

An Optimal Driving System by Using Wireless Helmet

K. Rambabu¹, B. Premalatha², C.Veeranjaneyulu³

Abstract— In this Paper implementation of an add-on interaction system for motorcycle is implemented using wireless helmet. The system consists of a vehicle-to-driver, vehicle-to-traffic signal, vehicle to speed breaker communication mechanism, which is based on a ZigBee technology. The system is focused to increase the safety level of a motorcycle, a compact embedded electronic units implementing a voice recognition unit, ZigBee, RF module. The driver-to-vehicle interaction is based on an audio interaction located at helmet level.

Keywords— 8052 microcontroller, ARM-7, RF module, Voice recognition unit, ZigBee.

I. INTRODUCTION

Now a days wearing helmet is becoming very essential. It is made from fiber glass and thermoplastic it acts like a shell for protecting our brain. The helmet is lined with expanded polystyrene (EPS) of controlled density. When the helmet is struck with a hard surface, the inner lining acts as a buffer and absorbs the shock. It bears the sudden change in energy and pressure and keeps the skull intact. The EPS may crush but it still protects the skull. Government has laid many rules for wearing the helmet. Even though public isn't showing their interest in wearing it. Since wearing the helmet is good for people's life. We have designed the wireless helmet which will be very useful for the people. By using this system people can drive their vehicle safely.

In this proposed system we have used a wireless communication between bike to helmet and bike to traffic signal and speed breaker. The system will be comprised of a helmet module including stereo speakers and microphone, and a bike mounted base unit. The system will make use of different wireless communication protocols including ZigBee and another radio frequency (RF) protocol with the intent to eliminate all physical connections between the rider and the motorcycle. The helmet module will communicate with the bike module using a ZigBee signal. Whenever we are in traffic sometimes the signal will not visible to the rider or driver. Because in front of our bike big lorries and buses are there, then using ZigBee we can display the signal on the bike LCD. Here we developed another one also i.e. when the rider or driver driving a bike he don't know where the speed breakers are there. By using RF technology we will know where the speed breakers are there.

II. RELATED WORK

1. ARM-7 Microcontroller:

In this paper ARM-7 microcontroller acquires and stores different parameter of vehicle. The main block of multi-functional monitoring system is ARM-7 micro controller. The software program is stored in ARM-7 microcontroller on chip memory, according to which it provides the controlling actions. It senses signals from input blocks and processes output blocks. The LCD used to display traffic signals and where is the speed breaker. ARM-7 microcontroller is placed at bike's module.

2. Voice recognition unit:

The speech recognition system is a completely assembled and easy to use programmable several carrier frequencies are commonly used in commercially-available RF modules, including 433.92 MHz, 315 MHz, 868 MHz and 915 MHz. These frequencies are used because of national and international regulations governing the use of radio for communication. The speech recognition system is a completely assembled and easy to use programmable speech recognition circuit. Programmable, in the sense that you train the words (or vocal utterances) you want the circuit to recognize.

This board allows you to experiment with many facets of speech recognition technology. It has 8 bit data out which can be interfaced with any microcontroller for further development. Some of interfacing applications which can be made are controlling home appliances, robotics movements, Speech assisted technologies, speech to text translation, and many more. In the voice recognition unit already records the left, right and stop. When the helmet is manufacturing these all are recorded. Some voice recognition systems use voice independent speech recognition, these will be take any person voice.



Figure.1 Voice recognition unit

In the voice recognition unit already records the left, right and stop. When the helmet is manufacturing these all are recorded. Some voice recognition systems use voice independent speech recognition, these will be take any person voice. But sometimes we use only particular voice these are called as voice dependent speech recognition. But here we use independent speech recognition unit. Whenever we are driving a bike, if we want go to left side, then just say left automatically left indicator will glow.

3. ZigBee:

ZigBee is a specification for a suite of high level communication protocols using small, low-power digital radios based on the IEEE 802.15.4, 2006 standard for wireless personal area networks (WPANs), such as wireless headphones connecting with cell phones via short-range radio. The technology defined by the ZigBee specification is intended to be simpler and less expensive than other WPAN, such as Bluetooth.

ZigBee is used in applications that require a low data rate, long battery life, and secure networking. ZigBee has a defined rate of 250 Kbit/s, best suited for periodic or intermittent data or a single signal transmission from a input device. Applications include wireless traffic management systems, and other consumer and industrial equipment that require range.

ZigBee is the only standards-based wireless technology designed to address the unique needs of low-cost, low-power wireless sensor and control networks in just about any market. Since ZigBee can be used almost anywhere, is easy to implement and needs little power to operate, the opportunity for growth into new markets, as well as innovation in existing markets, is limitless. Here are some facts about ZigBee:

- With hundreds of members around the globe, ZigBee uses the 2.4 GHz radio frequency to deliver a variety of reliable and easy-to-use standards anywhere in the world.
- Consumer, business, government and industrial users rely on a variety of smart and easy-to-use ZigBee standards to gain greater control of everyday activities.
- With reliable wireless performance and battery operation, ZigBee gives you the freedom and flexibility to do more.
- ZigBee offers a variety of innovative standards smartly designed to help you be green and save money.

4. 8052 Microcontroller:

In this paper 8052 microcontroller is used in helmet section and traffic signal section. The 8052 is another member

of the 8051. The 8052 has all the standard features of the 8051 as well as an extra 128 bytes of RAM and an extra timer. 8052 has 256 bytes of RAM and 3 timers. It has 8K bytes of on-chip program ROM instead of 4k bytes. The 8052 has three (3) 16-bit timers, the 8051 has two (2). The third timer has some new operation modes not available with the 8051.

5. RF module:

An RF module is a small electronic circuit used to transmit and/or receive radio signals on one of a number of carrier frequencies. RF modules are widely used in electronic design owing to the difficulty of designing radio circuitry. Here RF transmitter is placed at Speed breaker section. RF receiver is placed at bike's section.

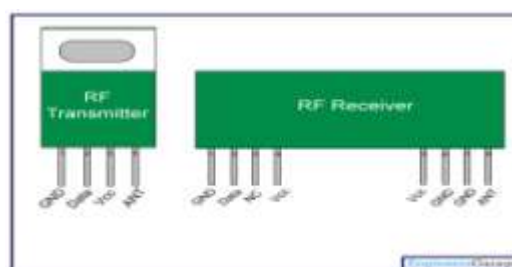


Figure.2 RF transmitter, RF receiver

Transmission through RF is better than IR (infrared) because of many reasons. Firstly, signals through RF can travel through larger distances making it suitable for long range applications. Also, while IR mostly operates in line-of-sight mode, RF signals can travel even when there is an obstruction between transmitter & receiver. Next, RF transmission is more strong and reliable than IR transmission. RF communication uses a specific frequency unlike IR signals which are affected by other IR emitting sources.

III. SYSTEM IMPLEMENTATION

BLOCK DIAGRAMS

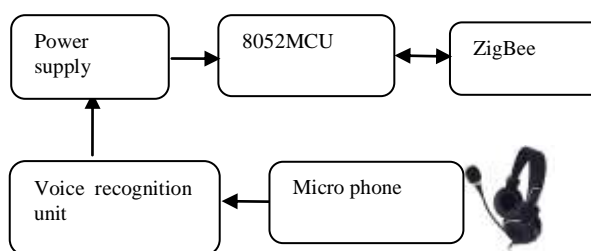


Figure.3 Helmet Section

When we are driving a bike, sometimes we don't know where is speed breaker. Using this method we can eliminate that problem. At speed breaker section we place one RF transmitter. Similarly at the bike section we place one RF receiver. If the speed breaker is nearer to bike display on bike i.e., Speed breaker go slow. By using these techniques we can eliminate the accident.

IV. RESULTS

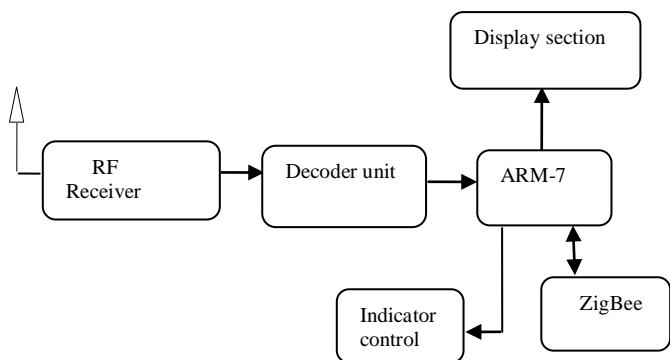


Figure.4 Bike Section

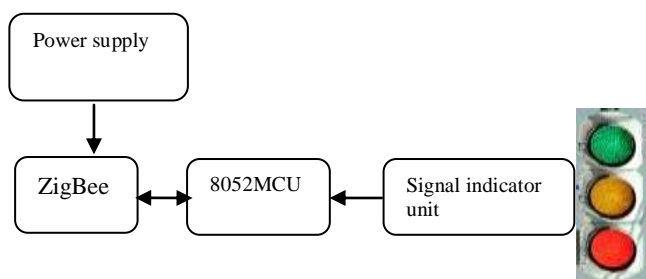


Figure.5 Signal Section

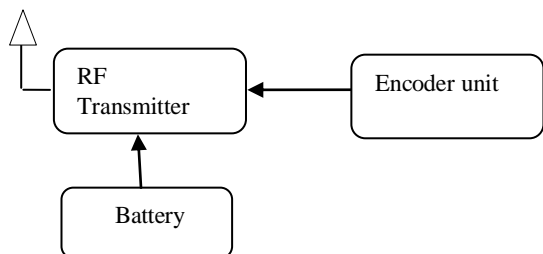


Figure.6 Speed Breaker section

In this paper implementation of an optimal driving system by using wireless helmet. Whenever we are driving a bike, if we want go to left side, just say left then left indicator is glow through ZigBee communication. After we want to stop the indicator, just say stop, then the indicator will off. Left, right, stop all are record in the helmet section using voice recognition unit.

When we are in traffic, sometimes traffic signals are not visible. Using this technique we can eliminate that problem. In the traffic signal we place one ZigBee module. In the bike section ZigBee, LCD are there. Suppose traffic signal is in green colour then green is display on the bike's LCD. Similarly remaining colours are also display on the bike.

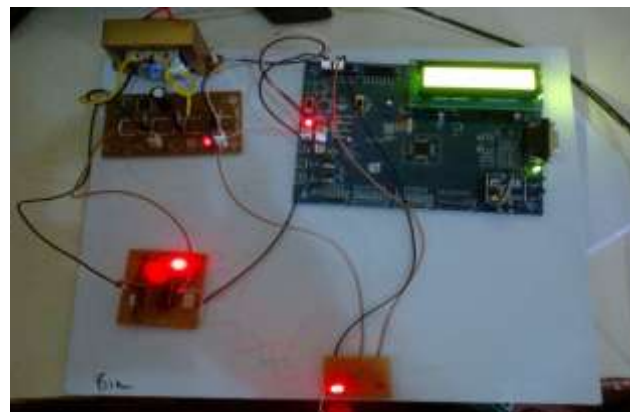


Figure.7 Bike Section



Figure.8 Helmet Section

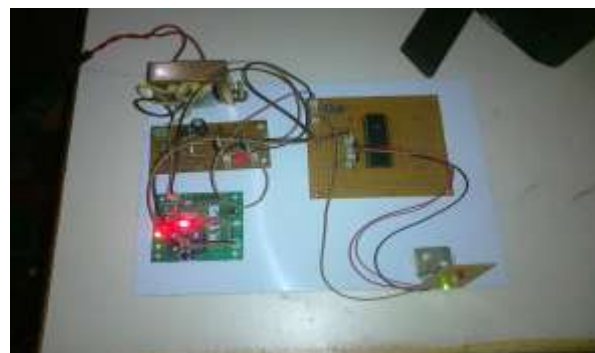


Figure.9 Traffic Signal Section

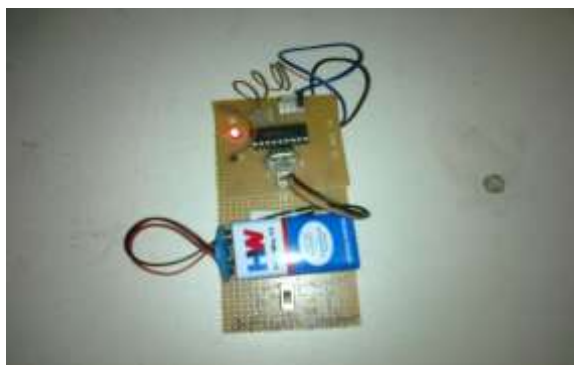


Figure.10 Speed Breaker Section

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V. CONCLUSION

In this proposed paper implementation of an add-on interaction system for a vehicle-to-driver, vehicle-to-speed breaker and vehicle to traffic signal, based on ZigBee wireless communication and RF signal. By using this we can eliminate bike accidents.

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