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Two-Wheeler Accident Alert Using Arduino Uno (Atmega 328)

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Abstract: *This project intimates the care taker of the bike rider, if a collision or accident happens. The concept is introduced to overcome some major issues and built with power management techniques. The usage of GPS to track the location is replaced by GSM modem is one of the main advantage of the project. The project is developed with Arduino UNO R3(ATMEGA8) micro controller, GY-521, GSM modem SIM800A, LCD display(16x2). Once, the bike is switched ON, it initiates and calibrates the sensor(GY-521) and starts to flow the checking conditions. All the instructions are provided to the viewer through 16x2 LCD display.*

Keywords: *Bike Care, Bike safety device, two- wheeler accident informer, Location track without GPS.*

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I. Introduction

More number of vehicles are registered on a daily basis and the scenario makes more traffic as well as accidents. In some remote places, the victims may get unconscious and unable to aware the care taker. To quickly contact the care taker, the project is initiated. It bridges M2M communication between the victim and the care taker through network provider. The micro controller breaks the boundary by connecting to the GSM modem. It comes under simple Internet of Things(IoT) concept. Initially, the gyro sensor provides the X- axis values of the two- wheeler to the micro controller and it continuously checks for the condition. The function gets executed when it reaches beyond the critical limit. The GSM modem can understand only AT commands. So, the commands are feed through SPI communication protocol in this device. The Arduino is coded in such a way to work simultaneously on I2C and SPI.

Fig 1.1 Micro Controller

The device is developed in such a way to identify the accident or vibrations. The power management technique also provided to the micro controller board via coding. It switches ON the GSM modem when an incident is happened. The current process will be shown in 16x2 LCD module.

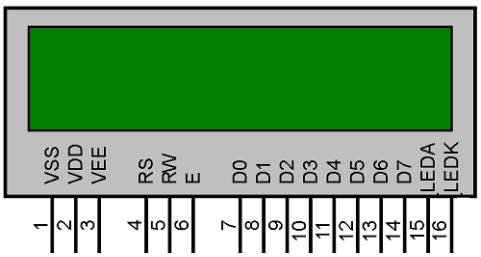

Fig 1.2 16X2 LCD module

The prototype itself designed in an economic way for the user benefits.

1.1 Circuit connection& Working Methodology

The device is fitted in two-wheeler with accurate x axis coordinates and the power supply of two-wheeler (by default 12V for every vehicle) is connected through ignition switch. Once the ignition switch is ON, the Gyro sensor takes 3sec-4sec to calibrate itself with the sensor physical position at initial stage. The sensors are fitted with rubber lock to withstand some vibrations from the two-wheeler. During calibration, the LCD module intimates the user through LCD module. The micro controller fetches the X-coordinates from the Gyro sensor through I2C bus for every 1 second, after the calibration. The GSM modem will be switched OFFin the cut off values. When the two-wheeler crosses the hurdles or major vibration, the gyro may provide garbage value to the controller unit at that time. The sensor waits for 10 seconds and again check for the values. Once the checking gives cut off values, it loops the program. But when it satisfies the second checking, it switches ON the GSM modem and waits for the modem to connect to the network. After a successful connection, it sets the APN setting in the modem. The instructions are fed to the GSM modem by the micro controller through AT commands. Every GSM modem, WIFI module and some Bluetooth devices works under this AT commands. This part of function takes sometimes to communicate with modem for the GSM response. For each feed, the GSM response must be **"OK"** and must not through an error message. The GSM modem used in the device is shown below.

Fig 2.1 GSM Modem

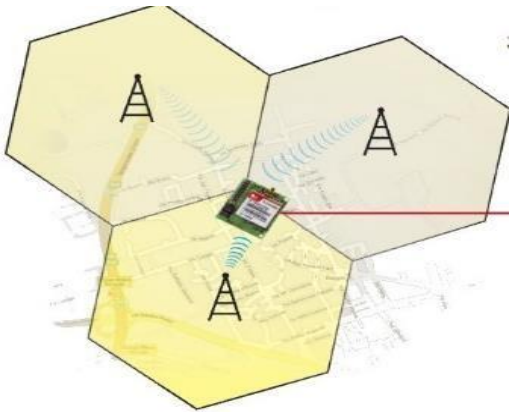

Fig 2.3 Triangulation method

The initial instruction of the modem is shown and Instructions through AT commands to set the internet settings to the modem is must every time when it is switched OFF and ON or when sim is changed.

Serial.print ("**AT")** GSM response:
OK (GSM is connected to the network)
Serial.print**("AT+SAPBR=3,1,\"CONTYPE\",\" GPRS\"")**
GSM response:
OK
Serial.print**("AT+SAPBR=3,1,\"APN\",\"INTER NET\"")**
GSM response:
OK

Normal GSM modem without inbuilt GPS module is sufficient for tracking location exactly and faster. The circuit diagram for the device is provided below.

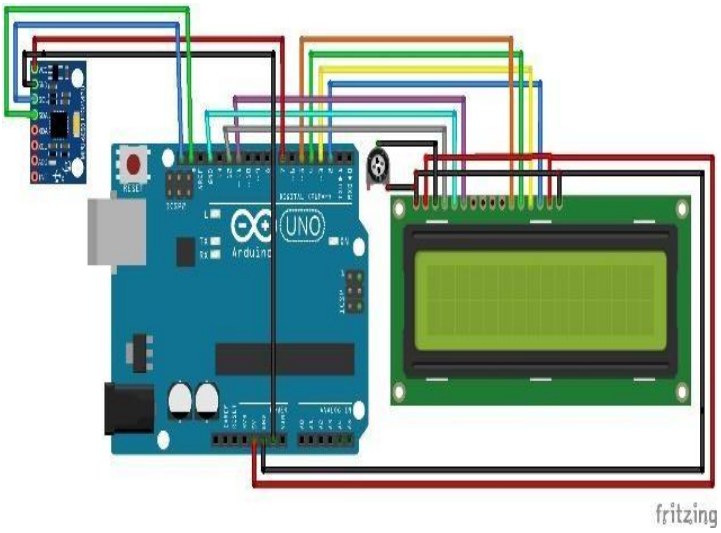

Fig 2.2 Circuit diagram

This is achieved by locating the position from the ground level mobile towers.
Once the settings for APN is over, switch ON the packet data for internet connection by providing the AT command.
Serial.print(**"AT+SAPBR=1,1")**

After successful activation, the GSM respond with the text **"OK"**. The location can be tracked by the AT command.
Serial.print("**AT+CIPGSMLOC=1,1**")

GSM response:
+CIPGSMLOC:0, 74.009142, 10.080012,
2017/08/15, 10:52:05

This response is stored in a string **"loc"** and the internet connection is deactivated by the AT command.
Serial.print(**"AT+SAPBR=0,1")**

GSM response:
OK

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