the GSM module. The alarm messages are sent to the mobile phone by the SMS. The correctness of the implemented functions was confirmed through trial applications. The future works included the extension of Android applications for vehicle owner services, the durability test of the device, and the evaluation through the long term use.

Existing System:

The existing system provides a prevention, detection and reporting system of accidents. Sensors, Wi-Fi enabled processor, and cloud computing infrastructures are utilized for building the system. The accident detection is done using the tri-axial accelerometer and the accident notification is sent. The system initially consisted of three units i.e., helmet unit, bike unit and a receiver unit. The helmet unit consisted of pressure sensor, gas sensor and accelerometer sensor GPS (Global positioning system) and the GSM (Global System for Mobile) modules. The microcontroller in the helmet unit had the control over the ignition of the bike.

Disadvantages:
- Less accuracy in the detection of accidents.

- There is no system to check if the bike is lifted or if there is any attempt of two-wheeler theft.

Proposed System:

The proposed system aims at reducing the probability of accidents and theft of two-wheelers. The system consists of helmet unit and bike unit where the helmet unit consists of Infrared sensor, Alcohol sensor and a Bluetooth transmitter integrated with Arduino UNO and the microcontroller ATMega328P.The Bike unit consists of DC Motor, Accelerometer sensor,GPS and GSM Module and a Bluetooth Receiver.

i) Arduino UNO

The **Arduino Uno** is a microcontroller board based on the ATmega328. It has 20 digital input/output pins (of which 6 can be used as PWM outputs and 6 can be used as analog inputs), a 16 MHz resonator, a USB connection, a power jack, an in-circuit system programming (ICSP) header, and a reset button.

ii) Infrared Sensor

An infrared sensor is an electronic instrument that is used to sense certain characteristics of its surroundings. It does this by either emitting or detecting infrared radiation. Infrared sensors are also capable of measuring the heat being emitted by an object and detecting motion.

iii) Alcohol Sensor

An alcohol sensor detects the attentiveness of alcohol gas in the air and an analog voltage is an output reading. The sensing range is from 0.04 mg/L to 4 mg/L, which is suitable for breathalyzers.

iv)   **Bluetooth**

HC‑05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup .The HC-05 Bluetooth Module can be used in a Master or Slave configuration, making it a great solution for wireless communication.

v)   **Accelerometer Sensor**

Accelerometer is a transducer that is used to measure the physical or measurable acceleration experienced by an object due to inertial forces and converts the mechanical motion into an electrical output. It is used as a form of anti-theft protection, as the sensor can send an alert through the system if an object that should remain stationary is moved.

vi)   **Ultrasonic Sensor**

An ultrasonic sensor is an instrument that measures the distance to an object using ultrasonic sound waves. An ultrasonic sensor uses a transducer to send and receive ultrasonic pulses that relay back information about an object's proximity. The sensor determines the distance to a target by measuring time lapses between the sending and receiving of the ultrasonic pulse.

vii)   GPS Module

Global Positioning System (GPS) is a satellite-based radio-navigation system used to get geo-location in terms of latitudes and longitudes.GPS works around globe for 365 days a year irrespective of any weather and without any subscription or setup charges.

viii)   GSM Module

GSM is a mobile communication modem; it is stands for global system for mobile communication (GSM). A GSM digitizes and reduces the data, then sends it down through a channel with two different streams of client data, each in its own particular time slot.

BLYNK

Blynk is a hardware-agnostic IoT platform with white-label mobile apps, private clouds, device management, data analytics, and machine learning. Blynk was designed for the Internet of Things. It can control hardware remotely, it can display sensor data, it can store data, vizualize it and do many other cool things. It handles all the connection routines and data exchange between your hardware, **Blynk** Cloud, and your app project.

SYSTEM ARCHITECTURE
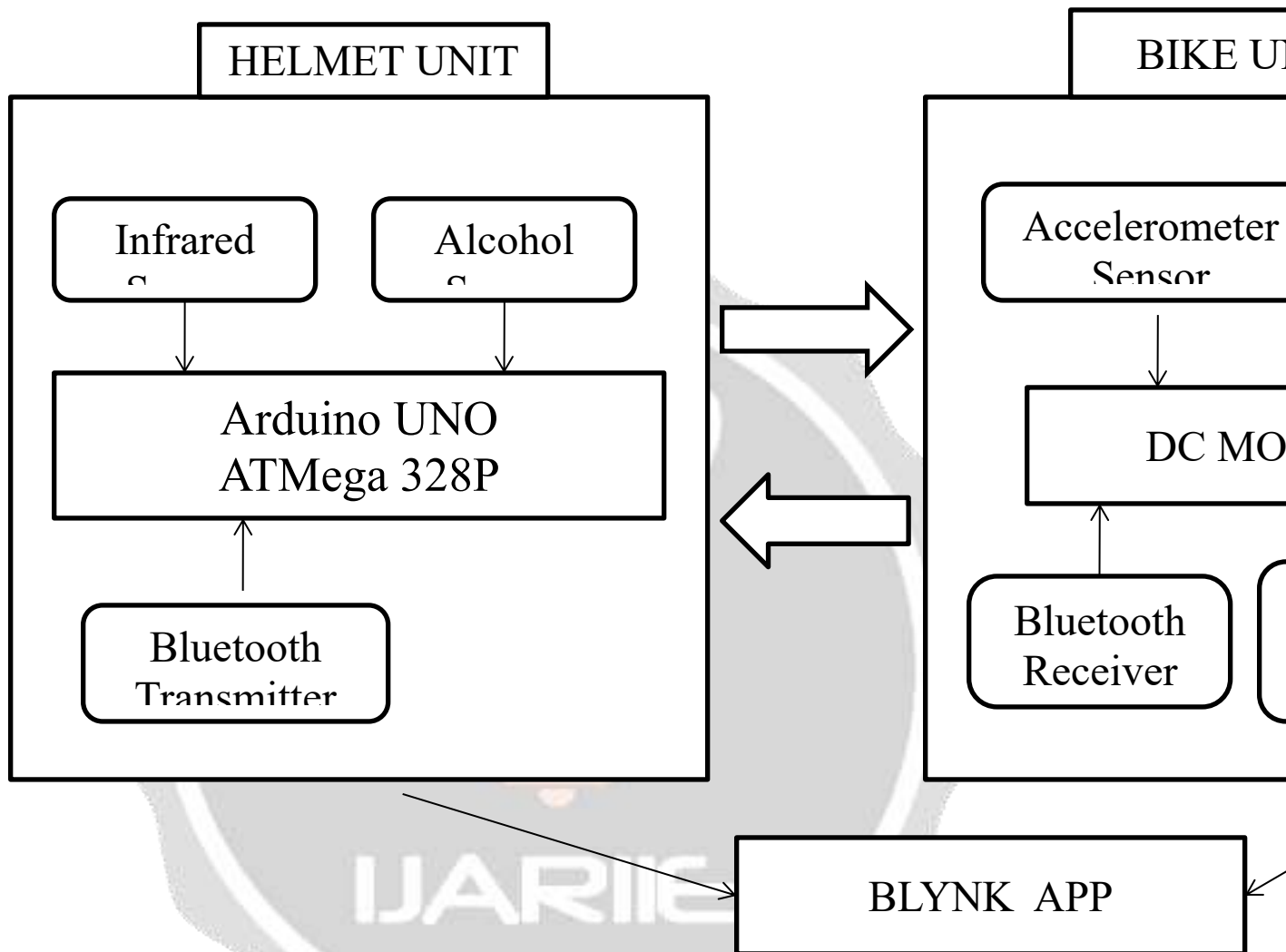
ARCHITECTURE OVERVIEW

The System Architecture consists of two units helmet unit and bike unit where the helmet is connected with the bike's motor wirelessly. The helmet unit consists of infrared sensor, alcohol sensor and Bluetooth transmitter integrated with the Arduino UNO. The bike unit consists of accelerometer sensor, Bluetooth receiver, DC Motor, GSM and GPS module. The infrared sensor checks for the presence of helmet and the alcohol sensor checks for the presence of the alcohol content in the rider's breathe. If both the test case passes then the microcontroller will initiate the ignition start by sending notification through the Bluetooth transmitter. The Bluetooth Receiver in the bike unit receives the notification and will initiate the ignition of the bike. When an accident occurs, the accelerometer sensor senses the tilting positions of the bike and sends the notification to the family member of the rider through the GPS and GSM module. The buzzer in the bike unit alarms the nearby people when the accident takes place. Hence the accelerometer sensor is also used to measure the vibration in the two wheeler and notifies the user about the anonymous vibrations on the bike. When the bike is on parking mode the sensor monitors the bike

completely and if anyone tries to tamper the ignition switch or siphon fuel then the alert message will be sent to the rider's mobile phone. The ultrasonic sensor is used to detect any abnormal lift of the bike when on parking mode. Thus ultimately the proposed system focuses completely on the rider's safety.

CONCLUSION

System confirms the safety of riders, by obligatory use of safety equipment. Additionally, it provides certainty of non absorption of alcohol throughout ride. The ignition system avert rider to start a bike when rider violate any of security rules. Furthermore, reporting system helps to inform family member for immediate treatment via SMS with location in case of accident occurs.

FUTURE ENHANCEMENTS

As a future extension of this work, the safety system can be integrated with cameras for security purposes. The video and audio transmitter can be used in the two wheelers to transmit the images and video of the accident that is being taken place. The system can also be integrated with most efficient algorithm to find the nearest hospital to the place of accident.

REFERENCES

[1] Sreenithy Chandran, Sneha Chandrasekar, N Edna Elizabeth, "Konnect: An Internet of Things (IoT) based smart helmet for accident detection and notification ", in 2016 IEEE Annual India Conference (INDICON) ,pp.1-4

[2] Mohd Khairul Afiq Mohd Rasli, Nina Korlina Madzhi, Juliana Johari, "Smart helmet with sensors for accident prevention", in 2013 International Conference on Electrical, Electronics and System Engineering (ICEESE) , pp. 21-26

[3] K.Sudha, Ajay Kumar, Ritika Jaiswal, Shakshi Bhardwaj and Abhishek Matlotia, "Safety Redefined" IIJCS, Vol 5, Issue 8, Aug 2017, ISSN No: 2321-5992

[4] Vikas Desai, "Design and Implementation of GSM and GPS Based Vehicle Accident Detection System", IJIT, Vol 01, Issue 03, pp. 1- 4, 2013.

[5] Mr. B. Hari Kishor Rao Ms. Juby Jogi Ms. Khyati Varma, Ms. Sneha Jainwar. Helmet based vehicle's auto ignition with alcohol detection and accident indication and reporting system. International Journal of Advanced Research in Computer and Communication Engineering, Volume 5, Issue 8, 2016.

[6] Litto. Thomas Rahul.K.V Saravana Kumar K, Anjana.B.S. Smart helmet. International Journal of Science, Engineering and Technology Research (IJSETR), Volume 5, Issue 3, 2016.

[7] K Diwakar Vibhor William Sanjeev Sahu, Lokesh Yadav. Bike rider's safety measures using helmet as a key. International Journal of Computer Engineering in Research Trends (IJCERT), Volume 4, Issue 1, January 2017.

[8] Ayush Garg, Swati Gupta, Harpeet Kaur, "SMART HELMET", International Journal of Computer Applications (0975-8887).

[9] Saravana Kumar k, Anjana.B.S, Litto. Thomas, Rahul K.V, "SMART HELMET", "International Journal of Science, Engineering and Technology, Volume 5, Issue 3, March 2016.

[10] Nitin Agarwal, Anshul Kumar Singh, Pushpendra Pratap Singh, Rajesh Sahani, "SMART HELMET", International Research Journal of Engineering and Technology, volume 2, issue 2, May 2015.