



WOMEN SAFETY BAND BY USING IOT WITH ARDUINO MEGA MICRO-CONTROLLER

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Abstract: In this model, we create a Smart band by using ARDUINO MEGA (ATmega2560) microcontroller to protect women's from the harassment which acts as brain of the system, because the entire system program instruction stored in it. Here we have heart beat sensor to know the abnormal condition of women even women can manually trigger the device to notice other that she is at an emergency situation. The GPS module which we use here to know the exact location of the person therefore the location send to respective person and aslo public service organization to take immediate action against women attacks using RF based wireless module call ZIG BEE. The GSM can send message or call to desired person whom the women want to. The system has Neuro stimulator for women at the time of emergency to attack back all though we have also used an alarm device to let other know about the emergency situation.

Index Terms - Arduino Mega, Heart beat sensor Zig bee, Neuro Stimulator.

I. INTRODUCTION

Safety of women plays a lot whether at home or working place. Last few crimes against women especially women harassment were very dread and fearful. Women safety in India is not a strong topic due to this kind of crimes. Here we developing a Smart band with the IoT technology to secure the women, based on identifying their behavior and reaction using the electronic device. With the help of all electronics device store the information to the controller which can operate the system automatically with intelligence. This project introducing a new creative idea for protecting women from the tragedy situation. In this creative idea we using the sensors like Heart Beat sensor, Microcontroller (ARDUINO MEGA), GSM, WIFI shield enabled with GPS, Zig bee, Neuro Stimulator, LCD and the buzzer. When the person press the switch the data like the heart beat rate, temperature sound, flexibility of women and movement of the victim from the different sensors are given to the Microcontroller Arduino mega(ATmega2560). Using ARDUINO MEGA (ATmega2560) microcontroller which acts as brain of the system, because the entire system program instruction stored in it. Here we have heart beat sensor to know the abnormal condition of women even women can manually trigger the device to notice other that she is at an emergency situation.

The GPS module which we use here to know the exact location of the person therefore the location send to respective person and also public service organization to take immediate action against women attacks using RF based wireless module call ZIG BEE. The GSM can send message or call to desired person whom the women want to. The system has neuro stimulator for women at the time of emergency to attack back all though we have also used an alarm device to let other know about the emergency situation

II. EXISTING SYSTEM

In Existing system the women security is performed based on the IoT device which is connected to the number of mobile phones or systems. In that system user send the message and the location to all connected IoT devices. But in the proposed system its automatically sends message alert to the concerned person. In previously it consists of power supply, Temperature and Accelerometer sensor, Microcontroller (ATMEGA8). Here we using Microcontroller (ARDUINO MEGA) instead of ATMEGA8, GSM, GPS, Zig Bee, Neuro Stimulator, LCD and the Buzzer. Arduino Mega is excellent online community support. Also, it's program are simpler that AtMega8 too. All the operation done by the system is automatically instruction given by the developer.

The main drawback of these system is that the alert message is send by the user but in that emergency situation they cannot able to sending messages to the their parents or concerned department. The solution to this automatically sending alert to the predefined contact number when the heart beat rate runs abnormally.

III. PROPOSED MODEL

In this system, we use ARDUINO MEGA (ATmega2560) microcontroller which acts as brain of the system, because the complete program instructions are stored in it. Here we've got heart beat sensor to understand the condition of girls, and also women can manually trigger the device to note other that she is at an emergency situation. The GPS module which we use here to grasp the precise location of the person therefore the situation send to respective person and aslo public service organization to require immediate action against women attacks by using RF based wireless module call ZIG BEE. The GSM can send message or call to desired person whom the we want to. The system has neuro stimulator for girls at the time of emergency to attack back all though we've got also used an alarm device to let other understand the emergency situation.

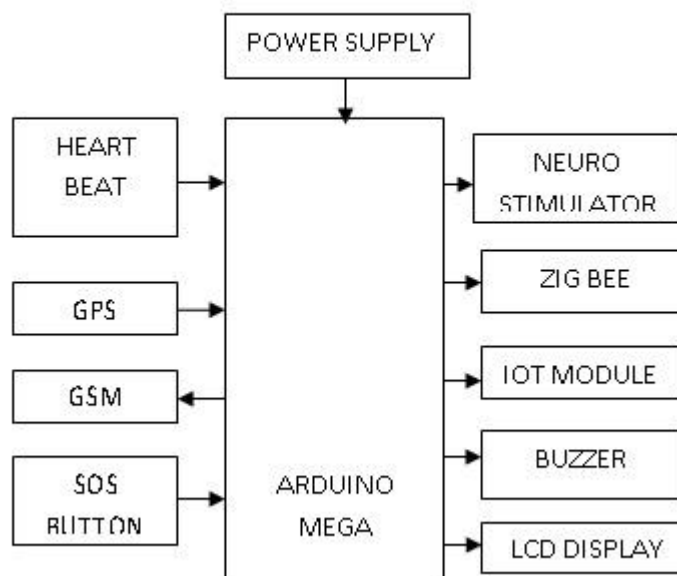


Fig. 1. Block Diagram

IV. HARDWARE DESCRIPTION

4.1. Arduino Mega

The MEGA 2560 is used for more complex projects. With 16 analog inputs, 54 digital I/O pins and a larger space for our sketch it is the recommended board for 3D printers and robotics projects. This gives our project plenty opportunities.

The Arduino Mega 2560 is a microcontroller board which is based on the ATmega2560. It consist 16 analog inputs, 4 UARTs (hardware serial ports), 54 digital input/output pins, 16 MHz crystal oscillator, a power jack, a USB connection, an ICSP header, and a reset button. Which needed to support the microcontroller; simply connecting it to a system with a USB cable or power it with an adapter(AC-to-DC) or a battery to get started. The Mega 2560 board is compatible.

Arduino Boards have revitalized the automation industry with their easy to use platform where everyone with little or no technical background can get started with learning some basic skills to program and run the board. All other boards function similarly in one way or the other. There are some basic features like PCB layout design, size, number of analog pins and breadboard friendly nature that make them different from each other. In terms of coding, all these boards are programmed in Arduino IDE software and we don't need to attach extra components or devices to put them in the running condition. Everything is already built in the board that makes this device readily available. Just plug and play with the board as per our requirement.

All the boards mentioned above work perfectly for a number of [Arduino Projects](#) when we require a simple task to be completed with less number of I/O pins and memory. However, when the nature of project goes complex, a board with less memory fails to complete the task. This is where Arduino Mega 2560 comes handy. Thanks to technology that keep our covered in every aspect and provides support in any way when it comes to fulfilling your technical needs.



Fig..2. Micro-controller

Arduino Mega 2560 will be programmed using Arduino Software called IDE which supports C programming. The code you create on the software is termed sketch which is burned within the software and so transferred to the board through USB cable. This board comes with a built-in bootloader which rules out the usage of an external burner for burning the code into the board. The bootloader communicates using STK500 protocol. Once you compile and burn the program on the board, you'll unplug the USB cable which eventually removes the facility from the board. after you shall incorporate the board into your project, you'll be able to power it up using

power jack or Vin of the board. One of the feature of Arduino mega is Multitasking which comes handy. However, Arduino IDE Software doesn't support multitasking feature but you'll use other operating systems like FreeRTOS and RTX to jot down computer programme for this purpose. this provides you the pliability of using your own custom build program using ISP connector. KSE-100 index is an index of 100 companies selected from 580 companies on the basis of sector leading and market capitalization. It represents almost 80% weight of the total market capitalization of KSE. It reflects different sector company's performance and productivity. It is the performance indicator or benchmark of all listed companies of KSE. So it can be regarded as universe of the study. Non-financial firms listed at KSE-100 Index (74 companies according to the page of KSE visited on 20.5.2015) are treated as universe of the study and the study have selected sample from these companies.

The study comprised of non-financial companies listed at KSE-100 Index and 30 actively traded companies are selected on the bases of market capitalization. And 2015 is taken as base year for KSE-100 index.

4.2 GPS

GPS satellites circle the world twice day after day in an exceedingly precise orbit. Each satellite transmits a completely unique signal and orbital parameters that allow GPS devices to decode and compute the precise location of the satellite. To calculate a user's exact location, GPS receivers use this information and tri-lateration. Essentially, the GPS receiver measures the space to each satellite by the amount of some time it takes to receive a transmitted signal. With distance measurements from some more satellites, the receiver can determine a user's position and display it electronically to measure your running route, map a links, find how home or adventure anywhere. To calculate your 2-D position (latitude and longitude) and track movement, a GPS receiver must be locked on to the signal of a minimum of three satellites. With 4 or more satellites seeable, the receiver can determine your 3-D position (latitude, longitude and altitude). Generally, a GPS receiver will track 8 or more satellites, but that depends on the time of day and where you're on the earth. Some devices can do all of that from our wrist. There are two basic sorts of services offered through GSM: telephony (also brought up as teleservices) and data (also observed as bearer services).

Telephony services are mainly voice services that provide subscribers with the whole capability (including necessary terminal equipment) to speak with other subscribers. Data services provide the capacity necessary to transmit appropriate data signals between two access points creating an interface to the network. additionally to normal telephony and emergency calling, the subsequent subscriber services are supported by GSM:

4.2.1 dual-tone multifrequency (DTMF)—DTMF could be a tone signaling scheme often used for various control purposes via the phone network, like remote of an electronic device. GSM supports full-originating DTMF.

4.2.2 facsimile group III—GSM supports CCITT Group 3 facsimile. As standard fax machines are designed to be connected to a telephone using analog signals, a special fax converter connected to the exchange is employed within the GSM system. this allows a GSM-connected fax to speak with any analog fax within the network.

4.2.3 short message services—Convenient facility of the GSM network is that the short message service. A message consisting of a maximum of 160 alphanumeric characters is sent to or from a mobile station. This service will be viewed as a sophisticated type of alphanumeric paging with variety of benefits. If the customer mobile phone is switch off or not reachable area, the information is stored and send back to the sender when the mobile is switch on or has reached the signal coverage area of the network. This function ensures that the text message are going to be received.

4.2.4 cell broadcast—A variation of the short message service is that the cell broadcast facility. A message of a maximum of 93 characters may be broadcast to any or all mobile subscribers in a very certain geographic region. Typical applications include traffic jam warnings and reports on accidents.

4.2.5 voice mail—This service is truly an electronic device within the network, which is controlled by the subscriber. Calls may be forwarded to the subscriber's voice-mail box and therefore the subscriber checks for messages via a private security code.

4.2.6 fax mail—With this service, the receiver can get a fax messages from any other fax machine. The messages are stored during a service center from which they will be retrieved by the subscriber via a private security code to the specified fax number.

4.3 Heart beat sensor



Fig.3. Heart beat sensor

The bright infrared (IR) LED and a phototransistor is used to detect the pulse of the finger, a red LED flashes with each an every pulse. The working of Pulse monitor: The LED(Light emitting diode) is on the light side of the finger, and on the another side of the finger is phototransistor, which is used to obtain the flux emitted, when the blood pressure pulse by the finger when the resistance of the photo transistor will be slightly varied.

The project's schematic circuit as shown in the Fig. 4, Here we choose a very high level resistance resistor R1, because mostly the light passes through the finger which is absorbed, it is useful that the phototransistor is sensitive enough. The fore most important thing is to keeping the shield stray light into the phototransistor. For that the home lighting is particularly important hence the lights at home mostly based 50HZ or 60HZ fluctuate, so heartbeat will adding considerable noise. When running the program the measured values are printed. To getting a real heartbeat from this could be a very challenging.

4.4 Nerve Stimulator Sensor

It's an electrifying time to be in neuroscience. Using implanted devices that send pulses of electricity through the nervous system, physicians are learning how to influence the neural systems that control people's bodies and minds



Fig.4. Nerve Stimulator Sensor

These devices give neurologists new ways to treat patients with a wide range of disorders, including epilepsy, chronic pain, depression, and Parkinson's disease. So far, these stimulators have been one-way devices that deliver a steady sequence of pulses to the nervous system but can't react to changes in the patient's body. Now, at last, medical device companies are coming out with dynamic neural stimulators that have a bit of brain themselves.

4.4 Zigbee Protocol

The nRF24L01+ is a single chip 2.4GHz transceiver with an embedded baseband protocol engine (Enhanced ShockBurst™), suitable for ultra-low power wireless applications. The nRF24L01+ is designed for operation in the world wide ISM frequency band at 2.400 - 2.4835GHz.

To design a radio system with the nRF24L01+, you simply need an MCU (microcontroller) and a few external passive components. We can operate and configure the nRF24L01+ through a Serial Peripheral Interface (SPI). The register map, which is accessible through the SPI, contains all configuration registers in the nRF24L01+ and is accessible in all operation modes of the chip.

The embedded baseband protocol engine (Enhanced ShockBurst™) is based on packet communication and supports various modes from manual operation to advanced autonomous protocol operation. Internal FIFOs ensure a smooth data flow between the radio front end and the system's MCU. Enhanced Shock-Burst™ reduces system cost by handling all the high speed link layer operations. The radio front end uses GFSK modulation. It has user configurable parameters like frequency channel, output power and air data rate. NRF24L01+ supports an air data rate of 250 kbps, 1 Mbps and 2Mbps. The high air data rate combined with two powers saving modes make the nRF24L01+ very suitable for ultra-low power designs.

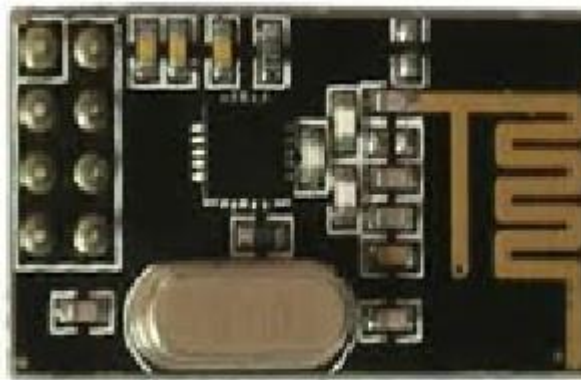


Fig.5. Nerve Stimulator Sensor

NRF24L01+ is drop-in compatible with nRF24L01 and on-air compatible with nRF2401A, nRF2402, nRF24E1 and nRF24E2. Inter modulation and wideband blocking values in nRF24L01+ are much improved in comparison to the nRF24L01 and the addition of internal filtering to nRF24L01+ has improved the margins for meeting RF regulatory standards. Internal voltage regulators ensure a high Power Supply Rejection Ratio (PSRR) and a wide power supply range.

4.5 Buzzer

A "piezo buzzer" is basically a tiny speaker that we can connect directly to an Arduino. "Piezoelectricity" is an effect where certain crystals will change shape when you apply electricity to them. By applying an electric signal at the right frequency, the crystal can make sound.



Fig.6. Buzzer

If our buzzer has a sticker on top of it, pull the sticker off. Connect one pin (it doesn't matter which one) to the Arduino's ground (Gnd) and the other end to digital pin 8. From the Arduino, we can make sounds with a buzzer by using tone. we have to tell it which pin the buzzer is on, what frequency (in Hertz, Hz) we want, and how long (in milliseconds) we want it to keep making the tone.

4.6 LCD

The Liquid Crystal library allows us to control LCD displays that are compatible with the Hitachi HD44780 driver. There are many of them out there, and you can usually tell them by the 16-pin interface. The LCDs have a parallel interface, meaning that the microcontroller has to manipulate several interface pins at once to control the display. The interface consists of the following pins: A register select (RS) pin that controls where in the LCD's memory you're writing data to. You can select either the data register, which holds what goes on the screen, or an instruction register, which is where the LCD's controller looks for instructions on what to do next.

A Read/Write (R/W) pin that selects reading mode or writing mode. An Enable pin that enables writing to the registers. 8 data pins (D0 -D7). The states of these pins (high or low) are the bits that you're writing to a register when you write, or the values you're reading when you read. There's also a display contrast pin (Vo), power supply pins (+5V and Gnd) and LED Backlight (Bklt+ and Bklt-) pins that you can use to power the LCD, control the display contrast, and turn on and off the LED backlight, respectively.



Fig.7. Lcd

The process of controlling the display involves putting the data that form the image of what you want to display into the data registers, then putting instructions in the instruction register. The Hitachi-compatible LCDs can be controlled in two modes: 4-bit or 8-bit. The 4-bit mode requires seven I/O pins from the Arduino, while the 8-bit mode requires 11 pins.

V. SOFTWARE DESCRIPTION

The Arduino (IDE), An Integrated Development Environment is a software application that provides facilities the computer programmer for software development. It containing text editor to a write code, message area, text console, toolbar with buttons for common functions and a series of menus. To upload programs and communicate with them by connecting to the Arduino and Genuino hardware.

Writing a Program using Arduino Software (IDE) are called sketches. These sketches allowing a programmer to write a program within the text editor which is saved with the file extension of .ino. The editor has cutting/pasting and searching/replacing text features. The message area provides the feedback while saving the program and exporting and also displaying the errors. The Input and output console displays the text output by the Arduino Software (IDE), which includes the complete error messages and other information. the another side mid corner of the window displays the configuration oft boards and ports. The toolbar buttons allow us to check and upload programs, create, open, and save sketches, and open the serial monitor

When we upload a sketch, by using the Arduino bootloader, a small program that has been loaded on to the microcontroller on our board. It allows us to upload code without using any additional hardware. When the board resets, the bootloader is active for a few seconds; then it starts whenever sketch recently uploaded to the microcontroller. The boot loader will blink the on-board (pin 13) LED when it starts (i.e. when the board resets).

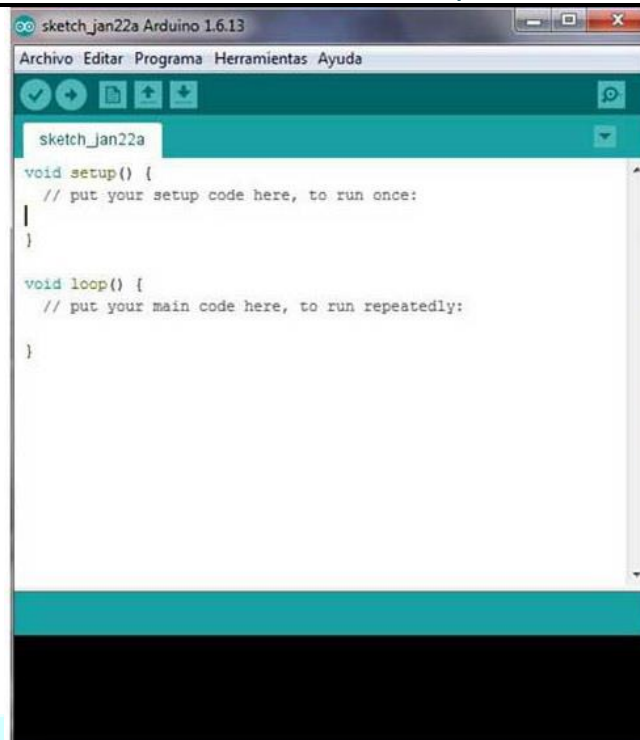


Fig.8. Arduino Software (IDE)

VI. CONCLUSION

This paper is about the existing applications for women security and comes out with improved microcontroller for security and protection for women and more research is possible with introducing smart technology where people and objects form a network. This will help to solve them technologically with compact equipment and ideas. Using screaming alarms and also alerting the emergency contacts which is connected to the IoT device, by sending the messages automatically with the location is helpful for women's security. This system can overcome the fear that frights every woman in the country about her safety and security. Descriptive Statics has been used to find the maximum, minimum, standard deviation, mean and normally distribution of the data of all the variables of the study. Normal distribution of data shows the sensitivity of the variables towards the periodic changes and speculation. When the data is not normally distributed it means that the data is sensitive towards periodic changes and speculations which create the chances of arbitrage and the investors have the chance to earn above the normal profit. But the assumption of the APT is that there should not be arbitrage in the market and the investors can earn only normal profit. Jarque bera test is used to test the normality of data.

6.1 Future Scope

In future, to improve the processing speed and to improve the input parameters from the women who is in threat. To identify the women in threat I need more than two parameters from the victim. For that I want increase the input sensors. And the IoT also used to identify the path based on the location from the victim device. And this may be used for the adults who have ailments. We can identify the health condition also like temperature and motion of the adults. Also the school children safety are major concerns for parents as well as school management due to the recent incidents of child crimes like children missing, abuse etc. This project may also be used for school students. While they traveling to school we can monitor by using this, after students reached the school management have to deactivate the band and send notification to the parents "your children reached school". This also suited for the adults. Hence, the advance technology makes the system more robust and reliable.

VII. ACKNOWLEDGMENT

The preferred spelling of the word "acknowledgment" in American is without an "e" after the "g". Avoid the tilted expression, "One of us (R.B.G.) thanks..." Instead, try "R.B.G. thanks". Put applicable sponsor acknowledgments here; DONOT place them on the first page of your paper or as a footnote.

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