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AN ADVANCED BLUETOOTH BASED SMART HELMET FOR ENSURING SAFETY IN TRAFFIC.

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Abstract:

In today's era, especially in the young generation, the craze of motorbikes is really remarkable. The middle-class families prefer to buy motorbikes rather than four wheelers, because of their low prices. As the bikes in our country are increasing, the road mishaps are also increasing day by day, due to which many deaths occur, most of which are caused due to most common negligence of not wearing a helmet. According to a survey of **India**, there are around **698 accidents** occurring due to bike crashes per year. If accidents are one issue, lack of proper treatment is another reason for deaths. In India out of the **698 deaths** occurring annually, nearly half of the people die due to lack of proper treatment in proper time. The many reasons for this are late arrival of an ambulance, no person at the place of accident to give information to the ambulance or parents, etc.This is a situation we observe in our day to day life; a thought of finding some solution to resolve this problem comes up with this idea of giving information about the accident as soon as possible because of **TIME**……!!!!!!!!! matters a lot. If everything is done in time, at least, we can save half the lives that are lost due to bike accidents.A **smart helmet** is a special idea which makes motorcycle driving safer than before. The main aim of the smart helmet is to prevent the biker from starting his bike until and unless he actually wears the helmet. The helmet acts as the second key to a biker.

In this project we have designed the helmet using IoT(Internet of Things) and with Arduino software. There are mainly two modules one is transmitter module and another is receiver module.A transmitter module is carried by the helmet. It consists of RF transmitter (434 MHz), encoder IC (HT12E) and TIP 122 as the main components. Receiver module consists of Decoder IC and Relay Module.

Literature Survey:

An Embedded System is a combination of computer hardware and software, and perhaps additional mechanical or other parts, designed to perform a specific function. A good example is the microwave oven. Almost every household has one, and tens of millions of them are used everyday, but very few people realize that a processor and software are involved in the preparation of their lunch or dinner.

This is in direct contrast to the personal computer in the family room. It too is comprised of computer hardware and software and mechanical components (disk drives, for example). However, a personal computer is not designed to perform a

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specific function rather; it is able to do many different things. Many people use the term general-purpose computer to make this distinction clear. As shipped, a general-purpose computer is a blank slate; the manufacturer does not know what the customer will do wish it. One customer may use it for a network file server another may use it exclusively for playing games, and a third may use it to write the next great American novel.

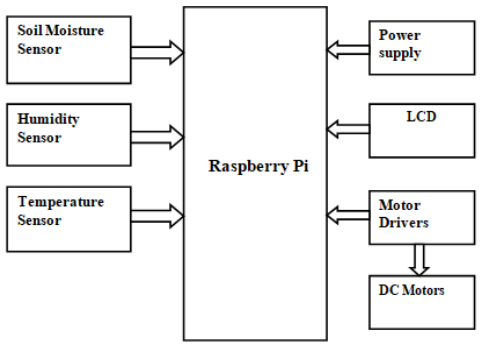
Frequently, an embedded system is a component within some larger system. For example, modern cars and trucks contain many embedded systems. One embedded system controls the anti-lock brakes, other monitors and controls the vehicle's emissions, and a third displays information on the dashboard. In some cases, these embedded systems are connected by some sort of a communication network, but that is certainly not a requirement.

At the possible risk of confusing you, it is important to point out that a general-purpose computer is itself made up of numerous embedded systems. For example, my computer consists of a keyboard, mouse, video card, modem, hard drive, floppy drive, and sound card-each of which is an embedded system. Each of these devices contains a processor and software and is designed to perform a specific function. For example, the modem is designed to send and receive digital data over analog telephone line. That's it and all of the other devices can be summarized in a single sentence as well.

If an embedded system is designed well, the existence of the processor and software could be completely unnoticed by the user of the device. Such is the case for a microwave oven, VCR, or alarm clock. In some cases, it would even be possible to build an equivalent device that does not contain the processor and software. This could be done by replacing the combination with a custom integrated circuit that performs the same functions in hardware. However, a lot of flexibility is lost when a design is hard-cooled in this way. It is mush easier, and cheaper, to change a few lines of software than to redesign a piece of custom hardware.

3.1 BLOCK DIAGRAM

It contains transmitter and receiver sections the below figure shows the transmitter block diagram .



3.3 HARDWARE TOOLS

In this project the hardware requirements are following:

- Power supply
- LCD
- Soil Moisture Sensor
- Humidity Sensor
- Temperature Sensor
- Raspberry pi3
- DC Motors

Temperature Sensors (LM35):

The LM35 series are precision integrated-circuit temperature sensors, whose output

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voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in Kelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient centigrade scaling. The LM35 does not require any external calibration or trimming to provide typical accuracies of ±1/4°C at room temperature and ±3/4°C over a full -55 to +150°C temperature range. Low cost is assured by trimming and calibration at the wafer level. The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or control circuitry especially easy. It can be used with single power supplies, or with plus and minus supplies. As it draws only 60 µA from its supply, it has very low self-heating, less than 0.1°C in still air. The LM35 is rated to operate over a -55° to +150°C temperature range, while the LM35C is rated for a -40° to +110°C range (-10° with improved accuracy). The LM35 series is available packaged plastic TO-92 transistor package. The LM35D is also available in an 8-lead surface mount small outline package and a plastic TO-220 package.

Features:

1. Calibrated directly in ° Celsius (Centigrade)
2. Linear + 10.0 mV/°C scale factor
3. 0.5°C accuracy guaranteeable (at +25°C)
4. Rated for full -55° to +150°C range
5. Suitable for remote applications
6. Low cost due to wafer-level trimming
7. Operates from 4 to 30 volts
8. Less than 60 µA current drain
9. Low self-heating, 0.08°C in still air
10. Nonlinearity only ±1/4°C typical
11. Low impedance output, 0.1 □□for 1 mA load

Arduino UNO board because it is the most popular board in the Arduino board family. In addition, it is the best board to get started with electronics and coding. Some boards look a bit different from the one given below, but most Arduinos have majority of these components in common.

Power USB

Arduino board can be powered by using the USB cable from your computer. All you need to do is connect the USB cable to the USB connection

Power (Barrel Jack)

Arduino boards can be powered directly from the AC mains power supply by connecting it to the Barrel Jack (2).

Arduino Reset

You can reset your Arduino board, i.e., start your program from the beginning. You can reset the UNO board in two ways. First, by using the reset button (17) on the board. Second, you can connect an external reset button to the Arduino pin labelled RESET (5).

Fig. 1 Arduino Uno board

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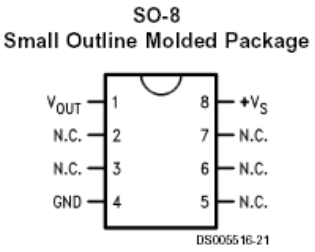
- 3.3V (6) − Supply 3.3 output volt
- 5V (7) − Supply 5 output volt
- Most of the components used with Arduino board works fine with 3.3 volt and 5 volt.
- GND (8)(Ground) − There are several GND pins on the Arduino, any of which can be used to ground your circuit.
- Vin (9) − This pin also can be used to power the Arduino board from an external power source, like AC mains power supply.

Pin diagram:



Applications:

The LM35 can be applied easily in the same way as other integrated-circuit temperature sensors. It can be glued or cemented to a surface and its temperature will be within about 0.01°C of the surface temperature. This presumes that the ambient air temperature is almost the same as the surface temperature; if the air temperature were much higher or lower than the surface temperature, the actual temperature of the LM35 die would be at an intermediate temperature between the surface temperature and the air temperature. This is expecially true for the TO-92 plastic package, where the copper leads are the principal thermal path to carry heat into the device, so its temperature might be closer to the air temperature than to the surface temperature. To minimize this problem, be sure that the wiring to the LM35, as it leaves the device, is held at the same temperature as the surface of interest. The easiest way to do this is to cover up these wires with a bead of epoxy which will insure that the leads and wires are all at the same temperature as the surface, and that the LM35 die's temperature will not be affected by the air temperature. The TO-46 metal package can also be soldered to a metal surface or pipe without damage. Of course, in that case the V- terminal of the circuit will be grounded to that metal. Alternatively, the LM35 can be mounted inside a sealed-end metal tube, and can then be dipped into a bath or screwed into a threaded hole in a tank. As with any IC, the LM35 and accompanying wiring and circuits must be kept insulated and dry, to avoid leakage and corrosion. This is especially true if the circuit may operate at cold temperatures where condensation can occur. Printed-circuit coatings and varnishes such as Humiseal and epoxy paints or dips are often used to insure that moisture cannot corrode the LM35 or its connections. These devices are sometimes soldered to a small light-weight heat fin, to decrease the thermal time constant and speed up the response in slowly-moving air. On the other hand, a small thermal mass may be added to the sensor, to give the steadiest reading despite small deviations in the air temperature.

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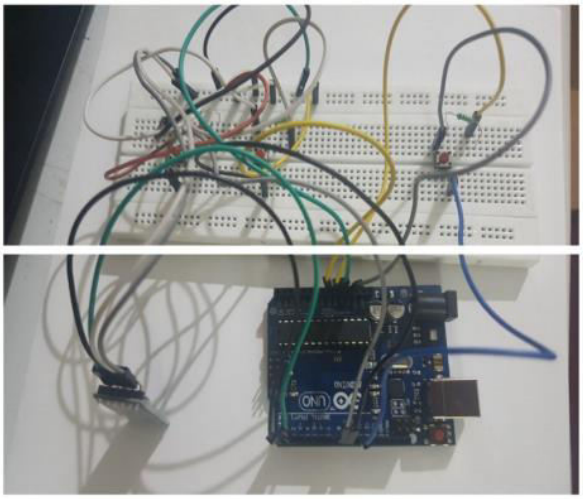
HUMIDITY SENSOR:

Humidity is the presence of water in air. The amount of water vapor in air can affect human comfort as well as many manufacturing processes in industries. The presence of water vapor also influences various physical, chemical, and biological processes. Humidity measurement in industries is critical because it may affect the business cost of the product and the health and safety of the personnel. Hence, humidity sensing is very important, especially in the control systems for industrial processes and human comfort.

Controlling or monitoring humidity is of paramount importance in many industrial & domestic applications. In semiconductor industry, humidity or moisture levels needs to be properly controlled & monitored during wafer processing. In medical applications, humidity control is required for respiratory equipments, sterilizers, incubators, pharmaceutical processing, and biological products. Humidity control is also necessary in chemical gas purification, dryers, ovens, film desiccation, paper and textile production, and food processing. In Helmet, measurement of humidity is important for plantation protection (dew prevention), soil moisture monitoring, etc. For domestic applications, humidity control is required for living environment in buildings, cooking control for microwave ovens, etc. In all such applications and many others, humidity sensors are employed to provide an indication of the moisture levels in the environment.

Results:



Conclusion:

Through this study, we 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 acheived 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. Finally this product can be enhanced by adding traditional and advanced IOT futures.

References:

1) S. R. Deokar, V. M. Kulkarni, J. S. Wakode ,"Smart Helmet for Coal Mines Safety Monitoring and Alerting" Vol. 6, Issue 7, July 2017

2) http://internetofthingsagenda.techtarget.com/definition/Internetof- Things-IoT

International Journal For Recent Developments in Science & Technology
2581-4575
Crossref
A Peer Reviewed Research Journal

3) https://en.wikipedia.org/wiki/Zigbe e

4) Kiran Kishore V, E Narasimha and Y Shruthi, ,"smart helmet for coal miners using zigbee technology" Issue-2, Volume-2, 067- 069

5) https://www.techopedia.com/defini tion/27874/arduino 6) arduino.cc/en/uploads/main/arduin onanomanual23.pdf

7) https://www.cnx-software.com/2015/04/18/nodemcu -is-both-abreadboard-friendly- esp8266-wi-fi-board-and-a-lua- basedfirmware

8) https://en.wikipedia.org/wiki/Node MCU

9) https://en.wikipedia.org/wiki/Thing Speak 10) C. j. Behr, A. Kumar and G. P. Hancke, „A Smart Helmet for Air Quality and Hazardous Event Detection for the Industry", IEEE, PP. 2028-2031, 2016.

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