IOT BASED WOMEN'S SAFETY DEVICE WITH SCREAMING DETECTION AND VIDEO CAPTURING

Project Reference No.: 46S_BE_3305

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Keywords:
women safety, screaming, Global system for mobile communication, Global positioning system.

Introduction:

Women are facing many problems globally based on their safety and security. A recent survey indicates 35% of women face many issues, abuse, and assault. Harassment of women is on the rise and there are countless articles in
newspapers and on television about women being harassed and abducted, even though several regulations and statutes have been implemented to safeguard women's safety. Despite the prohibitions are in place, violence against women and girls has not lessened but risen dramatically in recent decades, according to surveys. Since the incident in (1978), the incident in (2004) Manipur, the incident in (2012) Delhi, and many other incidents throughout India, harassment against women has not
decreased but has increased year after year. According to the National Crime Record Bureau's (NCRB) 2019 report, the crime rate increased to 7.3 percent in 2018, and the report also confirms that 31 percent of harassment cases in the country have occurred in the last ten years. The World Health Organization (WHO) stated that 40% to 60% of women in Samoa, Ethiopia, Bangladesh, Peru, Tanzania, and Thailand are ally abuses.

Issues are occurring in the streets, schools, and colleges, making women feel unsafe when they are stepping out. Many victims were harassed as children but never reported it to their

parents, guardians, or the police since it would impact her and her family. The safety of women is a societal issue that must be addressed as soon as feasible. To address all of these concerns, a multitude of IoT-based safety devices for women have been developed and implemented to date. Wearable devices, such as smart bands or wristwatches, are integrated into the majority of current systems. Few have been implemented, mostly on sensors that will monitor the heartbeat, temperature, and other human activities to activate the device based primarily on body temperature or pulse rate. Some use a fingerprint scanner to activate the gadget, while others use a variety of sensors and different approaches. Existing systems fail to execute in specified cases precisely and effectively while protecting the victim from hazards. All of the system's limits will be met by the suggested application I-based women's safety idea based on machine learning that will assure women's safety and protection. To abolish the need for physical availability of a person to control and monitor the situation Also, regardless of age, offer adequate women's security. The location is then sent to the neighboring "SHE" squads so that officers can reach in time to save the ladies or children. To propose an idea on the smart gadget for women's safety that detects a victim's threat by screaming's. Where screaming is detected using machine learning's SVM algorithm. It can be incorporated with added functionality such as video recording, which can be used for further inquiry. In addition to current systems such as smart bands or smartwatches, the suggested idea may be implemented in the form of a smart pendant, which is flexible and wearable, by reducing the size. To eliminate violence and harassment against women and girls, society needs a women's safety device, with the presented idea implemented.

Objectives:

- **Scream Detection:** To automatically detect distress sounds (e.g., screams) using a sound sensor.

- **Location Sharing:** To send real-time location data via SMS using a GSM module, providing emergency contacts with the victim's whereabouts.

- **Video Capturing:** To use the ESP32-CAM module to record video footage, providing visual evidence of the incident.

- **Manual Panic Button:** To offer a manual button for emergency situations, allowing the victim to activate the system.

- **Nearby Alert Mechanism:** To alert nearby people by triggering a buzzer and activating additional security mechanisms (e.g., siren or light) through a relay module.

1. Methodology:

- **Design and Circuit Setup:** The system's components are assembled and connected, including the sound sensor, GPS module, GSM module, ESP32-CAM, relay, and I2C LCD.

- **Programming:** The system is programmed using Arduino IDE. The microcontroller is programmed to monitor the sound sensor, trigger alerts when a scream is detected, and initiate video recording. The GSM module is programmed to send SMS with the victim's location when the system is activated.

- **Testing:** The system is tested for functionality in real-world conditions. The sound sensor's sensitivity is calibrated, and the GSM module's SMS functionality is tested. The ESP32-CAM is also tested for video capturing and storage.

- **Deployment:** Once testing is complete, the device is assembled into a compact, portable unit. It can be carried or embedded into a wearable item.

The fig.1 shows block diagram which gives you the overview of the proposed system. The brief description given below.

2.1 BLOCK DIAGRAM

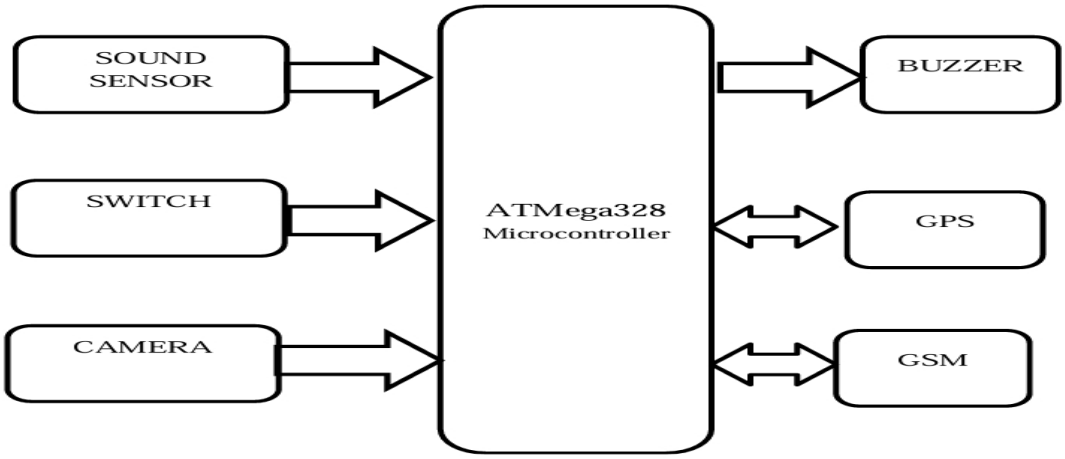

Figure 1: Block diagram of system

To complete our project, we require some software as well as some hardware.

- REQUIRED SOFTWARE: 1. ARDUINO IDE

- REQUIRED HARDWARE:
  1. ARDUINO NANO
  3. 9V BATTERY
  4. GPS MODULE
  5. GSM MODULE
  6. BUZZER
  7. SOUND SENSOR
  8.ESP-32 CAM

2. Project Description:

- **FUNCTIONAL UNIT DESCRIPTION:**

In the figure 2.1 we shown the hardware requirements & Technical approach in the way to design the system. The system consists of mainly parts like Microcontroller (ATmega328), Gsm technology, Sensor networks, which are described briefly below.

- **MICROCONTROLLER ATMEGA320:**

Arduino Nano 3.0. Arduino Nano 3.0 is shown in the Figure It is a 30 pin board having ATMega328 as microcontroller embedded inside it. From Figure 3 it can be seen that Arduino Nano has 14 digital I/O pins, 8 Analog reference pins and has a clock frequency of 16MHz [5], crystal oscillator of frequency 16 MHz is used for this purpose. With large number of I/O ports it is possible to connect large number of sensors to Arduino boards.

- **GPS MODULE:**

GPS module consists of U-blox NEO 6M module and GPS antenna. The NEO-6 module series is a family of stand-alone GPS receivers featuring the high-performance U-blox 6 positioning engine. The I2C compatible Display Data Channel (DDC) interface can be used either to access external devices with serial interface EEPROM or to interface with a host CPU. Its maximum bandwidth is 100kbit/s. NEO-6 modules are designed for use with passive and active antennas. The minimum gain and maximum gain are 15dB and 50 dB respectively and maximum noise figure is 1.5dB. GPS receivers use a constellation of satellites and ground stations to compute position and time almost anywhere on earth. The positions of the satellites are constructed in a way that the sky above your location will always contain at most 12 satellites. The primary purpose of the 12 visible satellites is to transmit information back to earth over radio frequency (ranging from 1.1 to 1.5 GHz). With this information and some math, a based receiver or GPS module can calculate its position and time.

- **GSM/GPRS:**

GSM/GPRS modem is a digital mobile network that is widely used by mobile users. It is used to establish communication between a computer and a GSM system. The modem is coming RS232 interface, which allows to connect PC as well as microcontroller with RS232 chip. The baud rate is configurable from 9600-115200 through AT command. The GSM modem is having internal TCP/IP stack to enable you to connect with internet via GPRS. It is suitable for SMS, voice as well as DATA transfer application in M2M interface. The onboard Regulate Power Supply allows us to connect wide range unregulated power supply. Using this modem, one can make audio calls, SMS, Read SMS, attend the incoming calls and internet through

simple AT commands. Every command starts with “AT”. That’s why these are called as AT commands. AT stands for “attention". When a ten-digit mobile number is provided, the program instructs the modem to send the text message using a sequence of AT commands.

- **BUZZER:** An audio signaling device like a beeper or buzzer may be electromechanical or piezoelectric or mechanical type. The main function of this is to convert the signal from audio to sound. Generally, it is powered through DC voltage and used in timers, alarm devices, printers, alarms, computers, etc. Based on the various designs, it can generate different sounds like alarm, music, bell & siren. 2.7 SOUND SENSOR: Detects loud noises, such as screams or distress sounds, and triggers an emergency response when the sound level exceeds a predefined threshold.

Results:

Figure 2: Software system

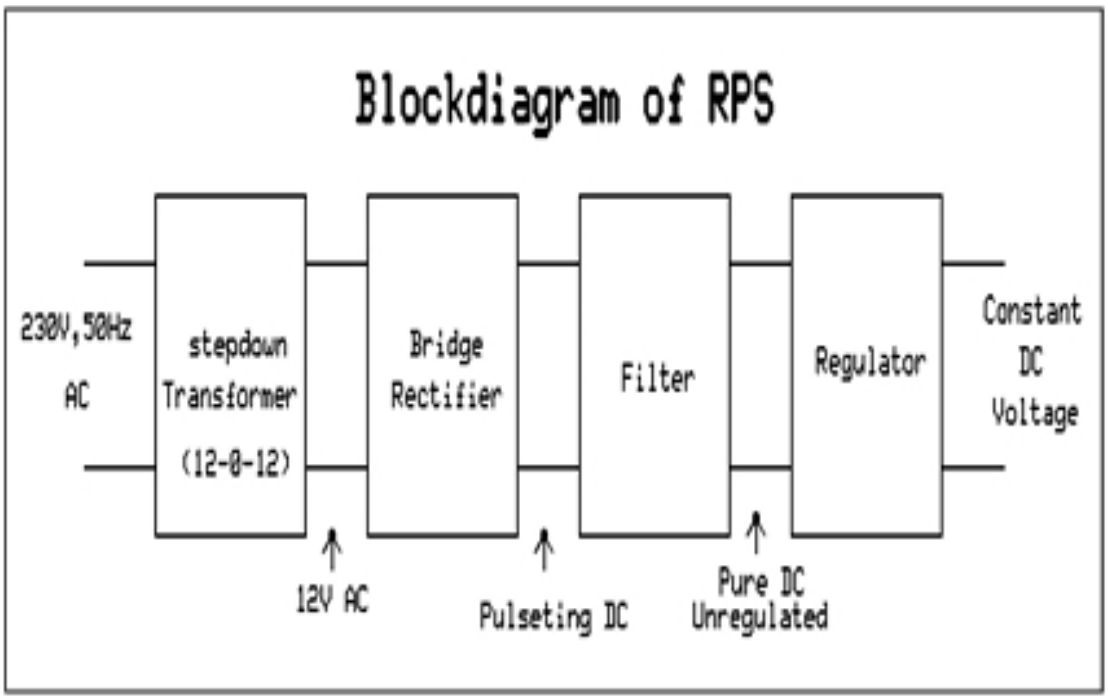

Figure 3: Block diagram of RPS

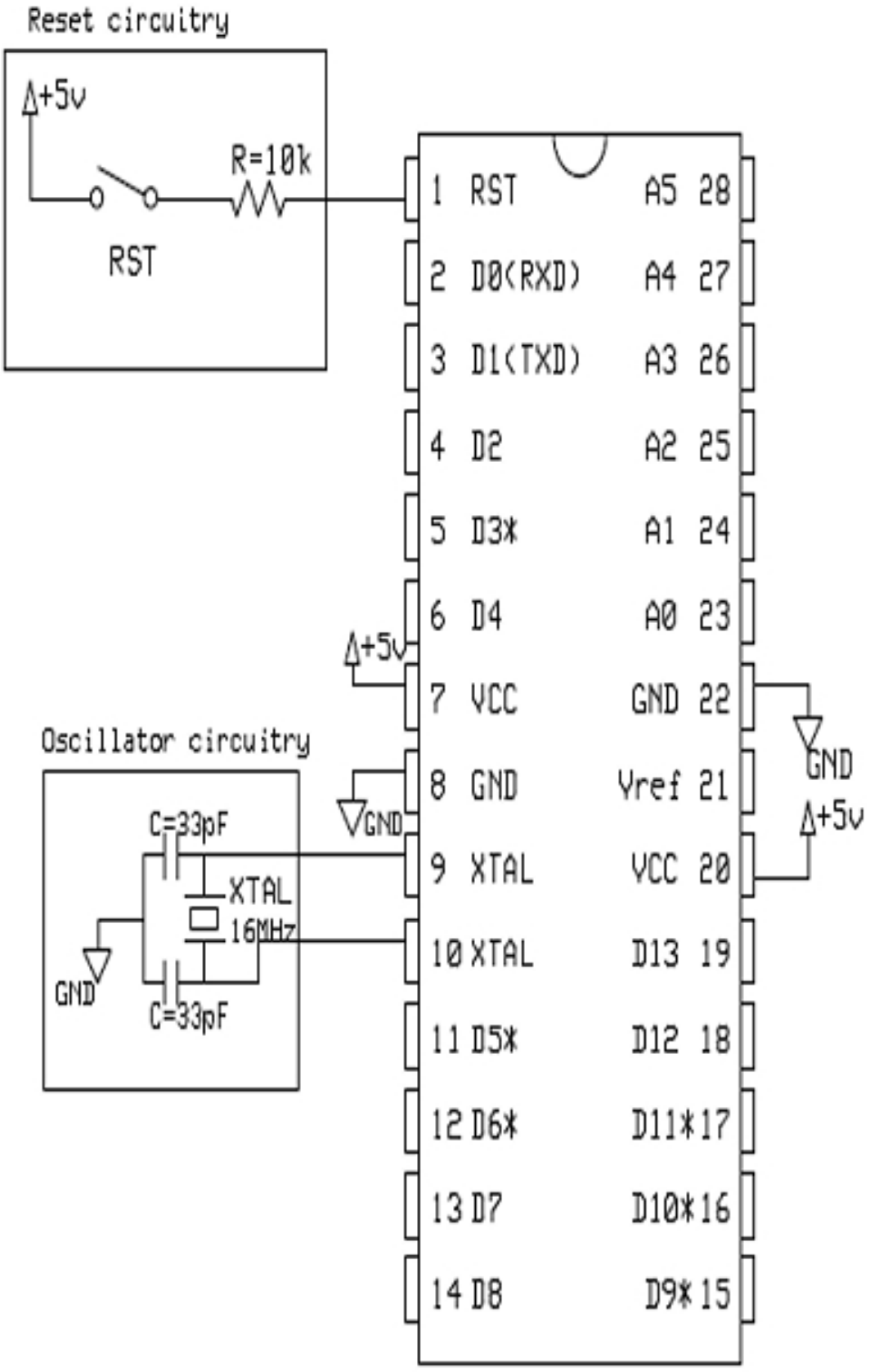

Figure 4: Circuit System

on:

This IoT-based women safety device provides a smart and proactive solution for enhancing personal security. By integrating sound detection, GPS tracking, video capturing, and GSM communication, the device ensures that women receive timely help in emergency situations. The device's compact design and user-friendly features make it a practical tool for everyday use. As IoT technology continues to evolve, further enhancements can be made to create even more robust and effective safety solutions for women in our society. This project highlights the potential of IoT in enhancing personal security and improving emergency response systems.

Future Scope:

We can also implement this in android watches, attached to other IoT concepts like home security, structural health, city energy consumption, smart lighting and so on.
SYSTEM OUTPUT AND DISCUSSION

System will start to work as soon as the user activates the push button located on pendant or at the right shoe. The system will send an SOS alert SMS to 5 prestored numbers using the GSM module used in this device. In figure it can be seen that the device sends a message 'PLZ HELP ME' to 5 numbers as stored by the user along with the latitude and longitude value of the present location of the victim. In this device victim's real time location can be tracked and traced. It is possible if the show receives 'Send Loc' message from any of the 5 pre-stored numbers. In revert to that SMS the device or the show will send its real time location, so that it can be tracked in a real time manner. The message also comprises the Google Map [14] link with which the receiver of the message can easily find the location of the victim using Google map [14] just in a click. In figure the Google map view can be seen.