

Smart Helmet for Fall

N. Prakash^{*1}, S. Udhaya Kumar², S. Sabari Giri Vashan², M.Sudhakaran²

¹Assistant Professor, Department of ECE, Panimalar Institute of Technology, Chennai, Tamil Nadu, India

²B.E Students, Department of ECE, Panimalar Institute of Technology, Chennai, Tamil Nadu, India

ABSTRACT

This paper describes a new embedded system, called smart helmet, for the detection of unexpected falls for the people who drives motor cycle. In combination with a new sensors system and the monitoring of its own rotation, Tilt sensor is able to detect a fall in its very beginning. It is thus able to initiate some emergency actions, such as inflating a tiny airbag, in order to alleviate a fall's consequences, primarily potential injuries. In that respect, this helmet is unique. It's physical properties, such as size, weight, and energy resources; make it almost invisible, so that it can be worn at any time at any occasion by any person. Data from the sensor is evaluated with several threshold-based algorithms and position data to determine a fall, taking into account factors such as height, weight, and level of activity of the user. When a fall is detected a notification is raised requiring the user to respond. For elderly people, unexpected falls can be a major problem, since they often go along with severe injuries, such as femoral neck fractures. Obviously, the integration of location awareness and fall detection technologies fulfills the requirements of delivering critical information to relative professions and improve the medical care quality.

Keywords : Smart Helmet , Adxl335 Relay, GPL, GNU

I. INTRODUCTION

As indicated by a report discharged by the Tamil Nadu Police in 2013, there were a sum of 15,563 fatalities in 14,504 recorded mishances. The comparing number of individuals maintaining deplorable wounds in 4,715 mishances was 6,513, and the quantity of individuals who managed minor wounds was 69,168 of every 44,158 mishaps. An aggregate of 2,861 individuals got away wounds. The state additionally bested the rundown of most mishaps among all states for all past ten years from 2002 to 2012. It was evaluated that were around eight mishaps consistently and an aggregate of 15 percent of all mishances in the nation happened in the state. According to the U.S. National Highway Traffic Safety Administration (NHTSA), in 2006, 13.10 autos out of 100,000 wound up in lethal accidents. The rate for cruisers is 72.34 for every 100,000 enrolled bikes.

Bikes additionally have a higher casualty rate for every unit of separation voyaged when contrasted and cars. Per vehicle mile voyaged, motorcyclists' danger of a lethal crash is 35 times more noteworthy than a traveler auto. In 2004, figures from the UK Department for Transport demonstrated that bikes have 16 times the rate of genuine wounds contrasted with autos.

Keeping in mind the end goal to defeat this mishap and to give wellbeing to the drivers, the shrewd cap is utilized, giving an external scope to the head, when the sensor detects a fall in edge.



Figure 1

A national study by the Australian Transport Safety Bureau (ATS) found that:

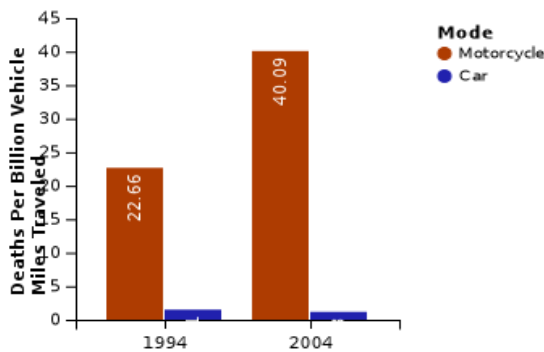


Figure 2

We have designed a helmet in a way that person feels comfortable in wearing the helmet and also the helmet predetermines the accident and fill the air into the air bags which covers the head safeguarding life of a person.

II. BLOCK DIAGRAM OF SMART HELMET FOR FALL:

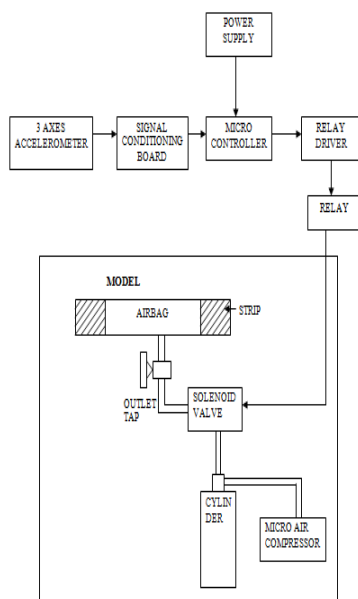


Figure 3

EXPLANATION:

The accelerometer sensor senses the angle of the fall. The output of the angle sensor is analog and also it was very low. The signal conditioning board will amplify the signals and sent those signal to the micro controller. The micro controller converts the analog signal into digital and the threshold for the particular person is already stored. The current value is compared with the stored value and it decides whether the fall is going to occur or not. When it decides that the fall is going to occur, then it activates the solenoid valve. The solenoid valve is activated through relay driver and relay. The micro air compressor and cylinder are used for filling the air bag. When air is filled in the air bag, the fall can be avoided and whenever it is not necessary the air will get released. The filling of air in the air bag will be done by using solenoid valve. The releasing of air is done by using the outlet tap. By using this, the fall can be detected and it can be avoided by using these concepts.

III. EXPLANATION OF THE BLOCK

POWER SUPPLY:

The power supply output is given to micro controller and other circuit also; the design of the power supply is mainly because of the micro controller, the micro controller work in Dc source with a voltage of +5v. As we are getting the line voltage VL has 230v in ac source, so it is not possible. This power supply designs an output of +5v Dc to activate the micro controller.

MICROCONTROLLER:



Figure 4

The micro controller, which we are utilizing here, is Arduino UNO. Arduino is an open-source gadgets stage in light of simple to-utilize equipment and programming. Arduino sheets can read inputs - light on a sensor, a finger on a catch, or a Twitter message - and transform it into a yield - actuating an air compressor setting off the barrel to fill airbag. In this undertaking, when ADXL335 sends flag to the arduino, it picks up the flag as a simple info where it checks whether the got flag achieves the limit esteem put away at first. At the point when the condition turns out to be valid, it will send the flag to the solenoid valve to fill air into the airbag.

RELAY:

A relay is an electrical switch that opens and closes under the control of another electrical circuit. In the first shape, the switch is worked by an electromagnet to open or close one or numerous arrangements of contacts. It was developed by Joseph Henry in 1835. Since a relay can control a yield circuit of higher power than the info circuit, it can be considered, in a wide sense, to be a type of an electrical enhancer. A sort of transfer that can deal with the high power required to straightforwardly control an electric engine or different burdens is known as a contactor. Strong state transfers control circuits with no moving parts, rather utilizing a semiconductor gadget to perform exchanging. Transfers with aligned working qualities and once in a while different working loops are utilized to shield electrical circuits from over-burden or blames; in present day electric power frameworks these capacities are performed by computerized instruments still called "defensive transfers". On the off chance that we utilize this hand-off, we have a downside that at the time we kill switch, it kills slowly, keeping in mind the end goal to side road the hand-off quickly we need to interface it with diode

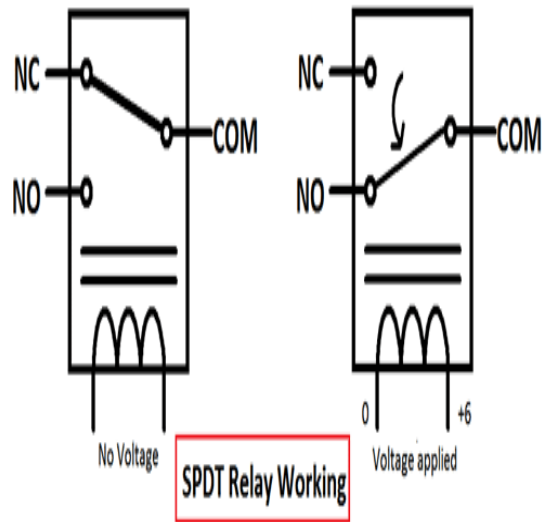


Figure 5

AXES ACCELEROMETER:

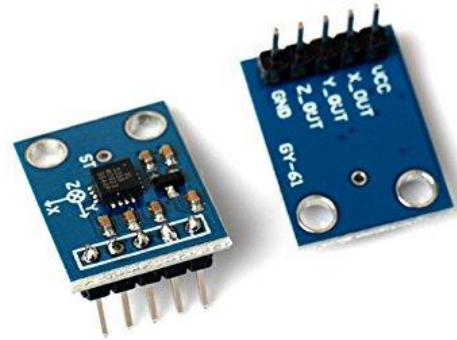


Figure 6

The ADXL335 is a little, thin, low power, finish 3-hub accelerometer with flag adapted voltage yields. The item measures speeding up with a base full-scale scope of ± 3 g. It can gauge the static quickening of gravity in tilt-detecting applications, and additionally unique increasing speed coming about because of movement, stun, or vibration. The client chooses the transfer speed of the accelerometer utilizing the CX, CY, and CZ capacitors at the XOUT, YOUT, and ZOUT pins. Data transmissions can be chosen to suit the application, with a scope of 0.5 Hz to 1600 Hz for the X and Y tomahawks, and a scope of 0.5 Hz to 550 Hz for the Z hub. The ADXL335 is accessible in a little, low profile, 4 mm \times 4 mm \times 1.45 mm, 16-lead, plastic lead outline chip scale bundle (LFCSP_LQ)

An accelerometer is an electromechanical gadget that will gauge increasing speed powers. These powers might be static, similar to the steady power of gravity pulling at your feet, or they could be dynamic - caused by moving or vibrating the accelerometer. At whatever point there is a fall of edge in x or y or z position, the sensor sends flag setting off the barrel to fill the airbag.

SOFTWARE :

Arduino

Embedded C

Embedded C is a set of language extensions for the C programming language by the C Standards Committee to address commonality issues that exist between C extensions for different embedded systems. Historically, embedded C programming requires nonstandard extensions to the C language in order to support exotic features such as fixed-point arithmetic, multiple distinct memory banks, and basic I/O operations.

Arduino is an open source computer hardware and software company, project, and user community that designs and manufactures single-board microcontrollers and microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical and digital world. The project's products are distributed as open-source hardware and software, which are licensed under the GNU Lesser General Public License (LGPL) or the GNU General Public License (GPL),[1] permitting the manufacture of Arduino boards and software distribution by anyone. Arduino boards are available commercially in preassembled form, or as do-it-yourself (DIY) kits.

EXISTING SYSTEM:

1. Fall can't be determined priory in vehicles.
2. Accident occurred and people get injured.
3. This may collapse the following vehicles also.

PROPOSED METHOD:

1. Fall is predetermined by using 3-axis Accelerometer.

2. Accident can be avoided.
3. Human life can be saved by the air bag more efficiently than normal helmet.

OUTPUT:

Whenever the 3 axis accelerometer detects the fall of angle x or y or z position, it sends signal to the arduino which compares it with threshold value and triggers the air compressor to pump air into the airbags if the received signal is either higher or equal to the threshold. As a result, the air bag covers the head safeguarding the life. So the helmet will be visible only at the time of accident.

IV. CONCLUSION

Thus the 'SMART HELMET FOR FALL' is an important protective gear worn to protect the persons during accident and safeguard their life.

V. FUTURE SCOPE

Street wellbeing for driver is a fundamental necessity of society. Nowadays an ever increasing number of vehicles are made. As the Number of vehicles increment step by step. Impact of vehicle likewise Increases all the while. Adolescents lean toward cruiser as opposed to different vehicles. In this circumstance this undertaking satisfy the Purpose of sparing lives. Protective cap is best security gear for driver. In future we would try to implement additional features like sending message indicating that accident occurred in some location and also implement compulsion of wearing helmet for drive.

VI. REFERENCES

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