INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X
Impact factor: 4.295
(Volume 4, Issue 5)
Available online at: www.ijariit.com

Smart bike data recorder for accident recovery

Shivam Kavathe
shivam.me45@gmail.com
Sinhgad Academy of Engineering, Pune, Maharashtra

Dr. R. K. Patil
rashmkipatil@gmail.com
Sinhgad Academy of Engineering, Pune, Maharashtra

Heena Malandkar
heenamalandkar938@gmail.com
Sinhgad Academy of Engineering, Pune, Maharashtra

Shreya Revadekar
shreyasr299@gmail.com
Sinhgad Academy of Engineering, Pune, Maharashtra

Rajkumar Gond
gondrajkumar123@gmail.com
Sinhgad Academy of Engineering, Pune, Maharashtra

ABSTRACT

These days' accidents have become a dominant issue in the world. By this incident, many people lost their lives. Safety, while driving or riding, is a crucial factor. The project will avoid such type of issue by using different sensor networks providing surveillance of the rider. In the absence of precise data regarding the causal factors of bike accidents. The actual effectiveness of system keeping this in mind we are proposing a system where the bike will send messages to emergency services. This sensor networks and wireless communication technologies are used for reducing the accidents due to unreliable problems. The system works for the accident avoidance and security providence for both bike and the bike rider. Nowadays, Science has made advances in recent bikes. These are having higher speed, state of the art engine, and more power, that's why it leads to accidents easily. It necessary to track all records of the bike.

Keywords— *EMS, MEMS module, GPS, GSM, IOT, Image processing, Embedded system*

1. INTRODUCTION

Now a day in every country vehicle accident is a major problem. Bikes are more likely involved in overall crashes. Many services are conducted by the different campaign for the awareness of death and disabilities due to the accident. This result in the development of a safety system also different technologies are invented to overcome this problem Here we are making efforts to overcome bike accidents. Many of the accident takes place due to the negligence of driver and breaking traffic rules. Drunken driving is one of the major issues also not wearing a helmet while riding a bike [1]. In the existing system, a GPS tracking device is implemented for the real-time monitoring system. It will be helpful when an accident occurs by giving the location in terms of latitude and longitude to the victim's family and nearby ambulance via GSM (Global System for mobile) [2]. Various sensors like Temperature sensor, Speed sensor, Helmet switch, etc. are used for the safety of drive [3]. These sensors will give information about the different parameters of the bike.

In airplanes black box traditionally being used for investigating an airplane accident. Now a day this is not the key-feature only for the airplanes in high consumer vehicle black box like the system is used [4]. But not in bikes because of cost issues. In the system, we are implementing black box like recorder called smart recorder to record real-time speed, tilt, the status of eyes of rider i.e. open or close using image processing technology [5]. This data is also stored on remote IOT server. This stored data is useful for police investigation purpose hence finding the real culprit. We can see also the real scenario. The insurance company uses this recorded data for checking the policy terms also for calculating insurance by monitoring data regularly.

2. LITERATURE REVIEW

This prototype can be designed with a minimum number of circuits. This can contribute to constructing safer vehicles, improving the treatment for crash victims, helping insurance companies with their vehicle crash investigations, and enhancing road status in order to decrease the death rate. According to the World Health Organization, more than a million people in the world die each year because of transportation-related accidents. In order to react to this situation, the black box system draws the first step to solve the problem. Like flight data recorders in aircraft, "Black Box" technology can now play a key role in motor vehicle crash investigations. A significant number of vehicles currently on the roads contain electronic systems that record in the event of a crash. That is why it is so important to have recorders that objectively track what goes on in vehicles before, during and after a

crash as a complement to the was used. Subjective input that is taken usually from victims, eyewitnesses and police reports. The data saved can be retrieved only after the accident for privacy purposes. In addition, a detailed report will be given to the user containing the recorded data in the memory [6].

In case of an accident, the time and location (coordinates) are sent through GSM to a pre-set number for immediate rescue and treatment. Recorded data can also be used for forensics, revealing the problems that caused the accident and give the manufacturer an idea for improvement. So the motto is to develop an embedded integrated system consisting of a microcontroller, a power supply unit, sensors, memory, a motor drive unit and a GPS/GSM modem. The concept is similar to the "black box" data recorders on airplanes. It records all the information, like speed & temperature of the cabin/engine, time and location, before and after the accidents so that it can be used to analyze the accident accordingly [7].

This paper presents findings from research conducted to identify existing and emerging Intelligent Transportation System (ITS) technologies for all vehicle types. Some of these technologies have the potential to actively prevent crashes involving motorcycles or passively lessen the severity of injuries when a motorcycle is involved in a crash. Examples include electronic stability programs; collision warning and avoidance system; and visibility enhancing system among others. Some technologies are intended to prevent run-off-road crashes, in which vehicle driver departs a lane or roadway or the motorcycle overturns, without colliding with an object or another vehicle [8].

The current study aimed to identify existing and emerging Intelligent Transport Systems (ITS) that have the potential to enhance motorcycle rider safety. A review of the literature revealed that very few commercially available ITS currently exist specifically for motorcycles, although several emerging technologies were identified. Consultations with international experts in ITS, motorcycle safety, motorcycle manufacturers and various road safety research organizations confirmed this. However, there are emerging and existing technologies for other vehicles that have the potential to address key motorcycle safety issues. Each of these technologies was described, and those deemed most directly relevant to these key safety issues were ranked in a prioritized list. Systems which addressed the stability and braking properties of the motorcycle were given the highest priority on this list, as these systems have the potential to enhance motorcycle safety in almost all crash situations. However, this list was based on safety relevance only [9].

The main purpose of the paper is to develop a prototype of Black Box for vehicle diagnosis that can be installed into any vehicle. Like flight data recorders in aircraft, "Black Box" technology plays a key role in vehicle crash investigations. This prototype can be designed with a minimum number of circuits. This can contribute to constructing safer vehicles, improving the treatment for crash victims, helping insurance companies with their vehicle crash investigations, and enhancing road status in order to decrease the death rate. The prototype provides complete information about the car along with Navigation system in collaboration with Google Earth. The prototype can provide Artificial Intelligence Support by having a communication channel between the user and the car. Car-To-Car Communication for analyzing abruptness in the forthcoming vehicle before it intends to collide is a major field studied in the paper along with living analysis through experiments [10].

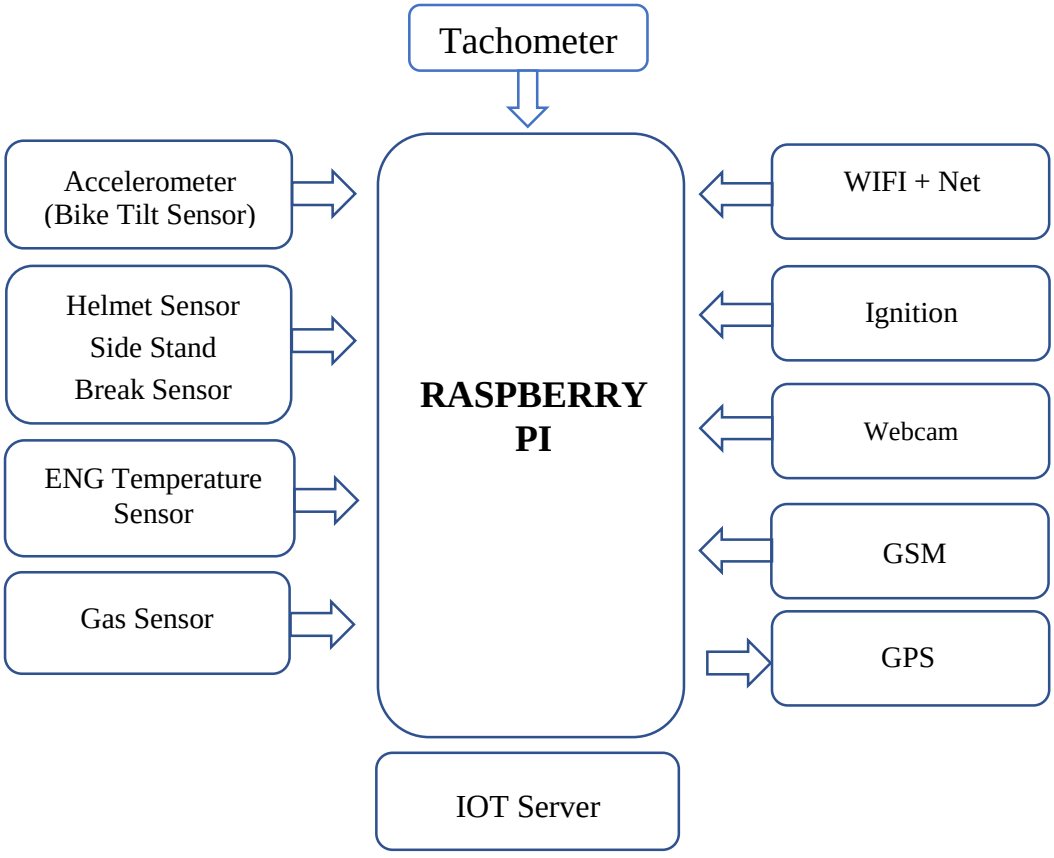

Fig. 1: System overview

3. SYSTEM OVERVIEW

This smart bike recorder has different sensors interfaced to the raspberry pi module. These sensors are a temperature sensor, an alcohol sensor, accelerometer, tilt sensor. After wearing the helmet, helmet switch checks it and grant permission for starting the bike. Alcohol sensor senses the presence of alcohol if not found in fact then and only then the bike will close the ignition relay and bike will start. Temperature sensor sense amount of the engine temperature exhausted from the bike. This helps in maintaining the engine of the bike. The accelerometer measures the speed of the bike and warns the rider if he crosses the speed limit. This speed is regularly stored on IOT server in graphical form. Tilt sensor measures the tilting position with reference to the bike. They enable the easy detection of the orientation of bike. The webcam takes images at certain intervals of the eyes of the rider and using image processing, we monitor the position of eyes. Using this we can check the rider is sleeping or not. GPS is used for real-time tracking of the bike. All the information about the sensor is given to the microcontroller (here raspberry-pi) and through it to the IOT server.

The occurrence of an accident is detected by calculating parameters stored in the IOT server. After an incident, the message is sent to the family member and nearby ambulance using GSM and also the position of the bike is also sent in the form of latitude and longitude.

3.1 Raspberry Pi

Heart of the project Raspberry Pi is a credit card-sized computer originally designed for education, inspired by the 1981 BBC Micro. It is a series of small single-board computers developed in the UK by the Raspberry Pi foundation to use while teaching computer science in schools from developing countries. The Raspberry Pi hardware has evolved from its origin to several versions that feature variations in memory capacity and peripherals supports. Raspberry Pi has its own GPOS; it is not following the procedures of other microcontrollers which use external IDE and program burning process. Raspberry Pi uses various operating systems, but the most common is Raspbian OS.

Newer versions are more powerful than before and convenient to use. Here Raspberry pi 3(B) is used which contains

SoC	: Broadcom BCM2837
CPU	: 4x ARM Cortex-A53 1.2 GHz
GPU	: Broadcom Videocom Videocore IV
RAM	: 1GB DDR2
Networks	: 10/100 Ethernet, 2.4GHz 802.11n wireless
Storage	: External Micro SD slot
GPIO	: 40-Pin header
Port	: HDMI, 3.5mm Audio Jack, 4x USB 2.0, Ethernet, Camera serial interface, Display serial interface

3.2 MEMS

Micro-electro-mechanical Systems is a technology in which the small-scale electronics components are made. These components are nothing but a small-scale replica of the larger mechanical sensors. Components are made using microfabrication techniques. MEMS are used in the electronics equipment's primarily where space is the main issue. MEMS include Microsensors, Microactuators, Microelectronics', microactuators which are the 'Transducers'. These are the devices which convert the Mechanical signal into the electrical signals. Using these components leads to low cost of the electronic products. In this project ADXL345 (Accelerometer), MQ135 (Alcohol Sensor) is being used.

4. CONCLUSION

The smart bike data recorder for accident recovery has been developed for bike monitoring and safety. The system can detect accident using sensors and information stored on the IOT server. After this emergency services will be provided to the driver and short message is sent to the family member, Ambulance and nearby police station. Recorded data used for police investigation and insurance purpose.

5. REFERENCES

[1] "Drunk driving Detection using car ignition locking" by Keerthana K., Ramya G., Dr.N.Bharti, Associate Prof. SAVEETHA SCHOOL OF ENGINEERING ISSN: 1314-3395.

[2] DR. Dilip Sharma, Ravi Vijay, Sakshi Sharma, on "Vehicle Tracking System Using GPS and GSM", Ujjain Engineering College, Ujjain (M.P.).

[3] Kazi Aaliya[1], Gantyala Supriya[2] on "Wireless Black Box Using MEMS Accelerometer for Vehicle Accidental Monitoring " Graduate student, Department of ENTC, PVPP Engineering college, Sion, India.

[4] Manish Bhelande[1], Viraj Chaudhari[2] assistant professor, department of information technology, on "Car Blackbox", Shah and Anchor Kutchhi Engineering College, Chembur, India.

[5] Rajeshree R. Lokhande, Sachin Gawate on "Design and implementation of vehicle black box for driver assistance and alert", WCC, Priyadarshini college of engineering, Nagpur, India.

[6] P.Ajay Kumar Reddy, P.Dileep Kumar, K.Bhaskar Reddy, E.Venkataramana, M.Chandrasekhar Reddy on "Black Box For Vehicles" International Journal of Engineering Inventions ISSN:2278-7461, www.ijeijournal.com Volume 1, Issue 7(October 2012) PP:06-12.

[7] Dheeraj Pawar, Pushpak Poddar on "Car Black Box with Speed Control in Desired Areas for Collision Avoidance" ETYASR-Engineering Technology & Applied Science Research Vol.2,0.5,2012, 281-284.

[8] Patricia A. Turner Research Scientist, Laura Higgins Associate research Scientist Texas A&M University College Station, Texas on "Intelligent Transportation System (ITS) Technologies for Motorcycle Crash Prevention and Injury Mitigation."

[9] MONASH University Accident Research Centre on "Intelligent Transport Systems And Motorcycle Safety" by Megan Bayly, Michael Regan, Simon Hosking.
[10] Technical Research Organization India "A Research Paper on Upgraded Black Box For Automobiles" by Sharvin Pingulkar, Haroondeep Singh Sandhu, Jayant. R. Mahajan BE Student.
[11] Hwase Park and Daesik Ko Daelim University, Mokwon University, KOREA on "A Design of the Intelligent Black Box using Mining Algorithm" International Journal of Smart Home vol.6, No.2, April 2012.
[12] Dr. Suryaprasad J, Sandesh D, PES Institute of Technology, Bangalore, India on "Real Time Drowsy Driver Detection Using Haarcascade Samples".
[13] Wanc Dong, Chenc Quan Cheng, China, "The Automatic Control System of Anti-Drunk Driving" IEEE-2011.

