Women Safety Device With GPS Tracking and Alerts | GPS Location Tracker

A project report submitted in partial fulfilment of the requirements for the 6th semester of the degree of

BACHELOR OF TECHNOLOGY

in

ELECTRONICS ENGINEERING

Submitted by

AMAN KAPIL (21001017005)

Under the Supervision of

Dr. ROHIT TRIPATHI

Department of Electronics Engineering
Faculty of Engineering and Technology
J.C. Bose University of Science and Technology, YMCA, Faridabad, Haryana-121006

TABLE OF CONTENTS:-

1. INTRODUCTION:-

- In today's world, safety concerns for women are paramount, and technological advancements have provided innovative solutions to address these concerns. One such solution is the Women Safety Device with GPS Tracking and Alerts, a cutting-edge device designed to enhance women's safety and provide peace of mind in various situations.

- This device combines the power of GPS tracking technology with real-time alerts, offering a comprehensive safety solution for women of all ages. Whether it's commuting alone at night, traveling to unfamiliar locations, or simply going about daily routines, this device serves as a reliable companion, ready to assist in times of need.

- With its GPS tracking feature, the device allows users to pinpoint their exact location at any given time, ensuring that help can be summoned quickly in case of an emergency. Additionally, the device is equipped with an alert system that can be activated discreetly, sending notifications to pre-selected contacts or emergency services with the user's precise location.

- Furthermore, the Women Safety Device prioritizes user comfort and convenience, featuring a compact and portable design that can be easily carried in a pocket or bag or like a wrist band. It is also user-friendly, with intuitive controls and a simple interface, making it accessible to individuals of all technological backgrounds.

- The Women Safety Device with GPS Tracking and Alerts is a crucial tool in today's safety-conscious society, empowering women to navigate their daily lives with confidence and security. By leveraging the latest advancements in technology, this device offers a proactive approach to personal safety, ensuring that help is never far away when it's needed most..

2. OVERVIEW OF THE PRINCIPLES INVOLVED:-

- **Arduino Microcontroller:** Utilizes the Arduino platform for its programmability, ease of use, and compatibility with various sensors and modules.

- **Global Positioning System (GPS):** Integrates GPS technology to accurately determine the wearer's geographical location coordinates.

- **Global System for Mobile Communication (GSM):** Incorporates GSM modules for communication purposes, allowing the device to send SMS messages or make calls to predefined contacts or emergency services.

- **Sensor Integration:** Potentially incorporates additional sensors such as accelerometers or panic buttons to detect sudden movements or trigger emergency alerts.

- **Real-Time Tracking:** Implements algorithms to process GPS data and transmit real-time location updates to designated contacts via GSM communication.

- **User Interface:** Provides a user-friendly interface for device configuration, emergency activation, and feedback to the wearer.

- **Emergency Response Protocols:** Defines protocols for handling emergency situations, including alerting authorities, providing location coordinates, and initiating rescue operations.

- **Accessibility and Affordability:** Emphasizes the principles of accessibility and affordability to ensure the device can be widely adopted, especially in regions with limited resources or infrastructure.

3. BLOCK DIAGRAM:-

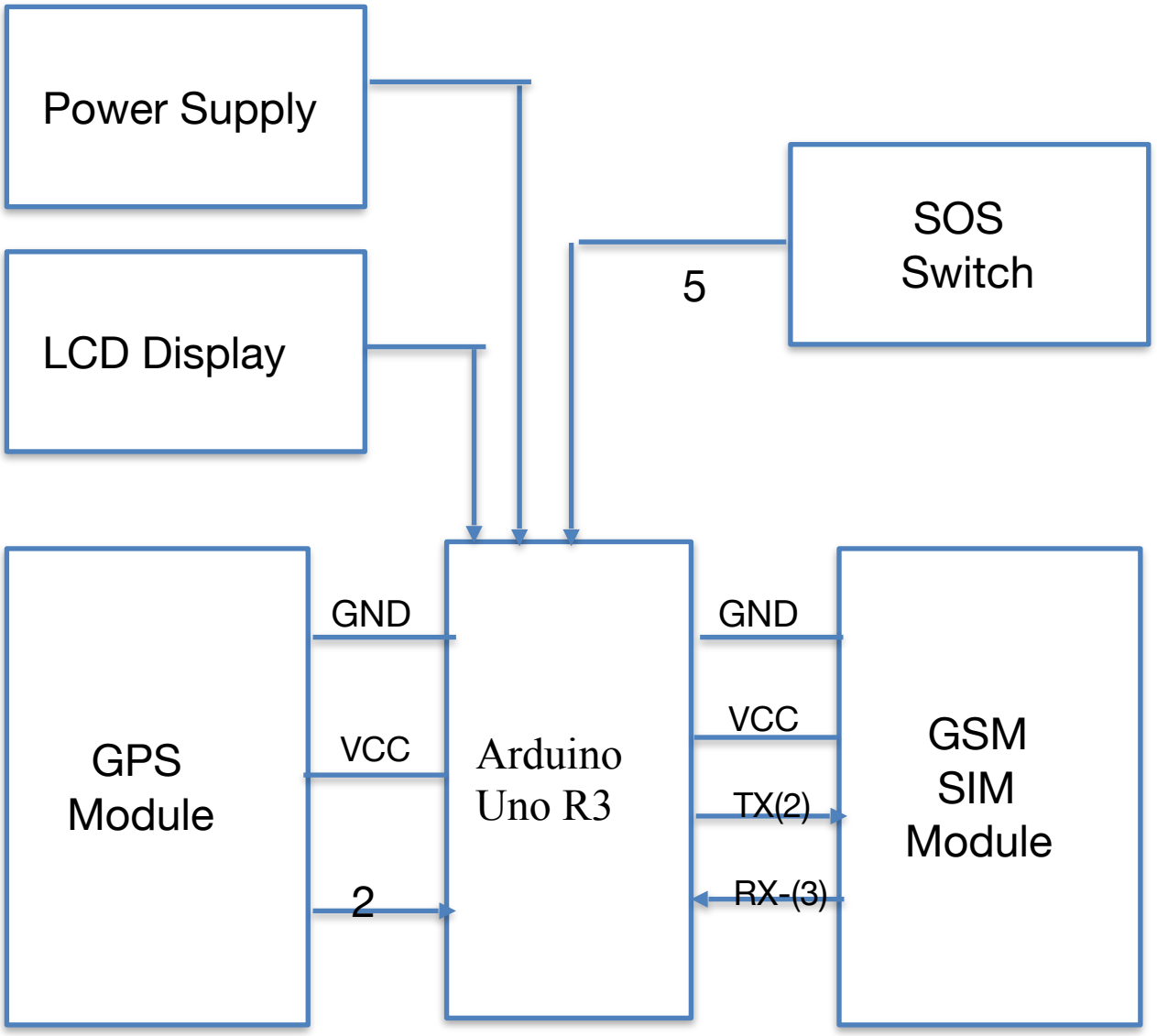

Fig1. Women Safety Device With GPS Tracking and Alerts | GPS Location Tracker Block Diagram

4. FLOW CHART:-

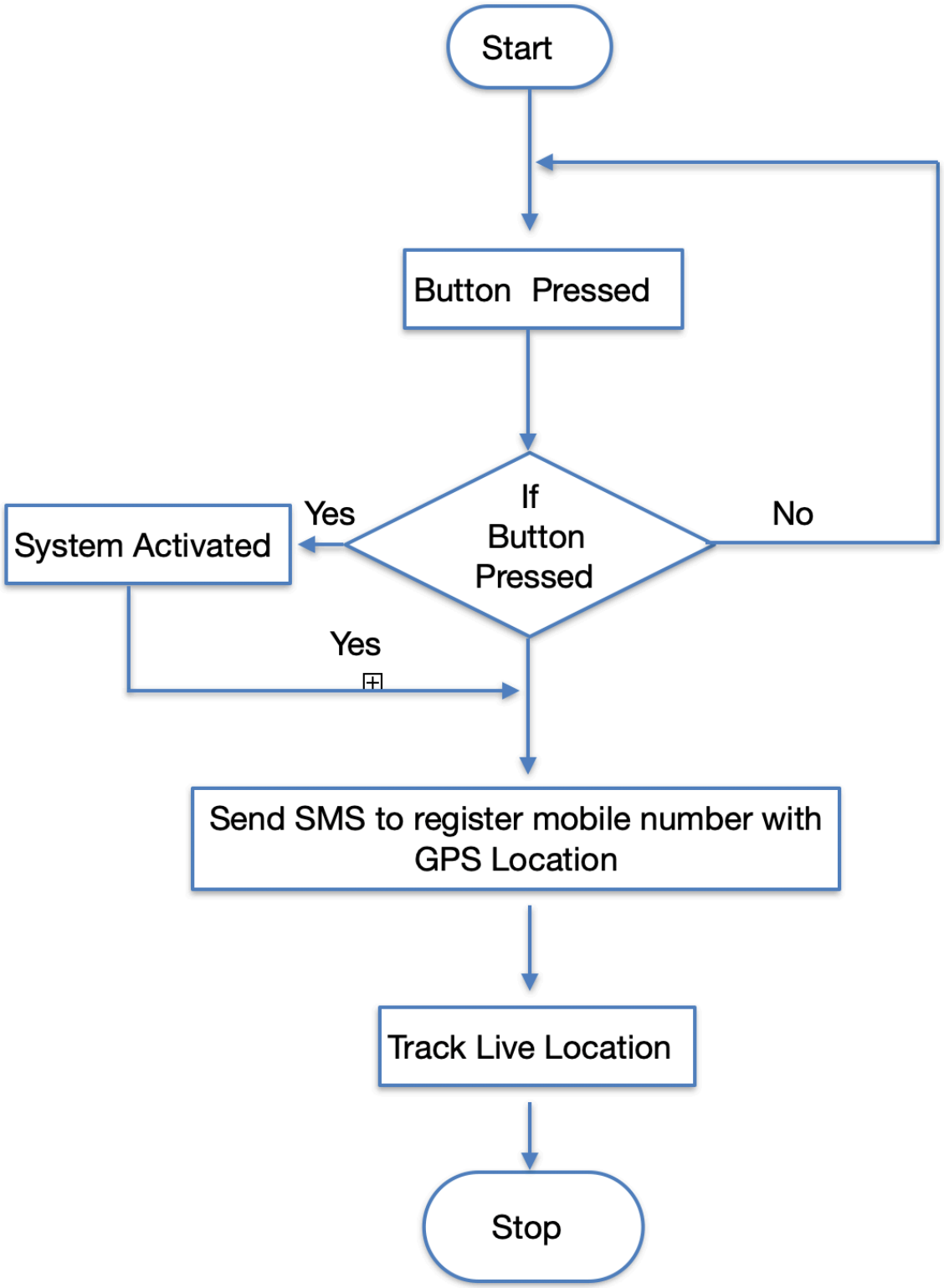

Fig2. Women Safety Device With GPS Tracking and Alerts | GPS Location Tracker Flow Chart

5. CIRCUIT DIAGRAM:-

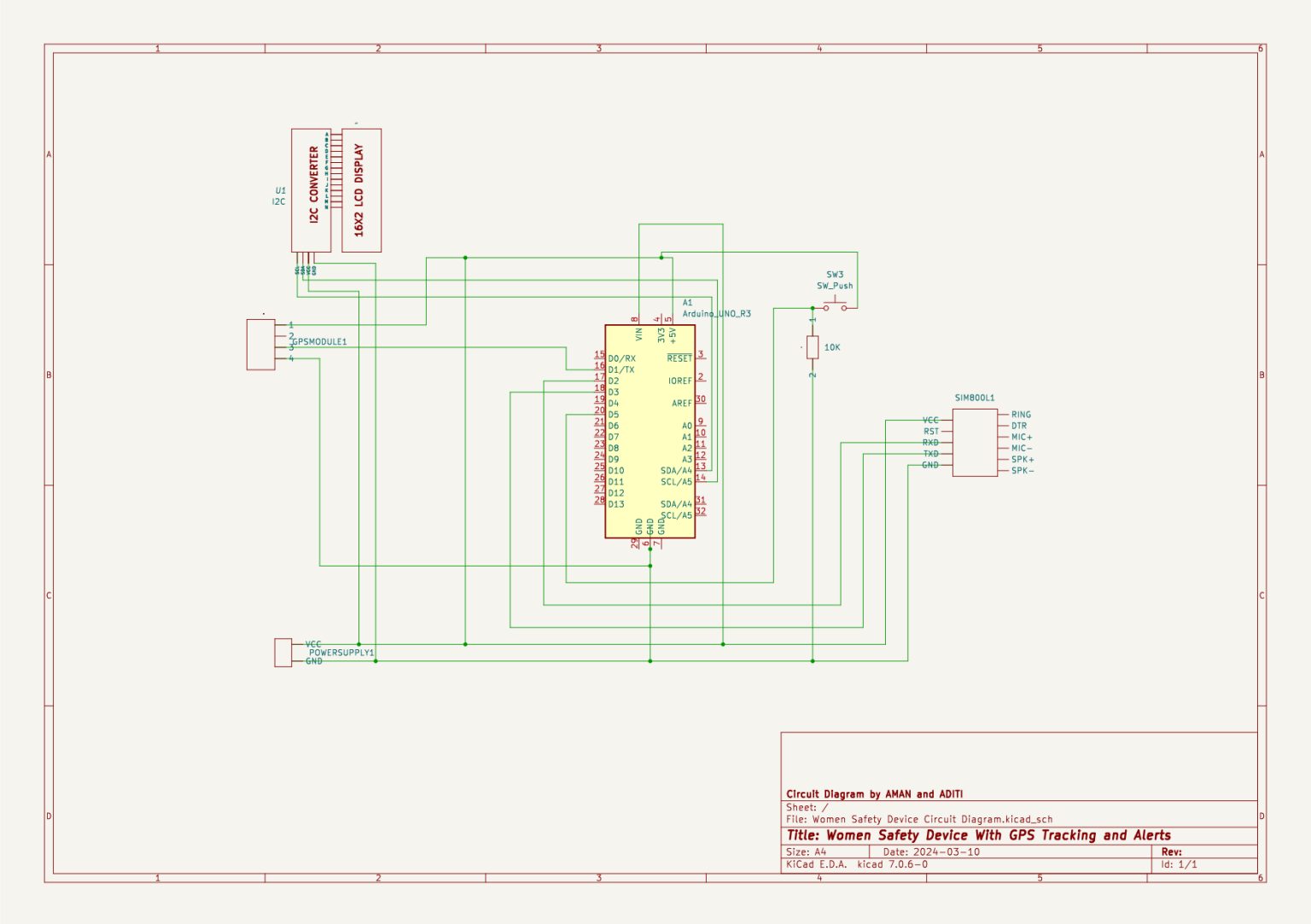

Fig3. Circuit Diagram of Women Safety Device With GPS Tracking and Alerts | GPS Location Tracker

6. COMPONENTS REQUIRED: -

- Arduino Uno R3
- GPS Neo-6m Module
- Gsm 800l Module
- Push Button
- Buck Convertor LM2596
- 1OK Resistor
- 12V Battery
- Li-On Cells
- Battery Holder
- Charging Module TP4056
- 16x2 LCD Display
- I2C Module
- PCB Board
- Jumper Wires

7. COST OF COMPONENTS: -

S.No.	COMPONENTS NAME	COMPONENTS PRICE
1	Arduino Uno R3	420/-
2	GPS Neo-6m Module	550/-
3	GSM Sim 800l Module	650/-
4	12V Battery	40/-
5	Buck Convertor LM2596	90/-
6	Push Button	20/-
7	16*2 Alphanumeric LCD	215/-
8	I2C Shield for 16*2 LCD	150/-
9	Jumper Wires	150/-
10	Push Button	50/-
11	10 K Resistor x 3	15/-
12	Li-Ion Cells x 2	160/-
13	Charging Module TP4056	40/-
14	PCB Board	180/-
15	Battery Holder	20/-
	Total Project Cost	2750/-

8. APPLICATION:-

- **Personal Safety Device for Women:** This device can be worn or carried by women to ensure their safety, especially when traveling alone or in unfamiliar areas. In case of emergencies, they can use it to send their location to pre-defined contacts or authorities.

- **Emergency Response System:** Integrating the device with emergency response services allows quick dispatch of assistance when a woman is in distress. Authorities can track the device's location in real-time and provide help accordingly.

- **Location-Based Services for Safe Routes:** The device can provide information about safe routes for women, especially during night hours or in areas known for crime. It can suggest alternate paths or warn about potential danger zones.

- **Campus Safety Solutions:** Universities and colleges can provide these devices to female students, staff, and faculty members to enhance campus safety. The devices can be integrated with campus security systems for quick response in case of emergencies.

- **Workplace Safety Initiatives:** Employers can provide these devices to female employees who work late hours or in isolated locations. It ensures their safety during commute to and from work, as well as during field visits.

- **Domestic Violence Prevention:** In cases of domestic violence, victims can discreetly trigger alerts using the device to notify authorities or support services about their situation and location.

- **Community Safety Programs:** NGOs, community centers, and local authorities can distribute these devices as part of community safety programs aimed at protecting women from harassment and violence.

- **Tourism Safety:** Female tourists can use these devices to ensure their safety while exploring new places, especially in regions where they might face language barriers or cultural differences.

- **Online Delivery Safety:** Delivery personnel, particularly those working in food or parcel delivery services, can carry these devices to ensure their safety during deliveries, especially in high-crime areas.

- **Elderly Care and Safety:** Besides women's safety, similar systems can be applied to ensure the safety of elderly individuals, who may be vulnerable to accidents or attacks.

9. ADVANTAGES:-

- **Real-time Tracking:** Provides real-time location updates, enabling quick response in emergencies and enhancing the chances of timely intervention.

- **Discreet Alerting:** Allows women to discreetly send distress signals, ensuring help is summoned without alerting potential threats.

- **Versatile Deployment:** Can be integrated into various wearable devices or personal belongings, offering flexibility in deployment and ensuring ease of use for different demographics.

- **Remote Monitoring**: Enables remote monitoring of the user's location, providing peace of mind to both the user and their loved ones.

- **Crime Deterrence:** Acts as a deterrent to potential perpetrators, as the presence of tracking technology increases the risk of apprehension and discourages criminal behaviour.

- **Two-Way Communication**: Certain devices may offer two-way communication capabilities, enabling users to communicate directly with emergency responders or contacts through built-in speakers and microphones.

- **Peace of Mind**: Knowing help is readily available promotes confidence and reassurance in daily activities.

- **Integration with Mobile Apps**: Allows remote monitoring, location history viewing, and settings adjustment via smartphone apps.

10. DISADVANTAGES:-

- **Privacy Concerns:** Constant tracking raises privacy issues, as individuals may feel uncomfortable with their movements being monitored, even if it's for safety purposes.
- **Reliance on Technology:** Dependence on technology can lead to complacency in personal safety measures, potentially diminishing situational awareness and self-defense skills.
- **Battery Dependency:** These devices require power to function, and if the battery runs out or the device malfunctions, it could leave the user vulnerable in an emergency situation.
- **Cost of Implementation:** The initial cost of purchasing and implementing these systems, along with ongoing service charges, may be prohibitive for some individuals or organizations, limiting widespread adoption.
- **False Alarms and Technical Glitches:** Technical glitches or false alarms may occur, leading to unnecessary panic or resource allocation for emergency responders, potentially causing inefficiencies in the emergency response system.
- **Limited Coverage**: GPS signal may be unavailable or inaccurate in certain environments, such as indoors or densely populated urban areas, affecting the device's effectiveness.
- **Cultural Barriers**: In certain cultural contexts, carrying or using such devices may be stigmatized or perceived as a sign of weakness, deterring adoption.
- **Risk of Theft**: The device itself may become a target for theft, especially if it's visibly worn or carried in public.

11. FUTURE SCOPE:-

- **Artificial Intelligence Integration:** Incorporating AI algorithms for predictive analysis of potential threats based on location patterns, enhancing proactive safety measures.

- **Wearable Technology Advancements:** Further miniaturization and development of wearable safety devices with seamless GPS and GSM integration, ensuring comfort and convenience for users.

- **IoT Collaboration:** Collaboration with IoT initiatives to create a more interconnected safety ecosystem, integrating safety devices with urban infrastructure for enhanced safety measures.

- **Global Coverage Expansion:** Expanding GSM networks and satellite coverage to ensure global availability of location tracking services, particularly in remote or less developed regions.

- **Community Engagement Strategies:** Implementing community engagement and awareness campaigns to promote the adoption of safety devices among women of all backgrounds, fostering a culture of safety and empowerment.

- **Data Security and Privacy Enhancements:** Strengthening data security and privacy measures to address concerns regarding unauthorized access to location data, ensuring user trust and compliance with regulations.

12. SOCIETY BENEFIT:-

- **Reduced Crime Against Women:** By providing a means for quick response in emergencies, these systems can deter potential perpetrators and ultimately lead to a reduction in crimes such as assault, harassment, and abduction against women.

- **Increased Women's Participation:** Enhanced safety encourages more women to participate in various activities, such as education, employment, and community engagement, leading to greater inclusivity and diversity in society.

- **Public Safety Awareness:** The implementation of these systems raises awareness about women's safety issues within society, prompting discussions and initiatives aimed at creating safer environments for everyone.

- **Strengthened Communities:** Safer communities foster trust, cooperation, and solidarity among residents. By prioritizing women's safety, communities can become more cohesive and supportive, leading to overall social well-being.

- **Positive Economic Impact:** When women feel safer, they are more likely to participate in the workforce and contribute to economic growth. This leads to improved productivity, higher incomes, and better living standards for individuals and families.

- **Long-term Cultural Shift:** Adoption of GPS and GSM-based safety systems for women can contribute to a cultural shift towards gender equality and respect for women's rights, ultimately creating a more inclusive and equitable society for future generations.

13. REFERENCES :-

[1] Shreyas R.S, Varun B.C, Shiva Kumar H.K, Punith Kumar B.E, Kalpavi C.Y, "Design and development of women self defence smart watch prototype," International Journal of Advanced Research in Electronics and Communication Engineering (IJARECE) ISSN: 2278 – 909X Volume 5, Issue 4, April2016.

[2] Prof. Basavaraj Chougula, Archana Naik, Monika Monu, Priya Patil and Priyanka Das, "Smart girls security system," International Journal of Application or Innovation in Engineering & Management (IJAIEM) ISSN:2319-4847 Volume 3, Issue 4, April 2014

[3] Monisha, D. & Monisha, M. & Gunasekaran, Pavithra & Radhakrishnan, Dr.Subhashini. (2016). Women safety device and application-FEMME. Indian Journal of Science and Technology. 9. 10.17485/ijst/2016/v9i10/88898.

[4] Suraksha. A device to help women in distress: An initiative by a student of ITM University Gurgaon. Efytimes.com. 2013. Available from: http://efytimes.com/e1/118387/SURAKSHA-A-Device-To-Help-

[5] Women-In-Distress-AnInitiative-By-A-Student-Of-ITM-University-Gurgaon.pdf

[6] T. Wu, F. Wu, J. Redouté and M. R. Yuce, "An Autonomous Wireless Body Area Network Implementation Towards IoT Connected Healthcare Applications," in IEEE Access, vol. 5, pp. 11413-11422, 2017, doi: 10.1109/ACCESS.2017.2716344

[7] Literature Survey On Women Safety Device Dr. Chanda V Reddy1 , Sabarish I J 2 , Samiksha S 3 , Sathvik U M4 , Swagath Aithal P G.