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Embedded Based Electronic Safety Device for Bike Riders

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Abstract: ***Accident is a specific, unpredicted, unusual and unintended external action which occurs with no apparent and intentional cause but with marked effects. Negligence of the driver is the major factor of such accidents. Nowadays most of the countries are forcing the motorcycle riders to wear the helmet and not to use the vehicles when the person is in drunken condition and also when the person is on phone. But still the rules are being violated by the users. In order to overcome this we introduces an embedded based intelligent system, Smart Helmet, which automatically checks whether the person is wearing the helmet and has non- alcoholic breath while riding. It also checks whether the person is using mobile phone while riding if it is so then the bike speed will automatically reduces. The person met with an accident then the smart helmet will send a message to the nearer hospital through the RF signal. Here we have a RF transmitter at the helmet and the RF receiver at the bike. IR signals are used to sure the wearing of helmet on the head.***

Keywords*:* Helmet, Accident, Alcohol sensor, Mobile detector, RF signals, microcontroller(89C51)

1. Introduction

Providing safety to a person while riding the bike is of prime concern. One of the way to do this is by making it mandatory to wear helmet while riding a bike. This is difficult to implement as every time the concerned people can't keep an eye on everybody. So detecting whether the driver has worn a helmet or not, as well whether he has consumed alcohol or not is the main problem. The system what we have planned to design provides solution to this problem. The system makes it mandatory for the rider to wear helmet before starting the vehicle and also he shouldn't have consumed alcohol. If the rider fails to do so then the vehicle cannot be started. This system also provides security to the vehicle as every bike will have an unique helmet and without which a person fails to start that particular bike. This project includes a helmet body and an integrated electronic system disposed in the helmet body. It is operated through a wireless control system. The components of the electronic system are sufficiently small and rugged for use in the helmet, ensuring that the helmet is lightweight and durable. Moreover, the components are spaced about the helmet to provide even weight distribution to promote overall balance and safety.

2. Methodology

The block diagram consists of two parts RF transmitter part and RF receiver part. One part is to be implemented in the helmet and consists of transmitter and the other in the bike which consists of a receiver. The transmitter part interprets the required condition and the microcontroller generates the code sequence continuously which is ported to the transmitting block. This transmitting block can be a IR module. This signal is transmitted to the receiver. The receiver decodes this signal based on which it takes necessary action like turning on/off the ignition system. The first step is to detect whether the driver is wearing the helmet or not. For this purpose we can use an IR sensors. The second condition is to check whether the rider is drunk or not. To check this we are using an alcoholic detector interfaced to the control circuit, which is placed near his mouth in helmet .The wireless network can be implemented by the RF (radio frequency) transmission/reception. With the help of RF we can intimate the rider is drunken or not worn helmet to the police station or concern person. The proposed system also checks whether the person is using mobile phone while riding if it is so then the bike speed will automatically reduces. If the person met with an accident then this smart helmet will send a message to the nearer hospital through the RF signal. The engine should not ON if any of the above conditions is violated. The software used in the proposed system is keil compiler –uVision3 which uses embedded c for coding. The fig 1 & 2 shows the block diagram of transmitter and receiver part of the proposed system respectively.

3. Block Diagram Description

3.1 Power supply unit

This section needs two voltages viz., +12 V & +5 V, as working voltages. Hence specially designed power supply is constructed to get regulated power supplies.

3.2 Alcohol Sensor: MQ-3

This alcohol sensor is suitable for detecting alcohol concentration on your breath, just like your common breath analyzer. It has a high sensitivity and fast response time. Sensor provides an analog resistive output based on alcohol concentration. The drive circuit is very simple, all it needs is one resistor. A simple interface could be a 0-3.3V ADC.

3.3 Monostable Multivibrators

Monostable Multivibrators have only ONE stable state (hence their name: "Mono"), and produce a single output pulse when it is triggered externally. Monostable Multivibrators only return back to their first original and stable state after a period of time determined by the time constant of the RC coupled circuit.

3.4 RF Transmitter

This is 2-channel Radio Frequency Transmitter specially tuned with its RF Receiver part in carrier frequency. Each zone are set with one channel and transmits their presence to moving vehicle's RF Receiver unit.

3.5 RF Receiver

This is also a 2-channel RF Receiver specially tuned with its counterpart RF Transmitter in carrier frequency. When vehicle enters into any zone that zones RF signals are received by this unit. Thus depend upon the channel signals it receives from transmitting end that channel output of RF Receiver goes HIGH. This HIGH signal is fed to controller chip through Buffer & Driver and Switching stage for further processing.

3.6 IR transmitter and Receiver

Infrared (IR) transmitters and receivers are present in many different devices, though they are most commonly found in consumer electronics. The way this technology works is that one component flashes an infrared light in a particular pattern, which another component can pick up and translate into an instruction. These transmitters and receivers are found in remote controls and all different types of devices, such as televisions and DVD players. Peripheral devices that include this technology can also allow a computer to control various other consumer electronics. Since infrared remotes are limited to line of sight operation.

3.7 Indicator

This stage provides visual indication of which relay is actuated and deactivated, by glowing respective LED or Buzzer.

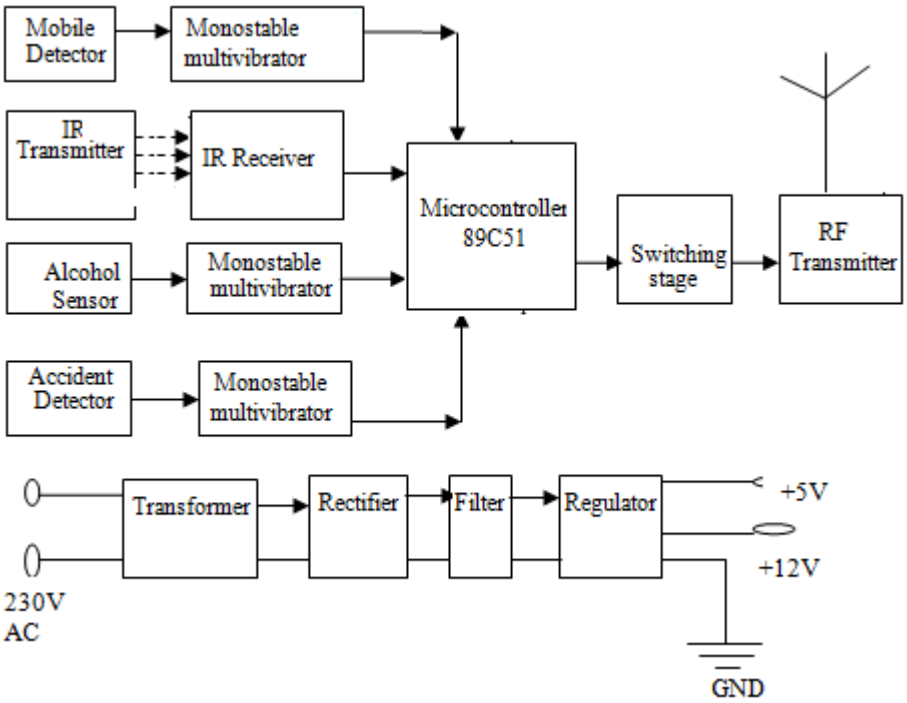

Figure 1: The Block Diagram of Transmitter Section

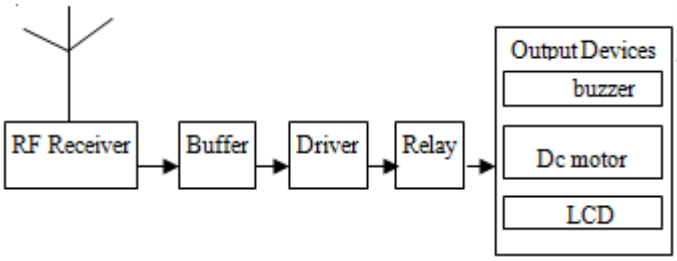

Figure 2: The Block Diagram of Receiver Section

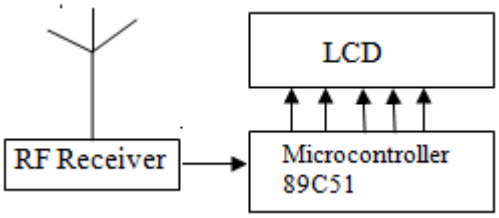

Figure 3: The Block Diagram of Receiver Section at hospital

3.8 Buffers and Drivers

Buffers do not affect the logical state of a digital signal (i.e. a logic 1 input results in a logic 1 output whereas logic 0 input results in a logic 0 output). Buffers are normally used to provide extra current drive at the output but can also be used to regularize the logic present at an interface. This section is used to drive the relay where the output is complement of input which is applied to the drive but current will be amplified.

3.9 Relays and DC Motor

It is a electromagnetic device which is used to drive the load connected across the relay and the o/p of relay can be connected to controller or load for further processing. A DC motor relies on the fact that like magnet poles repels and unlike magnetic poles attracts each other. A coil of wire with a current running through it generates an electromagnetic

field aligned with the centre of the coil. By switching the current on or off in a coil its magnetic field can be switched on or off or by switching the direction of the current in the coil the direction of the generated magnetic field can be switched 180°.

4. Software Details

The proposed system is integrated using keil compiler-uvision3which uses embedded C or assembly language for coding. This also uses WLPRO programmer.

5. Applications and Future Enhancement

5.1 Applications

This project can be used for all kinds of two wheeler. Further this project can be to eliminate key-lock arrangement altogether. This project can also be implemented in a confined area / geological area, so as to restrict the movement of vehicle including two-wheelers. Near the petrol Pumps, LPG Storages & Explosive Storage Places to prevent any possible damage due to the Cell Phone / GSM frequency, which may trigger explosion. In the military Camps, Defence establishments etc to prevent the information leaking. The cell phone may cause malfunctioning of the Bio-Medical Equipment. So this project can be used in the hospitals to detect the active mobile device.

5.2 Future Enhancement

In future we have a tendency to planned to construct our intelligent system during a compact size and additionally as globally acceptable to notify the No entry and No parking areas. Government should enforce laws to install such system in each 2 wheeler. By implementing such mechanism in 2 wheelers, the deaths attributable to due to driving and alternative road fatalities are often brought to zero p.c. And also indicates No parking area which would reduce the crowd of the vehicle in those areas. No entry area is mainly allocated during the development or repairing of the road, if the rider enters in such area this system would immediately intimate as No entry area and vehicle can stop automatically. in case of any accident it might send the messages to the friends continuously about the location of the accident happened until the first aid reaches the rider. Our system helps to know the location of the vehicle for rescuing in the case of theft incidents.

6. Conclusion

This design of helmet has been prepared keeping in mind the safety of bikers. The Motor system used here will make the biker feel free while on road because he will automatically get the information about to wear the helmet and Mobile detection. So this proposed system avoids the violation of traffic rules. The proposed system also helps in detection of accident.

References

[1] Azurna, R. T., "A Survey of Augmented Reality," Teleoperators and Virtual Environments 6, pp.3 5 5-385, 1997.
[2] Foxlin,E., Altshuler, Y, Naimark, L. andHarrington, M, InterSense, Inc., "Flight Tracker : A Novel Optical/Inertial Tracker for Cockpit Enhanced Vision," IEEE/ACM International Symposium on Mixed and Augmented Rality(ISMAR 2004), November 2-5, 2004.
[3] A. Dwyer III and J. Eugene, “Helmet Mounted Display,” U.S. Patent5 281 960, Jan. 25, 1994.
[4] National Institute on Alcohol Abuse and Alcoholism (NIAAA). [Online]. Available: http://www.niaaa.nih.gov/Resources/DatabaseResources/QuickFacts/AlcoholConsumption/PercentAlcoholGender.html, 2007.
[5] N. Cherry, J. Johnston, H. Venables, H. Waldron, L. Buck, and C. MacKay, “The effects of toluene and alcohol on psychomotor performance,” Ergonomics, vol. 26, no. 11, pp. 1081–1087, Nov. 1983

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Sushma V R did her Bachelor of Engineering in Electronics and Instrumentation Engineering at GSSS Institute of Technology, Mysore, Karnataka, India and doing Master of Technology in Digital Electronics at Karavali Institute of Technology, Mangalore, Karnataka, India. The research interest includes the Electronics and Embedded System Design.