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A.J. Institute of Engineering & Technology
Mangaluru - 575 096

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Chapter - 13

A Survey Paper on SAATHI: Women-Safety-Device Using

IoT

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Abstract

People these days, mostly women, are social bullies. Harassment of woman and children is increasing day by day, and cases of sexual-assault, molestation, and even rape followed by murder are regularly observed in public and outdoor very often. The main problem is that there are also many unsubstantiated and untreated cases due to lack of evidence/proof. This project introduces women safety using Node MCUs. The purpose of this device is to protect women in case they are in danger.

Devices use wireless sensor networks to communicate and send alerts. GPS and GSM are used to directly exchange information, voice and your location with authorities and stored contacts those are the family members. The device's switch acts as a panic switch that sends a manual alert or receives an electric shock in case of an emergency.

Keywords: Anti-rape; IoT device; women safety; GSM; smart-safety device;

1. Introduction

Crimes against women have increased significantly over the past few years. Women are persecuted in their homes, workplaces and shops, not only in the evening and at night, but also during the day. There are many women who are afraid of strangers for their safety. About 80% of women in our country fear for their safety. In the past few decades, women have generally been safer because they have not left the house for work. However, in the current situation, women want to work and want to work on the streets, but there is not enough security. There are various systems for women's safety. And each system uses a different method to detect the woman's unstable position.

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Every morning when we pick up the newspaper, we come across reports of rape, murder and molestation of women. In addition, to end violence and harassment against women and girls, such as kidnapping, and robbery, society needs women's safeguards.

The main goal of our project is to provide an effective and smart ideology of women's security. Proposed to help women in need, this idea will not only serve as a woman's third eye, but will also help women in an emergency case. It keeps women who are in danger safe in just one touch^[1].

Therefore, the contribution of our device:

- It sends a message with your current location.
- Pressing the button also makes calls to the predefined contacts.
- This IoT device is economical and power efficient.

This thesis is divided into six parts. Section 2 lists safety measures for women. Section 3 discussed case studies related to crime against women. Section 4 discussed existing work using IoT. Section 5 discussed other related tasks. Section 6 describes the components used. Finally, we concluded the document by discussing the overall results and the scope of future work.

Literature Review

2. Safety Techniques

Self-defence and training aimed to prevent or control savagery against women by nourishing women's capacity to shield themselves. This instruction gives women entry to a new set of decisive and aggressive responses to various forms of terrifying and menace along the sequence of sexual violence (Kelly, 1988; McCaughey, 1997). Women's self-security is meant to be practical, painless, and potent in usual situations, so that all women can study them nonetheless of size, age, corporeal strength and previous occurrences. Involvement in self-security/ training may change according to survivors framework and their chronicle and happening, so key variables were preferred from each of these province in Koss's data set to examine these techniques and approach^[2].

Optimist self-safety ratify women's right and capacity to protect themselves from damage. In lawful terms, self-security is the right to expose damage and/or use lethal force on another person when your life is in impending danger. To legally defend yourself, you must meet three criteria: Danger (attacker demonstrates intent to harm you), ability (attacker may physically harm you, i.e. not intoxicated or not seriously impaired), and

proximity (attacker is in a location where you can harm - your house, your car, etc.). Paradoxically, it is understood as what a “reasonable” person would do. I won't resist. Male aggression is considered natural, whereas female aggression is considered outside of gender-specific social roles. This contradiction of the 'reasonable man' justification of the Self-Defence Act is that in the case of sexual and domestic violence, even if it means giving up resistance, male aggression and female passivity are still used. There is a gender reasoning here that is abnormal and unlawful for women to speak out against molester, but normal for male backer [3].

This study examined that the relationship between self-safety training, women's concern of crime and bodily ability. The study involved 49 of women enrolled in an active behavioural self-safety course in Hamilton, New Zealand. Satisfaction with pre-tests and post-tests measuring eight specific fears of crime and confidence in one's ability to successfully defend oneself against individual and group aggression. This pre-test was also demonstration in a control group of women observing a bodily fitness course at the YWCA. Since the training, students reported a marked decrement in fear of all eight criminality and a marked increment in disposition to insulate against them. Analyze the pre-training event between the test and authority groups, the authority group had a compelling lesser mean fear of crime and larger assurance in actuality able to contend themselves against a single helpless attacker. However, after involving in the course, the test group announced a significant increment in self-courage correlated to the control group's measure assured level, implying that women who were somewhat convinced in their bodily abilities also took the series [4].

The act of women in stepping and compressing the risk of sexual incursion has become increasingly controversial as the male participation\involvement movement has become more approved in modern years. Two assertive arche type have been appeared respecting women's involvement in abduction avoidance. The first contend that the involvement in sexual virulence avoidance is approval and powerful, especially with interest to self-security course and training and risk avoidance (de Becker 1997; Higginbotham 2008; Warshaw 1994).

The second prototype claiming the important notion that risk reduction is powerful for women. Basically when related to the tendency to blame rape victims for their persistent fears from day-to-day risk reduction and “risk-taking” behaviour (Filipovic 2008; Hall 2004; Perry 2008); Ryan, 1972; Valenti, 2008). Rather, advocate of the second model expounder an entrance

to rape forestalling that involves men and addresses the standardized details of sexual invasion ^[5].

Self-security training teaches women emotionally and physically for more possible aggression by giving them the opportunity/chance to learn and improve, observe and practice physical tasks, civil and corporeal skills through board-playing, interview and keyed-up exercises (Follansbee, 1982). After corresponding the self-defence class, scores showed rapid increment in the proximate areas for women. Self-safe. Reduce defensive skills, physical drive, panic, abjection, aggression, fear, and ignorant behaviour ^[6].

This fixtures/articles explores the convincingness of impressive appeals to fear in motivating women to enroll in self-security classes to take assurance against rape. The model of Parallel Process is basically used as a structure to review the interrelation between perceived indestructible, perceived fear, and fear control authority. For the sake of women may perceive impenetrable to rape, persuasive fear appeals aimed toward them may be disorganised Achieving change in attitudes, intentions, and behaviour toward self-preservation. One available solution convince the man to talk to the woman he cares about. The solution showed that women did not feel immune to different effects of rape between high and low threat messages, women noted positive intentions and actions in response to direct appeal for fear. Men desired positive animus and actions in feedback to indirect fear ^[7].

Domestic violence is the study that can be defined as the Women's Protection from Domestic Violence Act (January 2005), is defined as a partner possessing in a conjoint family who harms, injures, or threshing the security and well-being of the casualty or any step by a family member. The various ways of abuse that fall under domestic affairs/violence include physical, literal, carnal and commercial abuse/crime. For the ambition of this study, physical crime includes pushy, hit-on, kicking, beheading, or any other form of physical crime. Literal abuse includes shouting, cussing, swearing, charging, abasing, isolating, threatening or any other form of verbal abuse ^[8].

Carnal abuse includes sexual assault, molestation, contraceptive, unwilling touching, or any other form of carnal abuse. Commercial abuse includes stipulation on the use of commercial resources, mugging of money, interdict from work, or other forms of commercial abuse. The assassin of domestic crime can be a playmate or another family member.

Recommendation for UN Agency Action: Treat services for abused women as essential services.

- Strengthen services, including shelters, through rapid capacity

assessments and emergency risk assessments, safety plans and case management development to ensure survivors receive assistance.

- Provides psychosocial support to women and girls experiencing violence and supports medical and social support workers on the front lines.
- Expand shelter capacity, including repurposing other spaces, such as vacant hotels or educational institutions, for quarantine needs.
- Strengthen our helpline, including sexual exploitation and abuse prevention (PSEA), online counselling and technological solutions such as SMS, online tools and social support networks^[9].

One of the most widely used approaches to understanding violence against women is the feminist interpretation of RAT. Various studies have used RATs to describe different types of criminal behaviour. For example, the crimes against property (Massey et al., 1989); domestic and intimate partner violence (Mannon 1997); persecution of women; car theft (Rice and Ksmith, 2002); and cyber-crime. Feminist interpretations of RAT emphasize the importance of examining social conditions that contribute to violence against women. This may lead to a better understanding of the factors that motivate the offenders (Schwartz and Pitts, 1995). We identified aspects of recorded and analysed the events that could help us understand what motivates people to be violent towards their partners during the pandemic^[10].

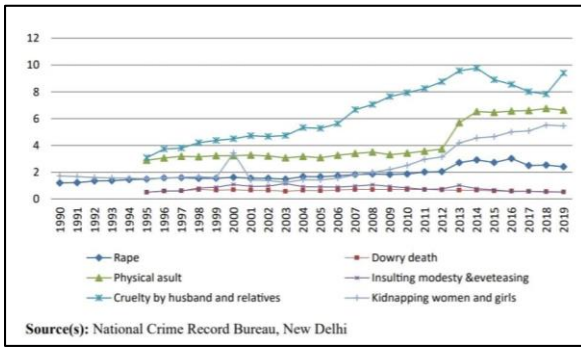
3. Case Study

In the 21st century, "women's empowerment" has become a well-known topic on several occasions. Women's empowerment is linked to many things, such as economic opportunity, social equality and individual rights. Women's empowerment itself makes it clear that social rights, political rights, economic security, judicial power and all other rights must be equal for women. Women have all these rights. But almost worldwide, women and girls continue to be denied these rights simply because of their gender. Since ancient times, women have been considered non-standard and subordinated to men. Today, women's empowerment has become one of the biggest concerns and demands of our time, but in reality, the situation is not good. Gender mainstreaming contributes to progress towards the ultimate goal of gender equality and women's empowerment. In this direction, the Government of India has developed policies and programs at different levels to address different rates and strategies of gender development. Women's empowerment is still needed. This article has attempted to shed some light on some of the issues and issues facing Indian women. The tip also recommends some suggestions for women's empowerment^[11].

According to National Crime Records Bureau, the number of acid attacks reported in 2011 was 83, 85 in 2012, 66 in 2013, 222 in 2015 and 206 in 2016. However, according to reports by Acid Survivors and Women Welfare Foundation (ASWWF) (formerly known as the Acid Survivors Foundation India (ASFI)), an NGO, the estimated total number of incidents of acid violence incidents in India is around 500 per annum. However, the number of cases/incidents received from the government were much lower, with around 80-116 reported numbers between 2010 and 2013 ^[12].

However, one report discusses the conflicting opinions of Asaram Babu's spiritual experts. He was criticized for saying "Victim is just as guilty as her rapist.". Out of the 55 articles dealing with public reactions, 6 out of 55 described instances of victim blaming. One of the articles quoted Rajasthan Legislature saying that rape would decrease if women wore pants instead of skirts. Blaming the victims, the case became a common theme of rape by women who don't dress conservatively. Another matter of these six articles is that women can reduce the number of rapes by not leaving their homes after sunset. These victim blaming cases sparked protests in these countries as people challenged the idea that female victims were held accountable in rape cases ^[13].

The number of crimes against women has increased dramatically over the past few years, reflecting their growing predicament in society. These increasing trends are fuelled by lengthy litigation, social taboos and victim stigma, increased criminalization of politics and persistent impoverishment in society, political indifference to the implementation of gender-sensitive laws and policies, and a growing number of women to strengthen and reform the police force. In 2018, India was ranked 129 out of 189 countries in the Gender Development Index (GDI, 2019, UNDP). Figure 1 shows the increasing trend in the number of crimes in India from 1995 to 2019: bullying, molestation, abuse by husbands and relatives, dowry death, rape of women, kidnapping, kidnapping. According to the NCRB report (2018), abuse by a husband or relative (27.9%) was the most common, followed by 'assault on a woman intending to harm'. Physical abuse includes pushing, kicking, strangling, or any other form of physical abuse. Verbal abuse includes yelling, swearing, swearing, blaming, shaming, isolating, threatening, or any other form of verbal abuse. Sexual abuse includes sexual assault, harassment, birth control, unwanted touching, or any other form of sexual abuse. The assassin of domestic violence can be a partner or another family member ^[14].



The rape case in Delhi, Nirbhaya (Fearless) has raised the need to understand the SAAW issue in India. The brutality of the incident not only sparked widespread public outrage, but also elevated the VAW issue to the centre of political discourse. The storm of violent protests is once again drawing attention to the issue of violence against women. It highlights the criss-crossing of multiple dimensions such as patriarchy, cultural values and poverty that cause and increase violence against women. In many aspects, the Nirbhaya case marked a critical point for the women’s movement that led to fundamental legislative changes in the law as the Government of India decided to enact the criminal Code Act in 2013. However, many other cases remain unregistered (Viswanath & Mehrotra in 2007). Lesser facts are known about the interaction between DV and SAAW [15].

Amongst the most popular myths recurring in response to SAAW is that mostly bad women are sexually harassed (Lahiri & Bandyopadhyay in 2012). This idea describes the indicators of "good" and "bad" women, who are these girls? Is this a woman flirting several men, call girl, woman visiting a disco, woman visiting bar, a woman wearing "naked" clothes, or a woman who has to work the night shift (call centre, doctor, nurse, police)? The presence of these myths, generally applied to women, often limits women's freedom. Scholars argue that most Indian women maintain the illusion of security barriers by drawing boundaries between their bodies and personal spaces through the practice of Indian femininity when approaching and negotiating in public spaces. Indian women's femininity (whether married or not) includes ornaments such as bindi (forehead dots), nose rings, mehendi, henna (hand painting kits), mangalsutra (gold chains with long black beads) for married women, and sindoor [16].

Nevertheless, in the values of Indian society, women are considered the "honour" of the family. This deeply rooted concept refers to stories of "physical horror". Fear of shame and loss of honour if a woman is sexually

assaulted, especially if the attack involves certain dress codes that are not acceptable in society. From a more subtle point of view, such attacks are condemned because they affect the honour of the family, not a woman's basic right to a dignified life. Here are some examples of attempts to control women's behaviour and sexuality:

- 1) (WCDD) The Women and Children's Development Department, Haryana (2012), It issued a notice prohibiting female employees from wearing jeans and t-shirts, which they called "indecent" and instructing women to wear "decent" clothing such as saris. Men's Salwar Kameej shirt and pants. But despite vehement protests, the WCDD minister simply replaces the word "decent" with "official."
- 2) Dimapur's Naga Women's Hoho forced women to avoid skirts and western clothing that invoke SAAW.
- 3) Previously, Uttar Pradesh Panchayat (caste-based local council) forbid women and girls from wearing cloths like jeans [17].

As we move from areas with low overall crime rates to areas with high overall crime rates, the difference in CAW scores between boroughs widens. This means that a high overall crime rate is not a sufficient condition for a high crime rate against women. There are areas where crime rates are generally high, but crime rates against women are low.

Table 8: Median Crime Rate against Women at the State/UT and District Levels

Level of Aggregation	Total Crime against Women	Rape	Kidnap or Abduction	Dowry Death	Molestation	Sexual Harassment	Cruelty at Home
States	89	12	13	5	24	1.25	29
Districts	89	12	10	3	22	0.42	25

Table 9: Selected Categories of Districts

Crimes	Crime Rate (Population Weighted)		Composition	
	LoW_HiT	HiW_LoT	LoW_HiT	HiW_LoT
Rape	7.75	17.28	14.02	14.85
Kidnap/Abduction	10.95	16.37	15.75	14.07
Dowry Death	3.47	8.14	4.99	6.99
Molestation	21.79	24.62	31.36	21.16
Sexual Harassment	3.96	2.38	5.70	2.05
Cruelty at home	19.59	47.60	28.18	40.88
All			100.00	100.00
All Crimes against Women	67.51	116.37		
Total Crime Rate	2325.49	1143.20	2.90	10.18
Number of Districts	58	63		

LoW_HiT Low Crime against Women, High Total Crime Rate
 HiW_LoT High Crime against Women, Low Total Crime Rate
 Low and High correspond to below and above median, respectively

The figure shows a map of India with high or very high incidence shaded areas. The rest of the area is unshaded to clearly highlight areas with high crime rates. The result of this exercise is a very clear spatial pattern. Concentrations appear to vary according to the type of crimes against women.

Additionally, high-scoring regions are mostly surrounded by very high-scoring regions, indicating that the patterns found are robust. The regional distribution by crime rate is shown in. A total of 109 to 110 areas were identified as areas with high or very high crime rates by category of crimes against women [18].

Figure 2: Crime against Women



Figure 3: Cruelty at Home



Figure 4: Rape



Figure 5: Molestation



However, the continued harm to women through DV sends a strong signal: A woman occupies a low position in the family, where she (particularly a wife/daughter-in-law) is expected to abide by the habits, customs and customs of her husband's family, even if these customs differ greatly from those at birth family. The enduring legacy of these norms requires women to accept the gender roles established by their husbands' families. On the family situation, says Anuradha Dutta, director of the National Rural Health Mission, "As boys grow up, they see their fathers attacking their mothers, they begin to tolerate the behaviour and repeat it." Studies show that most children who

witness domestic violence re-establish vague notions that violence and coercion against women is not wrong. Excessive approval of public attitudes that cover up acts of domestic violence can endanger women and even seriously disrupt their daily lives, contributing to their empowerment ^[19].

A blank noise project called "I'm not asking for it". I've experienced sexual harassment, and "teasing" shows that the notion that women's "exposed" clothing causes' harassment is false. The project collects clothes with bullying stories. The study shows 45% of teenage girls wearing school uniform, 9% of girls wearing veils (Islamic clothing) and 50% of females wearing western clothes were bullied on streets. It was hit back and forth while traveling ^[20].

4. Existing Works Using Other Technologies (Year 2010-2019)

I²PROB – Emergency app for women. This project consists of an alarm system for PROB detection using common off-the-shelf electronic devices to detect PROBs and alert authorities. Accelerometer data is evaluated using several algorithms based on threshold and position data to determine the PROB. Thresholds are adapted based on user-supplied parameters such as height, weight, and activity level. This algorithm adapts to the unique movement the phone experiences, unlike similar systems that require users to place the accelerometer on their chest or torso. If any suspicious movement is detected, a notification is sent consisting of a message from the victim. If no response is received, the system will send messages to the pre-defined numbers with an alert message via SMS. When the user responds, the application will send an audio notification and will automatically connect the audio and turns on the speaker. When the contact verifies the issue, a message is sent to the emergency services. I²PROB is a very powerful software specially designed to keep girls safe when someone encounters such incidents, you don't need to find a contact or find a way to send a call or a message or message to your loved ones.

The people may not be having enough time. What you have to do is shake your smartphone hard that is above the threshold. Even caregivers need a smartphone to instantly send message notifications to mom, dad, and anyone else. Even in silent mode. When you receive an ALERT message, it will automatically change your profile to a regular profile and emits an audio notification ^[21].

Abhaya: Women's Safety Android App. Here the article indicates the female safety Android application Abhaya, which can be stimulated at any time with a single clack. A single clack of this particular app pinpoint a place

via GPS, forward a message containing this area to a registered pre-defined number, and calls the initial registered number to help a person in danger. A feature of this app is that it continuously sends messages to registered contacts every 5 minutes until you press the "Stop" button on the app. Continuous location tracking information via SMS allows victims to be quickly located and rescued safely. Continuous location tracking information via SMS allows victims to be quickly located and rescued safely. It is the main feature of our application that distinguishes it from other applications developed so far. First, enter your four contacts - police, family and friends - into the application and press the "Save" button. Launch the app while traveling and press the start button if necessary. As soon as the start button is pressed, the stored registered contacts are first called and a message including the victim's location URL is sent to all contacts. One of the feature of this app is that location URL messages are continuously sent to registered contacts every 5 minutes until the stop button is pressed. Therefore, with the help of this application, the victim's location can be continuously monitored^[22].

Mobile application for women's safety (I Safe Apps). In the proposed system, one can notify preferred predefined number when a person is in trouble and can send their current location by one click. Using this personal security application, a person can never feel alone! Using public transportation, you may have to travel long distances alone at irregular times, and you may be at risk. In times like these, personal security apps are not only smart in terms of being easily accessible, and can also provide us a lot of self-confidence. This security apps require the mentioned username and number of a person to be contacted in case of danger. Person can also add multiple people to their contact list. These people are the ones who will receive alert message or SMS in case of any danger. The user simply activates the SOS button and the device sends the message at the fastest rate it can control. Pressing the SOS button will send the following message to emergency contacts. Another message will follow providing the phone's exact or approximate GPS location. Users have been provided with the facility to make voice/video calls. Here application further provides the essential first aid actions to be taken in an emergency. Just touch the application on your mobile device screen and options will appear, and selecting a specific option will trigger that function^[23].

Women Safety Android App. This system will be implemented using an Android app. When the victim's phone is shaken, a warning message and an alert sound are sent to the guardian's phone to notify nearby people who have the app. It also sends messages and alerts to contacts stored in the app and

police department. It also uses a GPS tracking system to show the victim's location. When the guardian's phone is in silent mode, the guardian's phone will also make a sound. Compared to traditional computerized systems, it provides more secure security and provides a more convenient experience for the user. Shakes the phone will send message to the neighbouring mobile phones that have this app. It will play a sound when the guard phone is in the silent mode. This system also sends messages to the police departments. The system also sends alert messages to police departments. This is a very useful application primarily for the safety of girls. You can shake your phone to send your location to your family or the police department ^[24].

Advanced women security app: We'RSafe - The We'RSafe app provides a safe and secure environment for the girls in the community and allows women to work late at night. A person who has not committed crime against women will be detained, which will help reduce crimes against females. The app will serve as a safety too for women, providing safety and security that works on smartphones with the Android operating system.) There is a panic button. When the panic button is pressed, a police siren (sharp and loud) sounds, catching the attention of the people around. This also consists of an emergency-call option. Once we press the button, it will automatically dial the emergency contact. It also consists of a panic-button. Press this button once to send a notification message to your emergency contact with your current location. A warning message is only sent if the user is not connected to the Internet. There is a button for "accessible hospitals and police stations". By clicking this button, you can use two modes such as offline mode and online mode. Users can use the offline mode when they are not connected to the internet. Click this mode to display nearby police station and hospital information according to the fixed area ^[25].

(Year 2020-2022)

Suraksha- Proposed application is divided into various modules as Hardware Trigger for shaking the phone Hardware trigger is used and speech recognised triggers such as saying a key phrase in the application program which will initiate a panic alert which will send SOS messages to emergency contacts. SOS Message To send SOS message containing location, audio recording and image captured following APIs are used Location Fused Location API is used in the proposed system which uses a GPS sensor of device which gives latitude and longitude of user by which the user's last location can locate, also declared a foreground service, which will allowing app to get location details continuously even after app is running in the background. Voice Recording Media Recorder API is used in the proposed

system which is provided in android SDK for the purpose of recording voice. Application will record audio for two minutes and will upload it to a database, which will generate an URL and this URL will be sent to emergency contact via SOS message Image Capture Camera2API is used in the proposed system which is provided in android SDK21+ and Camera API for SDK version less than 21 to capture images from the rear camera when triggered. Live location tracking ^[26].

Android App for Women Safety - In this system, the person will write the contents of the message, selects them and will store the contact to send the notification to. Hence when she is in trouble, she needs to open the application and press the help button, and this message will be sent to the number she stored in this app. To get help in a timely manner. This Android application is useful when users face problems or need help. When users open this app, they will see a HELP button. It can also store messages and 3 contacts. When users encounter difficulties or need help, they simply open the app and click the "Help" button. This app sends messages to your saved contacts. It supports many connections at a time. Different modes of operation: "view only" and "full access". Many display modes such as: "Window Mode", "full screen" and "zoomed out". It will run as a service on many systems. It works using firewalls and also supports DHCP. It also supports high-screen-resolution and colour depth ^[27].

This article introduces a female safety Android application installed on a smartwatch. The application can use the smartwatch's built-in sensors or automatically activate when needed with a single click. As soon as it determines that a change registered by the smartwatch's sensor is causal, the application raises an alarm that may be delayed for 10 seconds, locates the place via GPS, and sends a message containing this URL. Nearby user notifications from the application asking for help as well as location to registered contacts. An option of this application is that it is designed for smart-watch and it continuously sends messages to registered contacts every 5 minutes until you press the "stop" button on the app and triggers an alarm, making the sensor useful for female safety. Stop sending help messages if desired 10 seconds before sending. Constantly tracking site information via SMS helps to find victims quickly and rescue them safely. Smartwatch sensors are used in conjunction with apps to automate emergency alerts and digitally rescue victims. Women's safety can be guaranteed and improved thanks to the constantly evolving world technology and its elements. Technology plays a major role in addressing serious issues such as women security through new ideas and innovative approaches. The design approach will begin with

collaboration with other branches and departments for both research and technical requirements, leading to full customization and implementation [28].

NAARI Safety Application is designed to the security app is designed to allow users to point their camera at the QR code and scan it to learn vehicle details by QR code. Users also use GPS trackers to find out their current address. The extracted information is sent to the user's emergency contact. In this system, GPS location and QR scanning can be implemented using this app. The person's address can be obtained via GPS. Then, if you point the camera at the QR code that is automatically converted into text, the QR code is scanned to retrieve vehicle information. Finally, the system can send SMS to all authenticated users. This is the actual text address as well as the received address in latitude and longitude, as well as information about the vehicle obtained by the user during the scan a scanner code. After getting the vehicle details, the user can click "Click to get location" to get the location. This Data is stored later in a database. The new user's biometric data is stored in the database. To store the information in the database, firebase authentication and the user registers their details with the right pattern (Name, Email Id, Phone Number, and Emergency Number), then that data is stored in the database [29].

	TITLE	YEAR	DESCRIPTION
[1]	“Emergency Alert for Women’s safety with location-tracking”	2013	This project introduces a female-security-detection using GSM and GPS. This system can be linked to an alert system to notify neighbours. This messaging and sensing system consists of a microcontroller, GSM modem and GPS receiver. A GPS receiver will receive location details from satellites in the form of latitude and longitude. The ‘microcontroller’ processes this data and this information is transmitted/sent to the users using the GSM. The GSM modem connects to the MCU. The main moto of the GSM is to send notification to the predefined numbers that are fed into the systems.

A Female safety application: FEMSAPP-This project aims to effectively create a trusted platform for empowerment of women in our society. They tried to achieve this by creating a mobile application called "FEMSAPP" -

Right to Safety. Implement SMS sending, image capture, audio recording, and GPS location access using Android. With GPS, the current address of the person at risk can be converted into SMS and sent to all contacts Preferred by the users. The users must double-click the volume button on their phone. An emergency message with her GPS coordinates and pre-selected emergency contacts is immediately and automatically sent to the police, followed by a dedicated police helpline and camera and audio recordings. No user intervention is necessary unless emergency. Police receive voice alerts, and images and crisis locations are displayed on the precinct's Google Maps interface ^[30].

5. Existing Devices Using IoT

			The GSM modem will send an SMS to a contact number pre-selected by the users. Whenever a woman is in trouble and needs to defend herself, she must press the button assigned to her. The entire system is activated at the touch of a switch, and then a message is sent immediately to the contacts indicating the person's current-location using GPS and GSM ^[31] .
[2]	Smart-Gadget for Women safety using IoT	2017	This design basically focuses on providing the controllable electrical shock or current to the person known as culprit that will reduce the excited state and will definitely help women to escape the dangerous situation, this also tend to implement the device that can be operated without any manual also that provides safety for women in open places like transport vehicles such as cabs, bus, auto rickshaw, taxi and working places. The program aims to provide less cost IoT based solution that is useful for women safety which involves: Image clicked and stored of the culprit, and also sending emergency call via cloud (Twilio) to family to provide a platform of awareness about woman being in danger

			by locating the position of women under danger shock device for defence ^[32] .
[3]	Design of a Smart Safety Device for Women using IoT	2019	The proposed design includes the ability to notify family members and the nearby police departments for immediate assistance when a woman is unsafe. Some other features of the proposed work that provide support to women include: <ol style="list-style-type: none"> 1. Send messages from the victim's phone as well as the device. 2. An audio recording of the victim that can later be used as evidence against the perpetrator. 3. Find a safest place with the ongoing location of the victim on the representative map^[33].
[4]	Be with You- IoT-based Woman Security System.	2019	It is an appliance which automatically, senses and rescues the victim from the emergency situation, which is the fantastic idea of this project. This particular device/system identifies a smart band that is the mixture of GPS gadget that is particularly used to track the place and others to sense and measure the heartbeat and in addition to this the messages were sent whenever a crisis catch trigger caused. With the use of this 360-degree camera in the band, on-going live streaming is given in a website or any app along with the present location of the girl using the feature called IoT, so that parents can easily monitor the present situation. We focus more on self-service, to give the courage to fight back against, to lead the rights that she is born with. <p>More over this method was developed to help stop these crimes after all major crimes against girls and women in</p>

			India ^[34] .
[5]	IoT Based Smart Security and Safety System for Women and Children	2020	<p>This project was planned to propose a gadget which will serve as a safety device for both women/girl and children.</p> <p>The components like GSM, microcontroller, and GPS modules through which all the notifications will be sent along with the current location to various pre-defined numbers in her contacts. This project is also used as a security measure to stun the opponents for a second. The purpose of this is to help women/girl from the danger which they face in society. The ultimate goal of this project is to develop a self-defence device. In any case of emergency, you must press the button. The impact device and touch sensor are then activated. The notification will be sent to the other party along with current location^[35].</p>
[6]	WOMEN'S SAFETY SYSTEM USING IOT	2020	<p>This system consists of an Arduino UNO, GSM module (SIM900A), GPS module (Neo-6M), IoT module, accelerometer sensor, buzzer, panic button, LCD display. In this project, women/girl are required to press an alarm button on a device when they sense danger.</p> <p>When the system is activated, it uses GPS to track your location and sends an emergency message via GSM to the nearest station to your registered phone number.</p> <p>An accelerometer sensor can detect when it falls, and a buzzer is used as an alarm to alert people nearby so the person will know that someone needs their help. The main benefit of this project is that the device is small, hence it can be carried anywhere and ensure the</p>

			safety of women/girl ^[36] .
[7]	Women and Children Safety System with IOT	2021	<p>The proposed IoT-based women and women security framework can be used to find missing or lost women as well as track their development outside the home. The system can also be used to locate women at risk. We have combined one of the main functions of an extended cell, GSM and more specifically SMS, with GPS in one framework.</p> <p>Our proposed model includes various sensors measuring the different boundaries. In the event of an emergency like the police, send messages by pressing the emergency response signs, message or shouting slogans^[37].</p>
[8]	Smart Women Safety Device using IoT	2021	<p>This system acts as a device technology that tracks the perpetrators through the geographic identification of the incidents.</p> <p>User must provide their personal data for example Email Id and phone number. User can set up a contact list of their choice including close ones and their friends.</p> <p>This system is a wearable device that's made for safety of women. It is easy to carry. In the event of an important incident, our app saves a woman by notifying her nearest police station to rescue her and also informs her family^[38].</p>
[9]	Smart-Security-Solution for Women using Iot	2022	<p>This article focuses on security systems to keep women safe from feeling powerless in the face of these social issues. This device mainly focuses on the security of women and is built using IoT. It is possible to build an advanced system that can determine a person's location and health condition based on</p>

			electronic devices such as GPS, heart-rate sensor, body-temperature sensor, motion-sensor and Internet of Things (IOT) ^[39] .
[10]	IoT Based Emergency Button for Women Safety	2022	The implemented work focuses to develop a security device using IoT that connects to a fingerprint reader to keep women safe by alerting the people around her and the police whenever they are unsafe. After checking the fingerprint for one minute to determine the situation, if the device doesn't detect a signal, it alerts nearby people and the police. Also for security reasons, shockwave generators have been developed that can be of use to women to attack the criminals. Functions like message transmission and sound-recording are a part of this design too. For women's safety, a mobile application has been developed that displays a safe place on a map from the victim's current location so that the woman can navigate from the current unsafe location to the safe place ^[40] .

6. Components And Parameters

GPS Module:

The NEO-6M-GPS Module is a popular GPS receiver with a built-in ceramic antenna that provides extensive satellite searching. The receiver can locate up to 22 satellites and locate them anywhere. A built-in annunciator could be used to monitor the module's network status. A backup data battery allows the module to retain data in case of accidental power loss. The GPS module of a global positioning system acts like a satellite and often receives and transmits data in a manner similar. The US Department of Defence had developed this system ^[41].

The GPS signal is received at the antenna input of the module and a full serial data message containing area, acceleration and time information, and it is sent over the serial line. This module provides the current date, current time,

the longitude, the latitude, the altitude, speed and direction among other data and it can be used in many applications like navigation, vehicle management tracking, etc. It is based on a vehicle relative positioning method for safety applications. He demonstrated the accuracy and usability of the solutions which were obtained using these methods on a variety of equipment, in a variety of environments and identified problems that had to be addressed for a reliable method [42].

Collaboration between government and industry is expected to enable the development and implementation of the regulatory framework required for future deployment of these systems. Testing has shown more than 95% availability using either DPOS or RTK. DPOS provides better and good accessibility with all road accuracy compared to RTK. RTK accuracy is usually better than DPOS. Especially for the mixed receivers. RTK requires huge computing resources and wireless data transmission [43].



GSM Module SIM900:

It is a quad-band GSM/GPRS compatible mobile phone which operates at 850/900/1800/1900 MHz and it can be used for a variety of applications such as Internet access, voice calls, and sending and receiving SMS. GSM modem bands can be even set using AT commands. From 1200 to 115200 using AT commands. GSM and GPRS modems have an internal TCP/IP stack that can connect to the Internet through GPRS. This is an SMT type module, it uses the most powerful AMR926EJ-S single-chip processor, which is very popular in various industrial products. Whenever a victim feels threatened or scared, the Global System for Mobile Communications (GSM) module immediately sends a message to a selected contact that is registered [44].

It has a supply voltage of about 3.4V-4.5V and some specifications such as power saving mode, normally the power consumption of power saving mode is about 0.5mA. It mainly has an operating temperature of -30°C to +80°C, and it supports microphone input and audio input, speaker input, UART interface, and it supports firmware upgrade through debug port, and also supports communication through AT command. A panic button activates

the GSM module for communication. This module consists of a regular SIM card used for making calls and sending SMS. The module transmits the woman's coordinates to the mobile phone number stored on the device. The device must be accessible to the average Indian consumer and help them in need. The concept of the device is also to present an economical and reliable device ^[45].

It is Equipped with industry-standard interfaces. You can even seamlessly monitor variable resources from anywhere and anytime. A quad-band GSM/GPRS module which uses GPS technology to provide satellite communications.



NODE MCU:

Node MCU is an open-source platform and you can edit/modify/finish your hardware design. The node MCU development kit consists of ESP8266 which is a Wi-Fi enabled chip. The ESP8266 is a low-cost Wi-Fi chip which was developed by Espressif Systems using the TCP/IP protocol. More information can be found in the ESP8266 documentation. Node MCUs use the Serial-Peripheral-Interface-Flash-File-System (SPIFFS) file system in their embedded flash memory.

If the SDK is not an OS, the Node MCU is implemented in C and is overlaid on Espressif. This firmware was initially developed as a side project for popular ESP8266 based nodes. However, the community now supports the project and you can now run the firmware on any ESP module. You can usually find Node MCU Dev boards on the market from manufacturers such as Amica, DOIT, Lolin & D1mini/Wemos, etc. Amica Produces Version of ESP8266 Node MCU Development Board Version 1.0 (version 2) from which the technical characteristics of the equipment were developed.

The best way to quickly develop IoT applications by adding fewer integrated circuits is to choose the "Node MCU" circuit. Here is the detailed summary of NodeMCU V3. It is an open source development kits that play a key role in the development of the suitable IoT projects which are making use