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Intelligent Safety System For Women Security

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Abstract*—The world is becoming unsafe for women in all aspects. The crime against women are increasing at a higher rate. The employed women are feeling unsafe due to increasing crimes. According to the reports of WHO, NCRB-social-government organization 35% Women all over the world are facing a lot of unethical physical harassment in public places such as railway-bus stands, foot paths etc. The security of women is the most important concern these days and to build a safety device to act as a rescue and to prevent from harm at the time of hazard is highly necessary especially for women. Thus this project proposes the intelligent safety system for women to provide the safety measure in public places as well as travelling alone through public transports (school buses, company vehicle etc.). This project proposed a new model for the women security in public places which aims to provide the safety environment. This is a security system that is designed to providing security to women so that they never feel helpless while facing such critical situations.

Keywords*—CNN, Artificial intelligence, face detection , Microcontroller unit.

INTRODUCTION

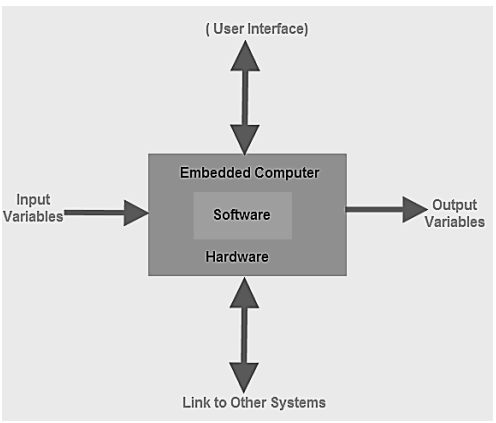
In modern India, women continue to face social challenges and are often victims of abuse and violent crimes and, according to a global poll conducted by Thomson Reuters, India is the ” fourth most dangerous country” in the world among the G20 countries. This project focuses on the security system that is designed solely to serve the purpose of providing safety and security to women so as they never feel helpless while facing such social challenges.

A security solution that creates a sense of safety among women needs to be developed. In instances of attack, it is largely reported that women' s are immobilized. Therefore there is a need of a simpler safety solution that can be activated as simply as by pressing a switch and can instantly send alerts to the near ones of the victim. This project focuses on a security system that is designed uniquely to serve the purpose of providing security and safety to women. The objective of research work is to create a portable safety device for women, which provides following facilities 1. Alerts family and friends by sending emergency message 2. Captures the images/video of the attacker to maintain a proof for legal actions.

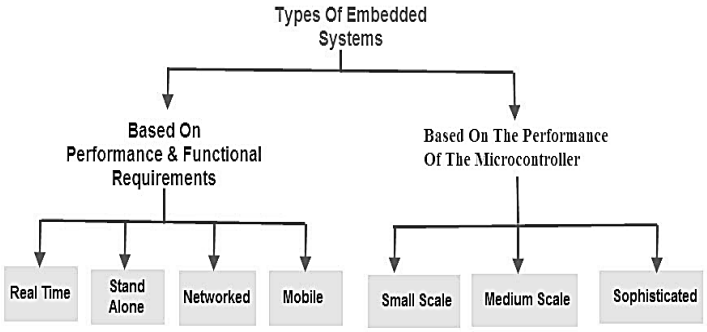
EMBEDDED SYSTEM

An embedded system is one kind of a computer system mainly designed to perform several tasks like to access, process, store and also control the data in various electronics-based systems. Embedded systems are a combination of hardware and software where software is usually known as firmware that is embedded into the hardware. One of its most important characteristics of these systems is, it gives the o/p within the time limits. Embedded systems support to make the work more perfect and convenient. So, we frequently use embedded systems in simple and complex devices too. The applications of embedded systems mainly involve in our real life for several devices like microwave, calculators, TV remote control, home security and neighborhood traffic control systems, etc.

An embedded system is integration of hardware and software, the software used in the embedded system is set of instructions which are termed as a program. The microprocessors or microcontrollers used in the hardware circuits of embedded systems are programmed to perform specific tasks by following the set of instructions. These programs are primarily written using any programming software like Proteus or Lab-view using any programming languages such as C or C++ or embedded C. Then, the program is dumped into the microprocessors or microcontrollers that are used in the embedded system circuits.



Embedded System Classification



RELATED WORK & LITERATURE SURVEY

[1] In this paper, we propose a time-efficient indoor navigation and evacuation (TINE) framework to minimize moving time for mobile users based on Internet of Things (IoT) technologies. In normal time, the proposed TINE framework can estimate the density of mobile users in each area and determine the moving speeds to pass through different areas. Based on the determined moving speed of each area, an indoor navigation path can be planned to provide the shortest moving time for a mobile user. In emergent time, TINE can accurately estimate the escaping time for groups of mobile users by jointly considering the length and moving time of passageways, the capacity of passageways/ doors/exits, the present distribution and parallel moving of mobile users, and the possible congestion caused by other groups. Based on the estimated escaping time, TINE can efficiently alleviate the congestion of all passageways/exits and evenly distribute the evacuation load among exits to minimize the total escaping time.

[2] This paper designs and implements a mobile crowdsourced guiding system, called EasyFind, using smartphones to guide indoor people and find lost items through Internet of Things (IoT) technologies. In normal time, the EasyFind system can provide the fastest guiding path with the shortest moving time to a destination place based on the density of indoor people in each area. In addition, in emergency time, the EasyFind system can evacuate all people in the shortest total escaping time through modeling spatial and temporal mobilities of indoor people. Furthermore, the EasyFind system can cooperatively find lost items equipped with mobile iBeacon nodes through participatory sensing networks formed by mobile users with smartphones in places with static iBeacon nodes. To precisely localize the lost item, six item localization cases are addressed to reduce the positioning errors with different numbers of smartphones detecting the lost item and

different numbers of fixed iBeacon nodes nearby these item-detecting smartphones. An Android-based prototype with static and mobile iBeacon nodes is implemented to verify the feasibility and correctness of our EasyFind system.

[3] With the prevalence of sensor-rich smartphones, MCS has become an emerging paradigm to perform urban sensing tasks in recent years. In MCS systems, it is important to minimize the energy consumption on devices of mobile users, as high energy consumption severely reduces their participation willingness. In this article, we provide a comprehensive review of energy saving techniques in MCS and identify future research opportunities. Specifically, we analyze the main causes of energy consumption in MCS and present a general energy saving framework named ESCrowd that we use to describe the different detailed MCS energy saving techniques. We further present how the various energy saving techniques are utilized and adopted within MCS applications and point out their existing limitations, which inform and guide future research directions

[4] Exploiting radio frequency signals is promising for locating and tracking objects. Prior works focus on per-tag localization, in which each object is attached with one tag. In this paper, we propose a comprehensive localization and tracking scheme by attaching two RFID tags to one object. Instead of using per-tag localization pattern, adding one-more RFID tag to the object exhibits several benefits: 1) providing rich freedom in RFID reader' s antenna spacing and placement; 2) supporting accurate calibration of the reader' s antenna location and spacing, and 3) enabling fine-grained calculation on the orientation of the tags. All of these advantages ultimately improve the localization/tracking accuracy. Our extensive experimental results demonstrate that the average errors of localization and orientation of target tags are 6.415 cm and 1.330°, respectively. Our results also verify that the reader' s antenna geometry does have impact on tag positioning performance.

[5] In the Internet-of-Things (IoT) era, it will be increasingly important to accurately and efficiently locate an object in the real world as well as identify it in the virtual world. However, it is not easy to accurately locate an indoor target using radio technology because the multipath propagation of radio waves in an indoor environment may lead to serious position estimation errors. In addition, when each target has a transceiver or each reader operates in its high-power mode, the overall power consumption of the whole system is considerable. In this work, a dual-channel low-power passive RFID positioning system is proposed to solve this problem. The probability for accurately locating a target within 0.5 m from its real position can reach 96.7% in this system. The positioning area of this work is bigger than those of the prior arts. The total RF radiation power of one block of the proposed system is 23.14 dBm, which is the lowest among reported RFID positioning systems. Furthermore, this proposed architecture can be easily expanded to a large system.

[6] People nowadays almost want everything at their fingertips, from business to entertainment, and meanwhile they do not want to leak their sensitive data. Strong information protection can be a competitive advantage, but preserving privacy is a real challenge when people use the mobile apps in the smartphone. If they are too lax with privacy preserving, important or sensitive information could be lost. If they are too tight with privacy, making users jump through endless hoops to access the data they need to get their work done, productivity can nosedive. Thus, striking a balance between privacy and usability in mobile applications can be difficult. Leveraging the privacy permission settings in mobile operating systems, our basic idea to address this issue is to provide proper recommendations about the settings so that the users can preserve their sensitive information and maintain the usability of apps. In this paper, we propose an unobtrusive recommendation system to implement this idea, which can crowdsource users' privacy permission settings and generate the recommendations for them accordingly.

[7] Nowadays more and more urban residents are aware of the importance of the air quality to their health, especially who are living in the large cities that are seriously threatened by air pollution. Meanwhile, being limited by the spare sense nodes, the air quality information is very coarse in resolution, which brings urgent demands for high-resolution air quality data acquisition. In this paper, we refer the real-time and fine-gained air quality data in city-scale by employing the crowdsource automobiles as well as their built-in sensors, which significantly improves the sensing system's feasibility and practicability. The main idea of this work is motivated by that the air component concentration within a vehicle is very similar to that of its nearby environment when the vehicle's windows are open, given the fact that the air will exchange between the inside and outside of the vehicle though the opening window. Therefore, this paper firstly develops an intelligent algorithm to detect vehicular air exchange state, then extracts the concentration of pollutant in the condition that the concentration trend is convergent after opening the windows, finally, the sensed convergent value is denoted as the equivalent air quality level.

[8] In this paper, we propose a smart campus care and guiding framework with deep learning based face recognition, called DeepGuiding, for students through Internet of Things technologies. The DeepGuiding framework can construct the dedicated video trajectory of a campus student, where the recorded video for each student can be automatically classified to achieve efficient footprint review as necessary. In addition, DeepGuiding can

provide time-efficient indoor and outdoor guiding in a campus to quickly reach places, meet friends, and find students. To the best of our knowledge, DeepGuiding is the first campus care and guiding system which provides the following features: 1) it achieves the seamless outdoor and indoor navigation between buildings in a campus, 2) it keeps additional construction cost low by utilizing existing surveillance cameras in a campus, and 3) it reduces the total searching time for finding a specific event/target in a campus by alleviating time-consuming labor overhead to review a huge amount of video data.

[9] As a key technology that is widely adopted in location-based services (LBS), indoor localization has received considerable attention in both research and industrial areas. Despite the huge efforts made for localization using smartphone inertial sensors, its performance is still unsatisfactory in large open areas, such as halls, supermarkets, and museums, due to accumulated errors arising from the uncertainty of users' mobility and actuations of magnetic eld. Regarding that, this paper presents iBILL, an indoor localization approach that jointly uses iBeacon and inertial sensors in large open areas. With users' real-time locations estimated by inertial sensors through an improved particle later, we revise the algorithm of augmented particle later to cope with actuations of magnetic eld. When users enter vicinity of iBeacon devices clusters, their locations are accurately determined based on received signal strength of iBeacon devices, and accumulated errors can, therefore, be corrected. Proposed by Apple Inc.

[10] This paper proposes a group-based framework with dedicated path planning for emergency guiding based on Internet of Things (IoT) technologies. The proposed framework can model the spatiotemporal mobility of indoor people to determine and relieve the congestion of corridors and exits. A dedicated path can be determined to provide the shortest evacuation time for each group of nearby people. The corridor and exit capacities, corridor lengths, clustering motion of a group, concurrent moving of different groups, and up-to-date distribution of group people are considered together to accurately estimate the evacuation time for each group. Based on the estimated evacuation time, evacuation load can be evenly distributed among corridors and exits to alleviate the congestion of all corridors and exits for minimizing total evacuation time. The performance of the proposed framework is evaluated by conducting mathematical analysis and computer simulations, which outperforms existing schemes and can achieve the shortest evacuation time for group-based emergency guiding.

EXISTING SYSTEM

In existing system, implemented an emergency response situation recognizing app VithU called as to provide women safety even in the situation. VithU, is an emergency App that, at the click of the power button of your Smartphone 2 times consecutively begins sending out alert messages every 2 minutes to your contacts that you feed into the app as the designated receivers or guardians. The message says "I am in danger. I need help. Please follow my location." The receiver will receive a link to your location every 2 minutes giving them your updated location. Also, you will get updates on the Crime Scene in India and a " Tips Feed" option exclusively giving you safety tips in an emergency situation.

On the other hand, Internet of Things (IoT) localization technologies including RFID tags/readers or Bluetooth Low Energy (BLE) iBeacon devices can be adopted for accurate indoor positioning and efficient people guiding. In particular, iBeacon devices with BLE broadcasting and surrounding smart phones with BLE scanning can be operated in coordination to periodically collect the current locations of mobile users and cooperatively track the trajectories of moving targets. Innovative crowd sourced sensing applications and systems have been developed for Automatic Queue Time Estimation, Unobtrusive Privacy Permission Recommendation, Fine-Grained Air Quality Monitoring, and Peer-to-Peer Navigation.

DISADVANTAGE

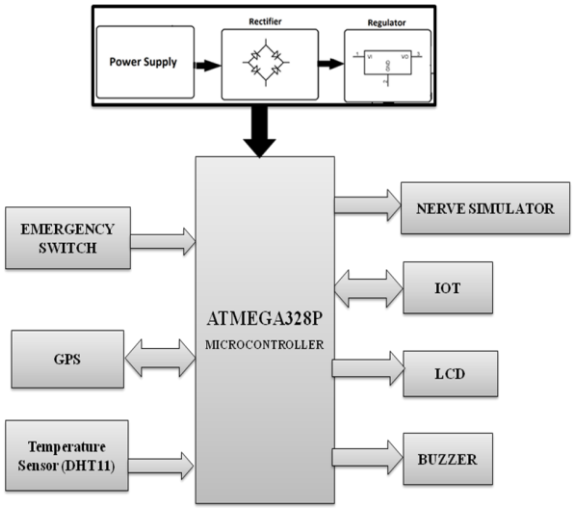
- Less security due to network issue

METHODOLOGY & PROPOSED METHOD

Proposes the intelligent safety system for women security. Nerve simulator is installed on these systems which provide shock when someone abuses.This system consists of wearable sensors like temperature sensor and UV sensor for monitoring temperature condition and sunburn producing ultraviolet (UV) radiation condition also installed with emergency button.

When the emergency button pressed, it sends the emergency message including the location in the form of latitude and longitude to the registered contacts.A GPS module tracks the location and sends the emergency messages to emergency contacts every two minutes with updated location through GSM and indicate through buzzer for neighbor people.An DHT11 temperature sensor and temperature is upadted to IOT using NodeMCU.LCD is used to display the measured sensor details.

BLOCK DIAGRAM



SOFTWARE DESCRIPTION

ARDUINO IDE

The Arduino Integrated Development Environment (IDE) is a software platform used to program and develop projects for Arduino boards. Arduino boards are microcontrollers that can be programmed to control various electronic components such as sensors, motors, and lights.

The Arduino IDE provides an interface to write and upload code to the Arduino board, as well as tools to debug and monitor the behavior of the board. The IDE is available for Windows, Mac OS X, and Linux operating systems.

The IDE uses a simplified programming language based on C++ and includes a set of pre-built libraries that make it easy to interact with sensors and other components commonly used in Arduino projects. Additionally, there is a large community of developers and hobbyists who share their projects, libraries, and tutorials on various online platforms, which makes it easy for beginners to get started with Arduino programming.

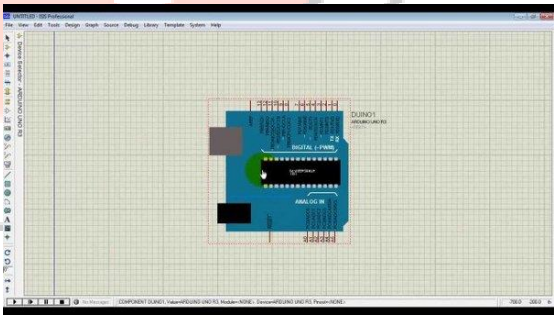
PROTEUS

Proteus is a simulation software tool used for designing and testing electronic circuits. It is widely used in the electronics industry for designing and testing electronic circuits before they are built physically. Proteus provides a comprehensive set of simulation tools and models that allow engineers and designers to test and verify the functionality of their designs.

Proteus has two main components: the ISIS schematic capture tool and the ARES PCB layout tool. With ISIS, you can design and simulate your circuit using a graphical interface that allows you to easily add and connect components. ARES allows you to create the PCB layout from your schematic, with options for auto-routing and manual routing.

Proteus also includes a wide range of simulation models for various electronic components such as resistors, capacitors, transistors, diodes, and integrated circuits. Additionally, it has a built-in virtual oscilloscope and other measurement tools that allow you to monitor the behavior of your circuit during simulation.

Proteus is used by engineers, students, and hobbyists in a variety of industries, including aerospace, automotive, industrial control, and consumer electronics. Its intuitive user interface and extensive library of simulation models make it a popular choice for electronic circuit design and simulation.



MODULE LIST

- Power supply
- ATMEGA328P microcontroller
- GPS
- NodeMCU
- Nerve Simulator
- Temperature Sensor
- Lcd

MODULE DESCRIPTION

POWER SUPPLY

A power supply is an electronic device that converts one form of electrical power into another. Its main function is to provide a stable and regulated source of power to electronic devices. There are two main types of power supplies: AC (alternating current) and DC (direct current). AC power supplies convert the incoming AC voltage from the power outlet into a DC voltage suitable for electronic devices. DC power supplies, on the other hand, convert the incoming DC voltage to a lower, more stable DC voltage that can be used by electronic devices. Power supplies can also be classified based on their voltage and current outputs. Linear power supplies provide a constant voltage output, while switching power supplies can provide a variable voltage output. Switching power supplies are more efficient than linear power supplies and are commonly used in electronic devices that require high power efficiency. Power supplies also have different levels of regulation, which determines how stable their output voltage is. A well-regulated power supply will have a stable output voltage regardless of changes in input voltage or current. Power supplies are used in a wide variety of electronic devices, from simple battery-powered devices to complex computer systems. They are an essential component of any electronic system and are designed to provide a reliable and stable source of power.

ARDUINO UNO

The Arduino UNO is an open-source microcontroller board designed by Arduino.cc that is based on the Microchip ATmega328P microprocessor. The board has a number of digital and analog input/output (I/O) pins that may be used to connect to various expansion boards (shields) and other circuits. The board features 14 digital pins, 6 analog pins, and is programmable through a type B USB connector using the Arduino IDE (Integrated Development Environment). It may be powered by a USB connection or an external 9 volt battery, and it supports voltages ranging from 7 to 20 volts.

It also resembles the Arduino Mini and Leonardo. The hardware reference design is available on the Arduino website under a Creative Commons Attribution Share-Alike 2.5 license. Konzept and production files for various hardware variants are also available. The name "Uno" means "one" in Italian and was selected to commemorate the launching of the Arduino Software (IDE) 1.0. The Uno board and Arduino Software (IDE) version 1.0 were the reference versions of Arduino, which have since progressed to later releases. The Uno board is the first of a series of USB Arduino boards and serves as the platform's standard model.

PINS General Pin functions

- **LED**: There is a built-in LED driven by digital pin 13. When the pin is HIGH value, the LED is on, when the pin is LOW, it's off.
- **VIN**: The input voltage to the Arduino/Genuino board when it's using an external power source (as opposed to 5 volts from the USB connection or other regulated power source). You can supply voltage through this pin, or, if supplying voltage via the power jack, access it through this pin.
- **5V**: This pin outputs a regulated 5V from the regulator on the board. The board can be supplied with power either from the DC power jack (7 - 20V), the USB connector (5V), or the VIN pin of the board (7-20V). Supplying voltage via the 5V or 3.3V pins bypasses the regulator, and can damage the board.
- **3.3V**: A 3.3 volt supply generated by the on-board regulator. Maximum current draw is 50 mA.
- **GND**: Ground pins.
- **IOREF**: This pin on the Arduino/Genuino board provides the voltage reference with which the microcontroller operates. A properly configured shield can read the IOREF pin voltage and select the appropriate power source or enable voltage translators on the outputs to work with the 5V or 3.3V.
- **Reset**: Typically used to add a reset button to shields which block the one on the board.

GPS

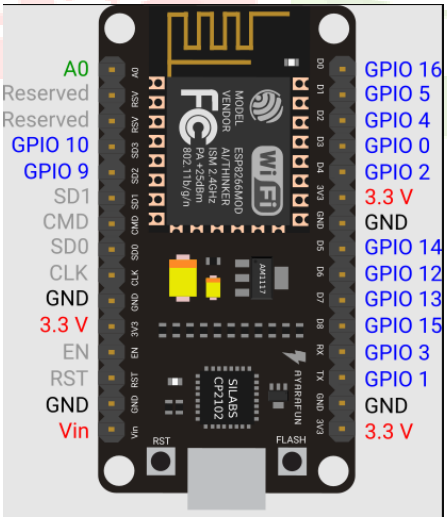
The Global Positioning System (GPS) is a space-based navigation system that provides location and time information in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. The system provides critical capabilities to military, civil, and commercial users around the world. The United States government created the system, maintains it, and makes it freely accessible to anyone with a GPS receiver.

NodeMCU

NodeMCU is the WiFi equivalent of ethernet module. It combines the features of WiFi access point and station + microcontroller. These features make the NodeMCU extremely powerful tool for WiFi networking. It can be used as access point and/or station, host a web server or connect to internet to fetch or upload data.

Features:

- Programmable Wi-Fi module.
- Arduino-like (software defined) hardware IO.
- Can be programmed with the simple and powerful Lua programming language or Arduino IDE.
- USB-TTL included, plug & play.
- 10 GPIOs D0-D10, PWM functionality, IIC and SPI communication, 1-Wire and ADC A0 etc. all in one board.
- Wifi networking (can be used as access point and/or station, host a web server), connect to internet to fetch or upload data.
- Event-driven API for network applications.

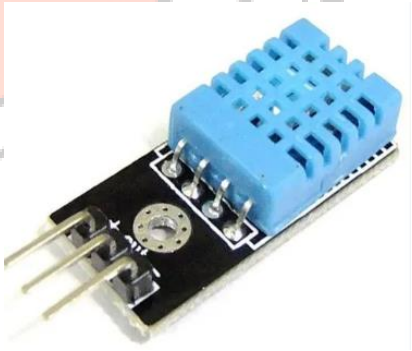


NERVE SIMULATOR

Transcutaneous electrical nerve stimulation (TENS or TNS) is a therapeutic technique that utilizes an electric current produced by a device to stimulate nerves. TENS encompasses the complete range of transcutaneously applied currents used for nerve excitation, but it is often specifically used to refer to the kind of pulses generated by portable stimulators to alleviate pain. Another type of stimulation device is a spinal cord stimulator, which operates by intercepting pain signals before they reach the brain. The stimulator delivers electric pulses to electrodes placed over the spinal cord. However, not everyone benefits from this method of treatment. If the stimulation fails, the implant can be safely removed without causing damage to the spinal cord or nerves.

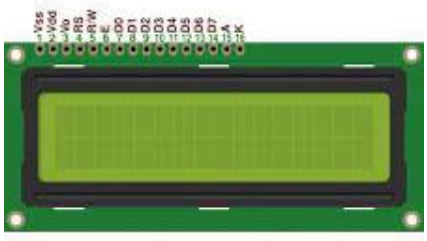
Temperature Sensor DHT11

The DHT11 is a popular and low-cost temperature and humidity sensor used in a wide range of applications including home automation systems, weather stations, and industrial automation. It is capable of measuring temperatures ranging from 0 to 50 °C with an accuracy of ±2°C and relative humidity ranging from 20 to 90% with an accuracy of ±5%. The sensor operates on a single-wire digital interface and is compatible with various microcontrollers, making it easy to integrate into different projects. Its small size, low power consumption, and ease of use make it a popular choice for temperature and humidity sensing applications.



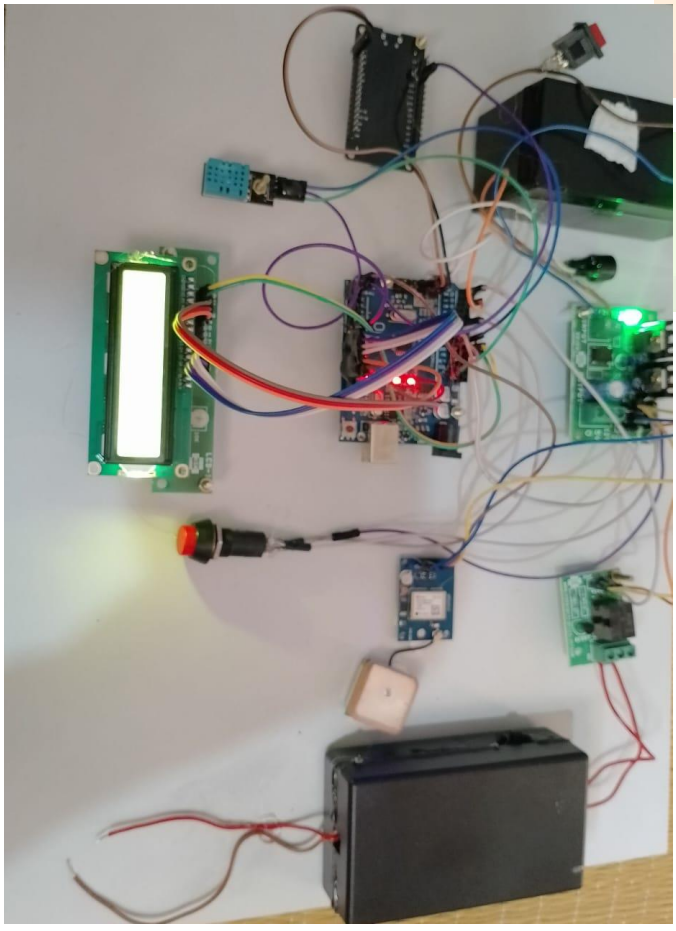
LCD

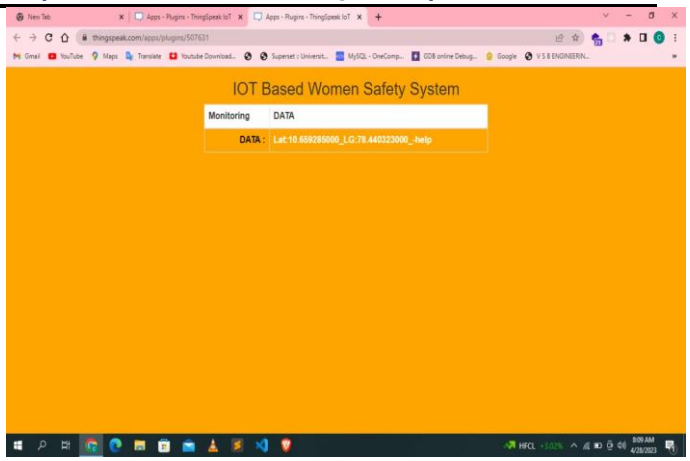
LCD stands for Liquid Crystal Display, which is a type of flat-panel display that uses liquid crystals to display images. LCDs are commonly used in electronic devices such as televisions, computer monitors, and smartphones. The basic structure of an LCD consists of a layer of liquid crystals between two transparent electrodes. When an electric current is applied to the electrodes, the liquid crystals align themselves in a specific way, causing the light to pass through the display in a controlled manner. By selectively blocking or allowing the light to pass through, the LCD can display images or text.



LCDs have several advantages over other types of displays, including low power consumption, high resolution, and a flat, slim design. They are also relatively easy to manufacture and can be made in large sizes, making them suitable for use in large-screen televisions and monitors. Some common applications of LCDs include digital clocks, calculators, and consumer electronics such as DVD players and gaming consoles. They are also used in medical devices, aviation displays, and automotive dashboards. With the advancement of technology, LCDs have been replaced with newer technologies such as OLEDs in some high-end devices, but LCDs remain a popular and widely used display technology.

RESULTS AND SIMULATION ANALYSIS





CONCLUSION

This proposed design will help to solve critical issues faced by women in the near past with technologically sound equipment' s and ideas. While the society may or may not change for the enhanced, the power to be autonomous, self-assured and truly free can come with arming oneself with the best possible device. The system will provide correct information as physical devices gives guarantee for the same. Our primary goal of this work is to ensure every woman in our society to feel safe and secured. The system will be portable, shock proof and cost effective.

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