A SMART SAFETY HAND BAND USING CUBE SATELLITE FOR WOMEN AND CHILDREN IN IOT WITHOUT MOBILE NETWORK

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1. ABSTRACT

Indian law prohibits kidnappings and abductions, but since 2005 there have been over 100,000 kidnappings in India. People continue to use underage youth   to kidnap, exploit and coerce them into horrific acts. Such crimes are an attack on civil liberties and must be prevented. Sections 359 to 374 of the Indian Penal Code,
1860 provide penalties for these crimes. The basics of
abduction and kidnapping, explains the difference between kidnapping, and also covers regulations on forced slavery, labour, and the sale of minors for illegal purposes.Power dynamics often manifest themselves in sexual harassment. Women are far more likely to be victims of sexual harassment because they are often powerless, more vulnerable, less confident, and conditioned to suffer in silence.To understand why women, experience the majority of sexual harassment, it is important to examine some of the root causes of this situation. We have developed a concept that will change the way women are seen as safe. It is a success that the media often highlights the achievements of women rather than cases of harassment. Since we are unable to respond appropriately to the emergency situations presented in our research, we are trying to develop technology that automatically detects and rescues victims. In an emergency,   simply pressing a trigger button activates the device. A GPS module is part of a smart band and can be used to obtain longitude and latitude and locate objects. After entering this position into the microcontroller, the data is sent to the CubeSat via   LoRa transceiver. A LoRa transceiver is built into the CubeSat to receive data from the wristband. Data is relayed to a base station using a microcontroller and LoRa transceiver. The base station is equipped with LoRa receiver for receiving data from the CubeSat and a GSM

module for calling the user's parents and police and sending SMS. A "Help Me" text and a live location are both included in SMS.

2. INTRODUCTION

Some of the most common crimes against women include rape, assault on women, kidnapping, husband brutality, and domestic violence. The latest data shared with HT by a short cell is her 2022 total of 659 cases registered as major offenses against women. Cases have surged over the past three years, with the city reporting 341 cases in her first five months of 2020 and 473 in 2021. Although many precautions have been taken by lawmakers to prevent these exercises, these diseases have not been affected and changed at the same time. Women continue to work from kitchen to office every day, but their primary concern is their safety [1]. This also changes women's working hours, assigning them different work shifts during the day or even at night. Therefore, it is very important to improve the safety of women and children, especially at night. Women may need to use the various modes of transportation available to get to the office or home in the middle of the night [2]. When it comes to women's safety, there are not enough answers [3]. At work, the complexity of obscene behavior is largely gradual. Obscenity in the work environment is unacceptable behavior by any person. [5]. Smartphones packed with safety apps for women can help women send emergency notifications to people they choose if something goes wrong [6]. Sometimes there are situations when a woman has an accident in the middle of the night. In such situations, a person cannot communicate the situation. And they don't know the details of basic first aid, nor do they know the person who suffered the incident [7]. With the development of the world, women can also adorn many high-ranking offices such as parliaments, banks, schools, universities, and many other places of importance, preparing them for all the challenges of modern society, but each of them has its main idea [8]. Also, the lack of data to find out the statistical graph is inadequate and the proper way may have hampered this importunity [9]. Because of social character and prestige, the victim's family just declines what happens to their girl. occasionally the family members want to protest but they can't continue due to a lack of substantiation [10]. It is not easy for sexually abused women and girls to maintain the same normal state of mind they had before[11]. Based on technological devices such as GPS modules, GSM modules, and CubeSats, an advanced system has been developed that can identify a person's location and respond appropriately. This security system uses a buzzer for instant alerts, a GPS and GSM module for location tracking, and an SMS module.

3. LITERATURE REVIEW
SMART SECURITY SOLUTION FOR WOMEN BASED ON INTERNET OF THINGS(IOT)-
The author G C Harikiran ,et.al.., developed an Modern
systems that use electronic devices to determine a person's location and health status so that they can respond appropriately[12] include GPS receivers, body temperature sensors, GSM, heart rate sensors, etc. Multiple sensors have been used to quickly and accurately locate women in risky addiction situations. A person's heart rate will be higher than usual in such circumstances, which can help with decision-making along with other sensors, such as the motion-her sensor used to spot the odd movements of an abused woman. can do. The idea

behind it was that it would be much more practical and user-friendly than current women's safety options, etc. B. A collection of outfits, a big belt, and a terrible, dated smartphone app. The synthesis of astute .

Disadvantage: This device won't be very useful if the smartphone with which it is constantly interacting is turned off.

IOT BASED UNIFIED APPROACH FOR WOMEN SAFETY ALERT USING GSM -
The author k. Venkatesh, et. al., constructed a device with Many gadgets combined into a wearable "Wrist Band" that constantly communicates with smartphones that have moved towards the Internet [4]. This essay used the arrangement and application of wristbands as an illustration. Trigger, Atmega2560 microcontroller, Neo 6m GPS module, ESP-12E IoT module, GSM module (sim800), neurostimulator, buzzer, and vibration sensor make up the gadget. Once the device has been authenticated, it can send emergency messages to registered adaptive devices and use the Global Positioning System (GPS) to track river areas. This study suggests a phone number that will take you from the station to your home. The IoT component is used to monitor the world and update the network efficiently.
Disadvantage: Mobile networks are primarily needed because this device uses a GSM module. Therefore, it won't function correctly in a remote area.

IOT BASED SMART SECURITY GADGET FOR WOMEN'S SAFETY-
The author Tejonidhi M. R, et.al., When a threat was felt, a portable device was created and could be used[13]. The goal of this initiative was to give women a way to report and respond quickly. Women can overcome their fears and ask their parents for assistance using this app. At the touch of a button, the smart band reported scenarios. Our idea is comparable to smart bands. Thanks to the numerous sensors that were integrated into the band, women can be protected. When you press a button on the Watch Raspberry Pi's GSM module, it uses the GSM network to send various pieces of information, including location, body position, heart rate, SMS alerts, and more, to a specific number. GPS was used to locate the victim precisely. Police can quickly identify victims, easily avoid incidents, rescue women, and punish offenders thanks to GPS, which provides the victim's longitude and latitude. IoT technology allows for the remote tracking of female information.

Disadvantage: If the woman or girl is outside the range of the network, neither the mobile signals nor the police will be able to locate them or issue an SMS warning.

RASPBERRY PI BASED SMART WEARABLE DEVICE FOR WOMEN SAFETY USING GPS AND GSM TECHNOLOGY –
The author DhirajSunehra, et.al.., developed an system that makes use of the Raspberry Pi 3 to create a smart wearable device system to increase the security and safety of women and children[14]. Alarm mechanisms and security systems are both used. A buzzer notification will be sent to anyone wearing a Smart device nearby the user. The Global Positioning System, or "GPS," is used by this system. Then, it texts your location to emergency contacts and the police using GSM/GPRS technology, which stands for Global System for Mobile Communications.

When the user presses the emergency button on her smart wearables and gadget her system, an electronic alarm sounds, and the gadget also takes pictures of the attack and the user's or victim's surroundings. Mail her a message.

Disadvantage: If there is no internet access available where the person is struck, this gadget will send an email with the taken image and an alarm message.

SMART SECURITY DEVICE FOR WOMEN BASED ON IOT USING RASPBERRY PI -

The author Prottasha Ghosh,et. al.., The police originally handled the case with a lot of difficulties, but there were issues like whether the crime had been committed, and due to a lack of substantiation, the police stopped the disquisition. To address these issues, we developed a novel IoT-based evidence-gathering tool [15]. This novel IoT- based tool for gathering evidence was created to protect women. A Raspberry Pi, a buzzer, a camera, a combined flex sensor, GSM, and GPS modules made up the system. While wearing their underwear, women can use this small device with ease and convenience.

Disadvantage: The cell signals won't be able to send the SMS if the woman or girl is in an area without network coverage, and if there isn't any internet access where the person is hit, it won't be possible to upload the video and photograph.

DESIGN AND DEVELOPMENT OF AN IOT BASED WEARABLE DEVICE FOR THE SAFETY AND SECURITY OF WOMEN AND GIRL CHILDREN –

The author AnandJatti, MadhviKannan, et.al., developed a a wearable device for the security and protection of women and girls [16]. Galvanic skin resistance and body temperature were excavated into physiological pointers. To determine the body position, we used the raw accelerometer data from a 3-axis accelerometer. After gathering the raw data, an exertion discovery-specific machine learning algorithm was applied. By wirelessly transmitting sensor data to an open-source pall platform, real-time data monitoring is now realizable. Data analysis was conducted using Matlab concurrently. The system was programmed to cover the subject's parameters continuously and respond to potentially dangerous circumstances. This was fulfilled by relating changes in the covered signals and informing the proper parties to take the necessary action. Disadvantage: Even if a woman or girl feels poorly, their body temperature and blood pressure tend to alter. However, neither the body temperature nor the blood temperature can be used to predict a person's mental state.

DESIGN AND IMPLEMENTATION OF WOMEN SAFETY SYSTEM BASED ON IOT TECHNOLOGY-

The author B. Sathyasri, et.al.., created a gadget that combines several devices [17]. A trigger, an Atmega2560 microcontroller, a GSM (SIM900) module, a Neo 6M
GPS module, an ESP-12E IoT module, a neurostimulator, a buzzer, and a vibration sensor make up the device. The device locates you using GPS (Global Positioning System) and calls your registered mobile number and the closest police station using GSM (Global System for Cellular Communications) when you turn it on. Send a message with urgency. The IoT module was used to update the webpage and track the position continuously. A buzzer was

used as an alarm to notify those in the vicinity that A neurostimulator delivered a non-fatal electric shock in an emergency to identify the attacker because someone was in trouble. If the device is not functioning, the vibration sensor will also send your most recent location. Disadvantage: Mobile network is essential for this gadget because it uses a GSM module. Therefore, it won't function

correctly in a remote area.

DESIGN OF A SMART SAFETY DEVICE FOR WOMEN USING IOT –

Wasim Akram et.al..,built an internet of things (IoT)- Security device that protecting women by connecting to them via fingerprint and alerting nearby people and law enforcement if they are unsafe [5]. If the device does not detect a signal after 1 minute of fingerprint authentication, it will automatically alert other users and officials in the region. A shock wave generator was also constructed to enable women to attack the offenders to defend themselves. This device has extra features like voice recording and group messaging. A mobile app created specifically for women's safety displays a safe location on a map that women can travel to from their current location. Disadvantage: If the equipment that is constantly transmitting is turned off, it will be of little use.

4. PROPOSED DESIGN

- To address this issue, wearable smart hand band devices have been developed that allow users to communicate with others without using cellular networks using cube satellites.
- When Women/Children sense insecurity in this proposed work, they must press the trigger.
- When you press the trigger, the GPS will begin sharing your location with the CubeSat via her LoRa transceiver, followed by calling the police and an emergency number of your choice and sending her an SMS via the GSM module.

4.1 METHODOLOGY

The device can be activated by just pressing the trigger button in an emergency. The method which works behind this is as explained below:

- The GPS module in a smart band is triggered by collecting the wearer's location using latitude and longitude. The location is then fed in to Microcontroller, which transmits it to our CubeSat via the LoRa transceiver.

- A LoRa transceiver is built into the CubeSat to receive data from the Hand band. Data is then relayed to the base station using the Microcontroller and LoRa transceiver.

- The base station has the necessary hardware for a LoRa receiver to receive data from a CubeSat, as well as a GSM module to call and send an SMS message to the police and the user's parents. An "Help Me" text and a live location are both included in the SMS.

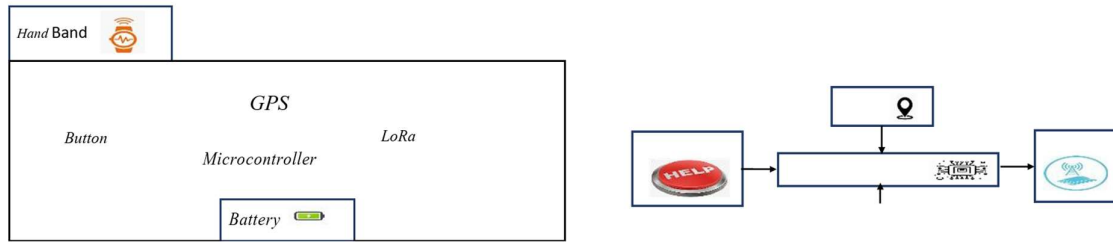## 4.1.1 HAND BAND WORKING PROCESS
Hand Band

Figure.1 Hand Band Working Process

When the hand band's trigger button is depressed, an ESP8266 microcontroller begins collecting real-time position updates from the NEO 6m GPS module. The microcontroller then sends the latitude and longitude information it has collected to the cube sat through a LORA transmitter.
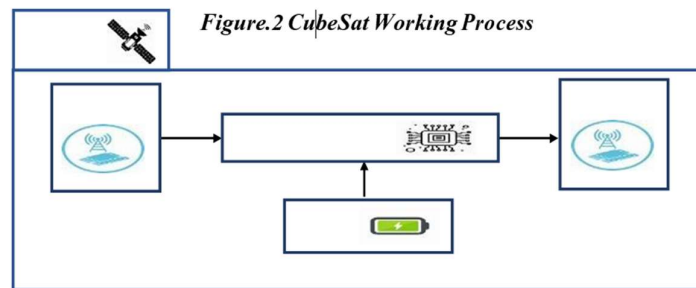
4.1.2 CUBESAT WORKING PROCESS

Figure.2 CubeSat Working Process

The LORA Transceiver module in cubesat will be used to receive the latitude and longitude data from the lora module in the hand band.The data will then be transmitted to the base station.The microcontroller was in charge of controlling the LoRA module (ESP8266).
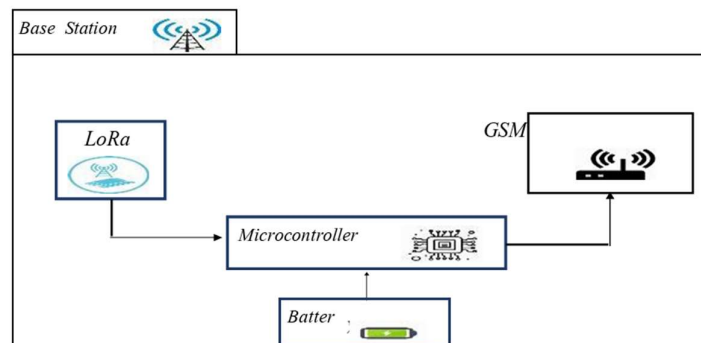
4.1.3 LIVE LOCATION

Figure.3 Base Station Working Process

Latitude and longitude information from the Cube Sat are received by the base station's LORA Transceiver module. The microcontroller serves as a conduit between the LORA and GSM Module in the base station so that the latitude and longitude data may then be delivered to the parents and the nearby police station using a GoogleMap link.

1. RESULT AND DISCUSSION

5.1 LOCATION IDENTIFICATION

In this part, The NEO-6M GPS module is a GPS

receiver that can track about 22 satellites and locate any position on Earth. Constructed with a powerful U-Blox 6 positioning engine.
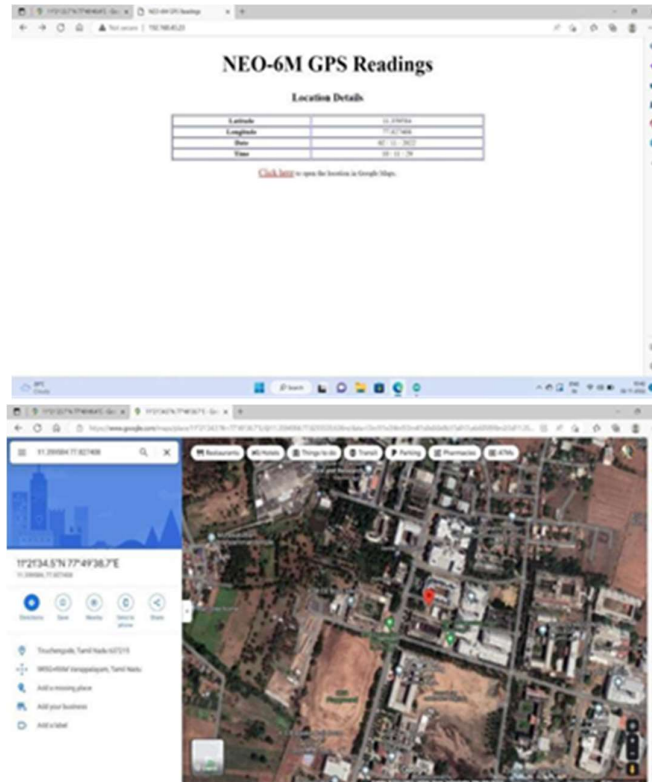
1.2 COMMUNICATION

An SMS is sent using an IoT trigger or event. Real-time data monitoring is not possible without an internet connection, but a GSM module can send alert messages whenever a sensor crosses a preset programming threshold value.
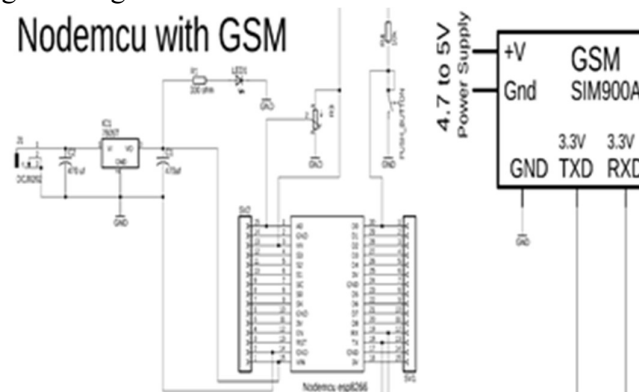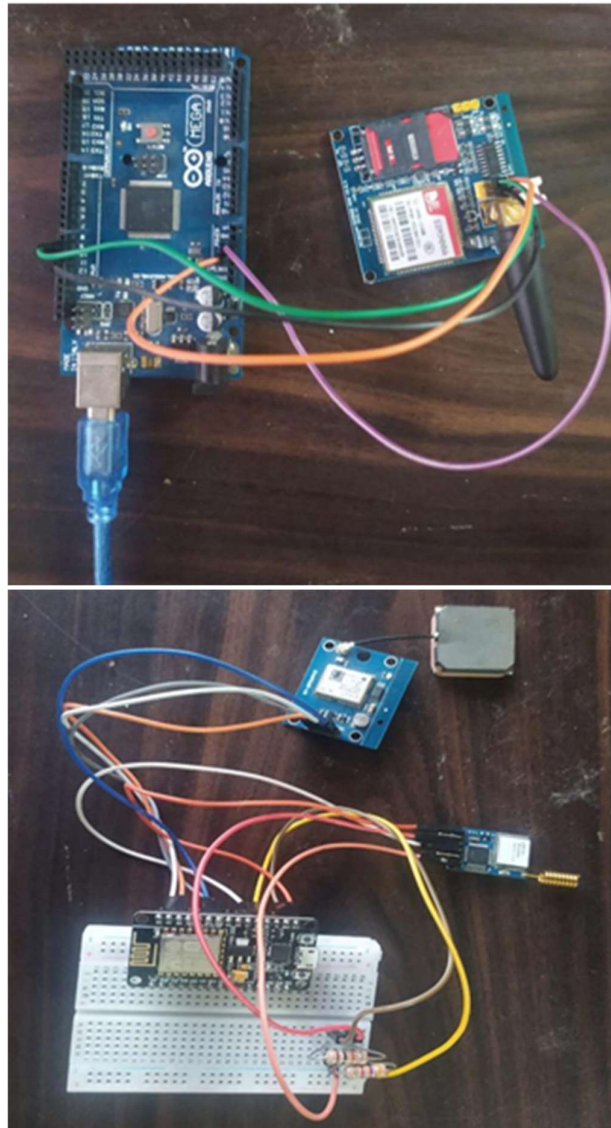
4.2 CONNECTING WITH SATELLITE

•   The NodeMCU ESP8266 Board with LoRa Module SX1278. There is a transmitter and receiver circuit built right into the LoRa Module. On a 0.96″ I2C OLED Display, the transmitted parameters are displayed.

•   NodeMCU is used in transmitter LoRa circuit.
         A voltage divider uses 4.7k and 10k resistors to reduce the 5-volt logic level to the LoRa module's 3.3-volt logic level.

•   The D7 as RX and D8 as TX for the serial verbal exchange with the LoRa module.

•   The NodeMCU's SD3, D3, D5, and RX GPIO
         pins are connected to the pushbuttons.
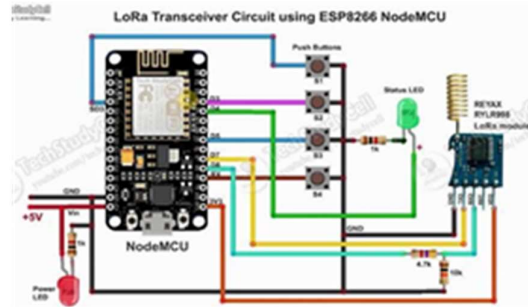
2. CONCLUSION

In this article, women's safety has always been an issue, even in an era of rapid technological progress.

Women are not safe everywhere, but they are especially at risk when traveling alone on remote roads or in remote areas. We therefore conclude that we were able to continue

our analysis of the many methods that have long been used to keep women safe. We also propose a system that can

function as a safety device for women and children that can

identify the location of objects at risk.

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