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Research Paper

HELMET REQUIRED VEHICLE STARTING WITH ACCIDENT ALERT

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The main aim of this project is to make the two wheeler riders to wear the helmet for riding his/her vehicle. It requires a RF transmitter and receiver pair to set up the communication between the bike and helmet that the helmet is on the head of rider. Then the receiver makes a connection between ignition coil and spark plug for starting the vehicle. Even after wearing the helmet if the rider met an accident which makes him fatal or unconscious the heart beat sensor employed to monitor the heart rate detects the abnormal functioning of heart at that time the PIC gets the current position and transmits that coordinates to the control center of medical services via GSM.

Keywords: Heart beat Sensor, GSM, GPS, PIC, RF Transmitter and Receiver

INRODUCTION

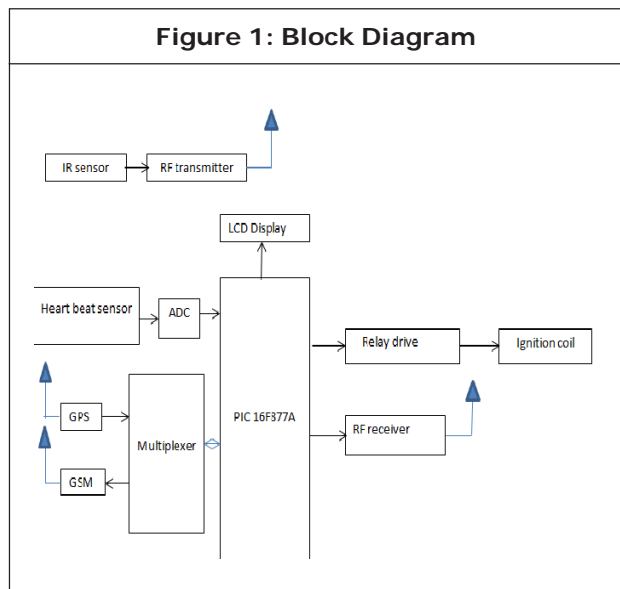
Road accidents are the major cause for sudden un-natural death. In India there is a sharp increase in road accidents every year. Of these accidents 40% occur because of two wheeler riders. Of these the riders who met death are of 50%, this happened because of not wearing helmet. If government alerts the people to wear helmet they are not taking it seriously even if it is for their safety. Transports are supposed to be increasing the nation's trade rather than increasing death rate. Helmet required vehicle starting is one of the ways to reduce death or head injuries due to accidents. Even after wearing the helmet. If accidents occurs then lack of treatment in proper time is another reason for deaths. There are

many reasons for this such as late arrival of ambulance, no persons at place where the accident occur to give information to the ambulance or relations. This is a situation we observe our day to day life, a thought of finding some solution to resolve this problem come up with this idea of giving the information about accident as soon as possible and in TIME....!!!! Because after all 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. Simply leaving or ignoring the person he may die. In such situation, informing to ambulance or family members through mobile to rescue him for an extent. The idea of this work is to give information about the rider wearing the helmet or

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not, and also, he met with an accident it gives an information about location where he is met with an accident through GSM module to mobile numbers

family members, so we have chosen GSM technology to give the information by sending SMS, using GSM module which has SIM card slot to place the SIM and send SMS. Sending SMS alone can't help the driver, if we send an SMS saying that accident had occurred where the ambulance will come without knowing the location of the accident. So to trace out the location where exactly accident occur using GPS module, and gives to microcontroller, then it sends the SMS which contains the latitude and longitude of that area to family members mobile numbers for this we use GPS module to extract the location of the accident, the GPS data will contain the latitude and longitude values using which we can find the accurate position of the accident place.



DESCRIPTION

In this system PIC16F377A microcontroller is used. When the system is switched on, LED will be ON indicating that power is supplied to the

circuit. The RF is used for start the two wheeler firstly it check whether the driver is helmet wear or not if not wear it will not allow to start two wheeler .The small voltage of ignition of the two wheeler is grounded. In normal condition when the helmet is wearied the IR sensor is senses and the RF transmitter radiates the FM modulated signal. The RF receiver is connected with the two wheeler which is receive the radiated signal and activate the relay. The relay is to remove the ignition wire from the ground and connected with the starter switch now the two wheeler will start. When driver met with accident heart beat sensor sends message to microcontroller. The GPS receives the location of the vehicle that met with an accident and gives the information back. This information will be sent to a mobile number through a message. This message will be received using GSM modem present in the circuit. The message will give the information of longitude and latitude values. Using these values the position of the vehicle can be estimated. To run the GPS and GSM module, microcontroller is a very user friendly device which can be easily interfaced with any sensors or modules and is very compact in size. Now some of the thoughts in our mind, how will send the SMS using the GSM module by keeping the GPS location in the SMS which is obtained from the GPS module. But when should all this is done? When accident occurs, how will the microcontroller detect the accident? This can be done by using a heartbeat sensor which is placed in the helmet or placed in the handle bar. This sensor is placed in the helmet such that it detects pulse rate of the driver. When the rider crashes the heart beat sensor detects the abnormal function and then sends signal to the microcontroller. It detects the accident occurrence and it will send an SMS containing

information about the accident and location of accident using GSM and GPS modules. Use of IR sensor, gives the whether the rider wear the helmet or not. If he not wears the helmet again bike will not start and intimate to rider to wear the helmet.

HARDWARE SOFTWARE DESCRIPTION

The PIC16F377A microcontrollers with 64kB flash and 1024 bytes of data RAM. A key feature of the P89V51RD2 is its X2 mode option. The design engineer can choose to run the application with the conventional 80C51 clock rate (12 clocks per machine cycle) or select the X2 mode (six clocks per machine cycle) to achieve twice the throughput at the same clock frequency. The flash program memory supports both parallel

programming and in serial ISP. Parallel programming mode offers gang-programming at high speed, reducing programming costs and time to market. ISP allows a device to be reprogrammed in the end product under software control. The capability to field/update the application firmware makes a wide range of applications possible.

LCD DISPLAY

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. A 16x2 LCD display is very basic module and is very commonly used in various devices and circuits. These modules are preferred over seven segments and other multi segment LEDs. The reasons being LCDs are economical easily programmable have no limitation of displaying special & alphanumeric characters A 16x2 LCD means it can display 16 characters per line and there are 2 such lines.

Figure 2: Architecture of PIC16F877A

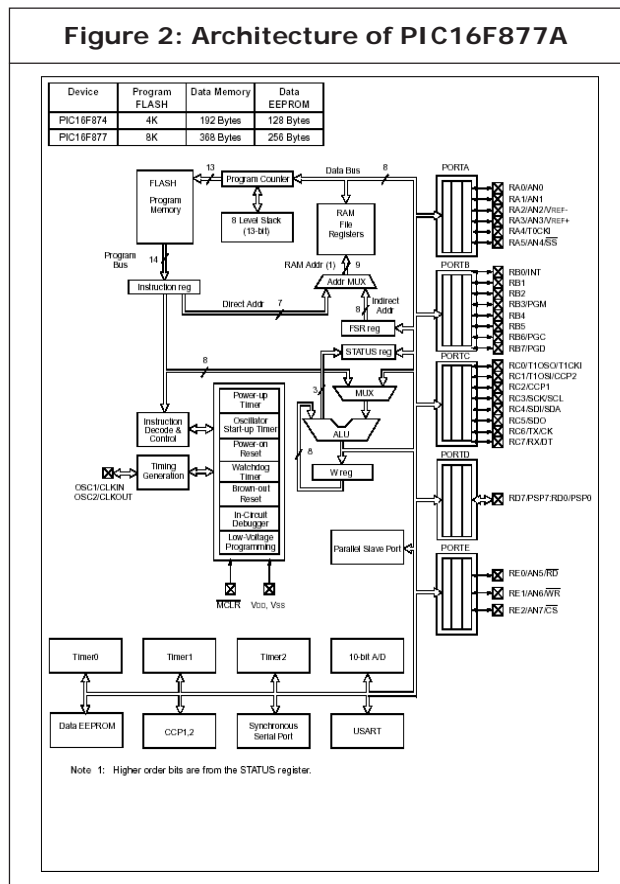
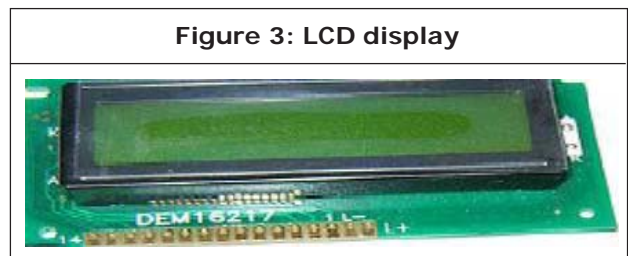


Figure 3: LCD display



ADC0809

ADC0809 is an 8-bit analog to digital converter. It is used to convert the analog voltage of temperature sensor and battery circuit. The reference voltage of ADC0809 is 5V. It is an 8 channel ADC. The temperature sensor is connected to channel 0 and battery circuit is connected to channel 1. The 8-bit A/D converter uses successive approximation as the conversion technique. The converter features a high impedance chopper stabilized comparator,

a 256R voltage divider with analog switch tree and a successive approximation register. The 8-channel multiplexer can directly access any of 8-single-ended analog signals.

IR TRANSMITTER AND RECEIVER

A **photodiode** is a type of photo detector capable of converting light into either current or voltage, depending upon the mode of operation. Many diodes designed for use specifically as a photodiode will also use a PIN junction rather than the typical PN junction. Most photodiodes is similar to a light emitting diode. They will have two leads, or wires, coming from the bottom. The shorter end of the two is the cathode, while the longer end is the anode. Current will pass from the anode to the cathode. The best frequency for the job is between 30 and 60 kHz, the most used is around 36kHz. So, remote controls use the 36 kHz (or around) to transmit information. Infra-Red light emitted by IR Diodes is pulsed at 36 thousand times per second, when transmitting logic level "1" and silence for "0". To generate a 36 kHz pulsating infrared is quite easy, more difficult is to receive and identify this frequency. It has an output pin that goes high (+5V) when there is a pulsating 36kHz infrared in front of it, and zero volts when there is not this radiation.

HEARTBEAT SENSOR

The Heart Beat Sensor provides a simple way to study the heart's function. This sensor monitors the flow of blood through ear lobe. As the heart forces blood through the blood vessels in the ear lobe, the amount of blood in the ear changes with time. The sensor shines a light lobe (small incandescent lamp) through the ear and measures the light that is transmitted. The clip

can also be used on a fingertip or on the web of skin between the thumb and index finger. The signal is amplified, inverted and filtered, in the box. By graphing this signal, the heart rate can be determined. Heart rate varies between individuals. At rest, an adult man has an average pulse of 72 per minute. Athletes normally have a lower pulse rate than less active people. Children have a higher heart rate (approx. 90 beats per minute), The heart rate rises during exercise and returns slowly to the rest frequency after exercise. The rate at which the pulse returns to normal can be used as an indication of fitness.

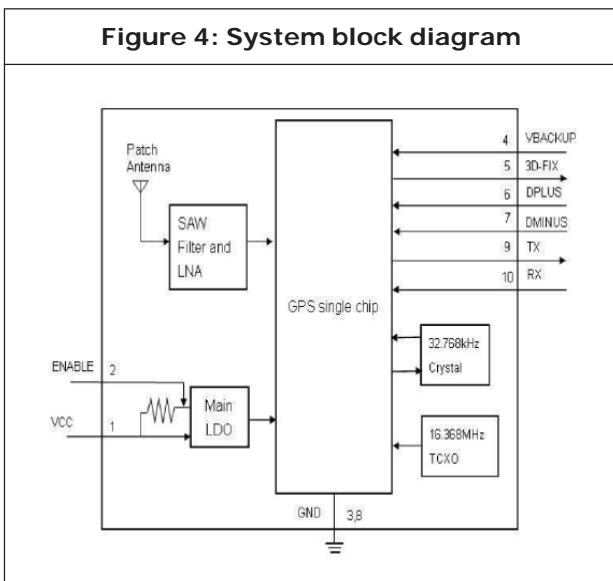
GSM MODEM

GSM/GPRS TTL –Modem is built with SIMCOM Make SIM900 Quad-band GSM/GPRS engine, works on frequencies 850 MHz, 900 MHz, 1800 MHz and 1900 MHz. It is very compact in size and easy to use as plug in GSM Modem. The Modem is designed with 3V3/5V TTL interfacing circuitry, which allows you to directly interface to 5V microcontrollers (PIC, Arduino, AVR ect) as well as 3V3 Microcontrollers (ARM, ARM Cortex XX, ect) . The baud rate can be configurable from 9600-115200 through AT command. Initially Modem is in Autobaud mode. This GSM/GPRS TTL Modem I shoving internal TCP/IP stack to enable you to connect with internet via GPRS. It is suitable for SMS as well as DATA transfer application in M2M interface. The modem needed only two wires (Tx, Rx) except Power supply to interface With microcontroller/Host. The built in Low Dropout Linear voltage regulator allows you to connect wide range of unregulated power supply (4.2V - 13V). Yes, 5 V is in between. Using this modem, you will be able to send & Read SMS, connect to internet via GPRS through simple commands.

GPS MODULE

The FGPMOPA6B is an ultra-compact POT (Patch On Top) GPS Module. This POT GPSReceiver provides a solution that is high in position and speed accuracy performances, with highSensitivityand tracking capabilities in urban conditions. The module can support up to 66 channels, and is designed for small-form factory device.

Figure 4: System block diagram



CONCLUSION

A helmet may not be a full proof but is definitely the first line of defence for the rider in case of an accident to prevent fatal brain injuries. Therefore it is extremely vital for the people on a two wheeler to wear helmets. Our proposed approach makes it mandatory for the rider to use this protective guard in order to drive a two-wheeler vehicle. This system ensures the safety of the human brain and therefore reduces the risks of brain injuries and deaths in case of an accident. In case an accident does occur, there is need for the installation of an additional GPS cum GSM security feature that notifies the nearest hospital

and police station about the location of the place where the accident has taken place.

RESULT PICTURES



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