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GARD- Geo Alert and Female Rapid Defense

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A B S T R A C T

In response to the growing need for enhanced personal safety, a smart women's safety device integrated into a handbag has been developed by us, combining multiple advanced technologies to provide a reliable safety solution. This device incorporates a loud buzzer for immediate attention, an L86 GPS module for real-time location tracking, and an ESP32 CAM for visual surveillance and enabling capturing images in case of emergencies. Additionally, an SD card allows for the storage of critical data, including footage and GPS logs, for later access. A shock circuit feature detects abnormal physical impact, signalling potential threats such as sudden force or attacks, while the battery indicator ensures users are always aware of the device's power levels, preventing unexpected shutdowns. Compact and discreet, this safety device is seamlessly embedded into a stylish and functional bag, providing women with a high-tech solution for personal security. The system is designed to alert emergency contacts and authorities promptly, offering a robust layer of protection while maintaining a sense of privacy and convenience. This innovative safety bag aims to empower women, enabling them to feel secure and confident in their daily activities, knowing they are equipped with an intelligent, responsive safety tool.

Keywords: Wearable safety technology, Buzzer alarm, L86 GPS module, ESP32 CAM, Shock Circuit

Introduction

Smart bags for women's protection have drawn growing interest in recent years. These packs help women have a great sense of safety when out openly regions by combining creativity and other elements. Using such packs is a significant step toward solving orientation-based violence and empowering women to take charge of their own safety. Though they might be useful in some situations, these bags won't address the problem of violence against women. Many parts of the world suffer from gender-based violence, a problem that touches everyone. Often the major victims of this kind of abuse are women, who may feel more vulnerable while traveling alone or to unfamiliar regions. This exam has led several companies and architects to create clever packs with security features including self-protection devices, crisis alerts, and GPS tracking. Among the most important safety features of the smart bag for women is GPS tracking. This function enables women to always monitor their pack's whereabouts, which can be rather useful should the bag be lost or stolen. Some bags include user-activated built-in emergency alarms as well. When out in public locations, these highlights can provide women a more obvious feeling of confidence and authority. Although smart bags for women's safety can be useful, they cannot take the place of more comprehensive efforts to stop gender-based violence. Building safe communities calls for us to maintain tackling the fundamental reasons of violence and harassment. Choosing a smart bag for personal use calls for numerous factors to consider, including its price, usability, and effectiveness of safety features. In the end, the individual decides whether to use a smart bag for women's safety. Depending on their particular circumstances and need, individuals should choose what best fits them.

Significance Of the System

Given their right to be free from assault, harassment, and discrimination, this paper stresses largely women's protection. Removing obstacles creating a dangerous environment will help women to realize their whole potential as individuals and as assets to companies, communities, and economies. Smart bags are very important for women's safety since they can provide women more control over their own protection and help to solve the problem of gender-based violence. These backpacks can especially benefit ladies traveling alone or to unfamiliar places, allowing them to feel comfortable and confident. Combining technologies like GPS tracking, crisis alerts, and self-preservation tools, smart packs for women's well-being can aid women with understanding more secure when in broad daylight regions. They can also be a significant instrument for handling cases of harassment or violence, enabling users to fast and simple request for help or track can increase awareness of the issue of orientation-based violence and the need for stronger security measures for women. It might also inspire more individuals to employ safety measures like enhanced public transportation, security cameras, and more public area lighting. Smart bags for women's safety are not a replacement for more comprehensive campaigns against gender-based violence;

therefore, it is crucial to understand this. Building safe communities requires ongoing effort on the underlying causes of violence and harassment including toxic masculinity, gender inequality, and cultural norms enabling violence. Overall women's safety depends on smart bags since they can enhance personal safety and enable women more over their own defense. Using them can assist one react to acts of abuse or harassment, increase awareness of the problem of gender-based violence, and encourage a more general application of safety measures in public spaces.

Methodology

Starting with the public environment risks to women's safety as theft, assault, and harassment, we first... We then did a literature review to locate present technology and solutions that may be put into a smart handbag for women's protection.

The smart handbag was designed with the following safety features based on the literature review:

1) GPS device: The pack has an integrated GPS module permitting continual tracking of the client's location.

2)Button for panic: The pack's emergency signal sends an SMS to a pre-characterized crisis contact with the client's location when tapped.

3)Camera: :The pack will photograph the offender for later legal use.

4) Alarm: Should the user feel unsafe, a click loud enough to create noise will be produced.

5) Shock Circuit: The pack will generate an electric shock should the criminals try to molest the victim.

An Arduino microcontroller and a GPS module were used to implement these features. A push-button switch connected to a microcontroller was used to build the panic button. A microcontroller-connected piezo buzzer created the alarm.

We then put the smart handbag through a number of tests to see whether the safety components were operating as intended. A smartphone app let us track the bag's whereabouts to confirm the GPS module. Pushing the panic button confirmed an SMS was sent to the pre-set emergency contact. By forcefully opening the bag, they checked the alarm and verified it had gone off.

The paper's overall strategy was to find women's safety concerns, do a literature review, design a smart handbag with safety features, use an Arduino microcontroller and a GPS module to build and evaluate such features. You could find more details on how they see these bags operate as well as whether they have concerns or constraints. You might also inquire about their encounters with violence or harassment and how, in their opinion, these bags could assist control such issues. A case study one concentrating on specific instances of how smart bags for women's protection were used to prevent or respond to incidents of abuse or harassment is another potential approach. Qualitative or quantitative studies could help one to identify patterns or trends in the use and effectiveness of these bags by means of data gathering from news reports or personal accounts. A third option may be a comparison study of several smart bags for women's safety in which you would assess the qualities, costs, and effectiveness of several products now on the market. This could involve writing product reviews, comparing prices and features, and analyzing user feedback to identify the advantages and disadvantages of various products. Your objectives and test question as well as the knowledge and resource availability will ultimately determine your system choice. It is vitally vital to choose an approach that fits your research issue and lets you collect trustworthy, genuine data. A study on smart bag use to protect women's safety could be considered depending on the objectives and research topic. Every method has its own advantages and disadvantages; hence, selecting one that fits the research topic and enables consistent and valid data collecting is vitally crucial.

Possible methods are surveys or questionnaires, case studies, comparative study, experimental design, ethnography, content analysis, and participatory action research. Every one of these techniques involves gathering data in many forms, including through assessments, meetings, perceptions, or analysis of existing information sources. The study topic, the accessible resources, and the kind of data needed will all help to shape your method. Through careful methodology choice and efficient implementation, researchers can offer informative study of the effectiveness of smart bags for women's safety and their probable contribution in handling issues of gender-based violence.

Block Diagram

This safety device aims to provide protection and security for women in potentially dangerous situations. It integrates various electronic components to ensure a robust response when assistance is needed. Key Components are 7.4V Battery its Purpose is to Provide power to all components of the device, Torch its Purpose is to act as a source of light to illuminate surroundings, Battery Level Monitor its main Purpose is tp Monitor the battery's state to ensure adequate power supply, Arduino Nano its main Purpose is to Act as the central processing unit which manages interactions between components, A7670C 4G GSM Module Facilitates communication and sends alerts via mobile networks, LC86L GPS determines and relays the device’s location for emergency assistance, 2 Channel Relay Module controls other components based on inputs from the Arduino, Shock Circuit feature sends a shock to deter attackers. ESP32 Camera captures images for security purposes, possibly for surveillance, Buzzer emits a loud sound to attract attention or scare off aggressors. Emergency Activation: When activated, the device uses the buzzer to alert nearby individuals while simultaneously utilizing the GSM module to send an emergency message and location coordinates to a preset contact. Visual Monitoring: The camera can capture images or record video, which can be accessed remotely for evidence or monitoring. Deterrent Features: The shock circuit can deter potential threats while the bright torch can enhance visibility in dark environments. Location Tracking: The GPS module ensures that the user’s location is tracked in case they need assistance.

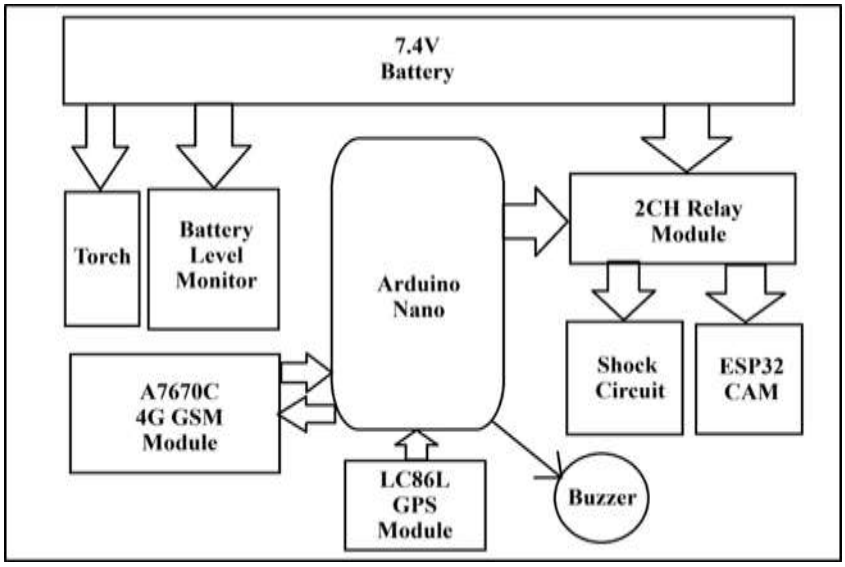

Fig 1 Block Diagram of GARD

Arduino nano

The Arduino Nano is a compact microcontroller board that serves as a versatile platform for developing electronic projects and prototypes. It is part of the Arduino ecosystem, which is designed to simplify the process of programming and interfacing with hardware components. The Arduino Nano is programmed using the Arduino Integrated Development Environment (IDE), which provides a user-friendly interface for writing and uploading code. The programming language is based on C/C++, with a simplified syntax and a rich set of libraries that facilitate hardware interaction. The board can be powered via a USB connection or an external power source (7-12V). It has an onboard voltage regulator that provides a stable 5V supply to the microcontroller and connected components. The compact size and pin layout of the Arduino Nano make it ideal for use on breadboards, allowing for easy prototyping and experimentation**.**

Fig 2 Arduino nano

ESP-32 CAM

The ESP32 CAM is a compact and versatile development board that combines the capabilities of the ESP32 microcontroller with a camera module. It is particularly popular for Internet of Things (IoT) applications, allowing users to capture images, stream video, and perform various image processing tasks.

Microcontroller is based on the ESP32-S chip, which features a dual-core processor capable of running at up to 240 MHz Integrated Wi-Fi (802.11 b/g/n) and Bluetooth capabilities. Camera Module is typically equipped with a 2 MP camera which supports various resolutions and can capture still images and video, it supports microSD cards for additional storage, allowing for the saving of images. Programming is Compatible with the Arduino IDE, making it accessible for beginners and hobbyists. Supports various libraries for camera control, image processing, and network communication.

Fig 3 ESP-32 CAM

L86 GPS

The L86 GPS module is a compact GNSS module that supports multiple satellite systems, including GPS, GLONASS, Galileo, and QZSS. Key features include an embedded patch antenna, high sensitivity with acquisition down to -149 dBm, and a maximum update rate of 10Hz, making it suitable for various applications in navigation and positioning. High Sensitivity acquisition sensitivity of -149 dBm and tracking sensitivity of -167 dBm. Low power consumption of 26 mA in tracking mode, ideal for battery-operated devices. LOCUS function allows for route and location data logging without needing external memory, horizontal position accuracy of less than 2.5 m CEP in autonomous mode, maximum altitude of 18,000 m and velocity of 515 m/s, and operates effectively in temperatures ranging from -40 °C to +85 °C.

Fig 4 L86 GPS

Shock Circuit

This circuit board is designed for generating high-voltage oscillations, typically used in mosquito repellent devices, here used to detects abnormal physical impact, signaling potential threats such as sudden force or attacks. Output Capacitor (650V) stores the high voltage output. It plays a crucial role in smoothing the voltage to ensure steady performance. Series Capacitor (2.7 CM) works in combination with other components to help control the current flow and stabilize the circuit. Switches allows the user to turn the device on or off or change its settings as required.

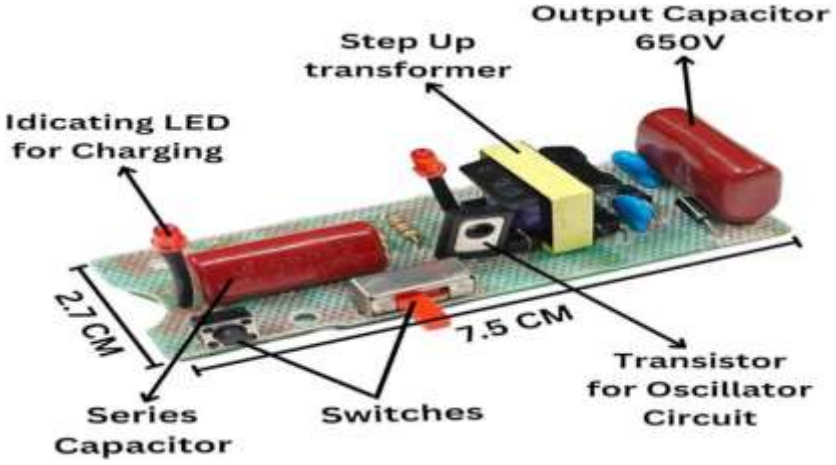

Fig 5 Shock Circuit

Future perspective

Smart bags for women's safety have a number of implicit unborn directions and advancements that could be delved. The following are a couple of models

1. Integration with technology for wearables Wearable technology, similar as smartwatches or fitness trackers, could be integrated into smart bags. The safety features of the bag could be actuated or covered from the stoner's wrist, performing in a further flawless and intertwined stoner experience.
2. Machine literacy (ML) and artificial intelligence (AI) Computer grounded intelligence and ML could be employed to break down information from the brilliant sack's detectors and give gests or vaticinations about implicit troubles. For case, the pack could use ML computations to fete and anticipate the customer's day to day schedules and exercises, and alarm the customer assuming any abnormalities or implicit troubles are linked.
3. Cooperation with governmental agencies in the event of an exigency, smart bags could be made to work with law enforcement agencies to give them with real- time position data or other useful information.
4. This device can be integrated into child’s lunch boxes and in the walking sticks of senior citizens.
5. This device can be made even more compact using SMT technology.

Advantages

1. Ease of Use: The device is often designed to be compact and wearable (hand bag) making it easy for women to carry without inconvenience.
2. Multi-layered Protection: By combining multiple features (buzzer, electric shock, ESP-32 CAM, GPS), the device offers a holistic approach to safety, covering physical defense, evidence collection, and location tracking.
3. Effective Defense: This feature provides a means of defense when escape isn’t possible or the attacker is too close to reach a weapon or use traditional defense tactics.
4. Confidence Boost: Knowing that they have a safety tool on hand can empower women to feel more confident and secure in their daily lives, especially when traveling alone or in unfamiliar areas.
5. Psychological Comfort: The combination of physical safety and technological support gives users the comfort of knowing they have resources at their disposal should a dangerous situation arise.

Conclusion

Creating a woman protection device is mostly for rescue and to prevent any harm to women in the case of a danger. Planned utilizing the suggested approach, which automates the emergency warning system, a smart device for women's protection. Using the women's position coordinates, this device finds and notifies loved ones without requiring her input in urgent situations. It immediately informs family members and the nearest police station of an emergency. The prototype fits in many different bags, including laptop bags and purses.

Smart bags for women's safety have been designed and used increasingly commonly in recent years. These packs let women have a reasonable sense of safety when making the rounds by combining ingenuity, for example, GPS monitoring, crisis alarms, and, perhaps unexpectedly, self-preservation qualities. Generally speaking, smart bags designed particularly for women's protection can be a useful tool for increasing personal safety. Still, one should remember that creativity by itself cannot stop every incident of provocation or violence. It is really important to keep working toward the building of safe communities and the addressing of the underlying causes of gender-based violence. Moreover, while choosing a smart bag for personal use, consider the features and performance of various models in addition to cost and usability issues. In the end, the individual decides whether to use a smart bag for women's safety. People should choose what best fits them depending on their particular circumstances and requirements.

Good bags for women's well-being have been somewhat fashionable lately as more women want to take charge of their personal safety. These bags have various features that can enable ladies to feel more protected and secure when out in public. Among the most widely known aspects of smart bags for women's well-being is GPS tracking. This technology lets users that can be activated with a straightforward button press should a bag be lost or stolen. Key feature of smart bags for women's protection is self-defense systems. Other bags might have reinforced straps or other design features that make it more challenging for someone to remove the bag from the owner of the device. Although smart bags for women's safety can be useful in some contexts, they are not a complete solution to the issue of gender-based violence. One should always keep this in mind. We have to keep building safe networks and tackling the fundamental reasons of provocation and violence. Choosing a smart bag for personal use that fits your particular requirements and circumstances requires thorough research first. When women are out in public, smart bags for women's protection can usually be a good approach to increase personal safety and empower them to feel more in control.

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