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SELF ACTIVATING EMERGENCY VOICE BASED HELP TAG FOR WOMEN SAFETY

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Abstract:

The Automatic Emergency Help Tag for Women is a compact, wearable device designed to ensure women's safety in critical situations. This tag uses real-time GPS tracking, an emergency alert system. When activated, it sends an immediate SOS alert with the wearer's location to emergency contacts and nearby authorities, ensuring rapid response. The tag can be triggered automatically if it detects abnormal patterns like when they are asking help(screaming). Additionally, it is discreet, minimizing visibility to avoid drawing attention. Integrated with a mobile app, users can configure emergency contacts and monitor device status. The Automatic Emergency Help Tag aims to empower women with a sense of security and a reliable, user-friendly tool that provides support when they need it most, offering a proactive approach to personal safety.

Keywords: Help tag, women safety, self activating, wearable device

INTRODUCTION

The Automatic Emergency Help Tag for Women is an innovative, compact wearable device that serves as a discreet yet powerful tool for enhancing women's safety in emergencies. Given the rising concerns about personal safety, particularly for women in public spaces, there has been a significant need for technology that can quickly alert others and help prevent or respond to dangerous situations. This device is designed to provide peace of mind by enabling users to signal for immediate help if they find themselves in distress. This emergency tag integrates several critical features, such as GPS tracking, mobile SOS call .Get Alert buzzer to mobile, and a responsive alert system. By combining these elements, it ensures that help can reach the user as swiftly as possible. If the wearer feels threatened or encounters an emergency, she can activate the device by screaminghelp, triggering an instant SOS alert. This signal is transmitted to pre-designated emergency contacts, nearby authorities, or even crowd-sourced responders. These recipients receive the user's real-time location and a notification indicating thatshe needs assistance.

This immediate communication allows friends, family, or first responders to act quickly, potentially mitigating risks and preventing harm.By analysing these signals, the tag can send an automatic alert when it detects signs of a potential emergency. For example, if a woman wearing the tag faints, the device will recognize voice activate its emergency protocol, notifying her designated contacts and providing her precise location.Designed to be as discreet as it is functional, the tag blends seamlessly into everyday wear without drawing unwanted attention. This subtle design ensures that the device remains concealed and does not make the user feel self-conscious or uncomfortable while wearing it. Additionally, the tag is lightweight and durable, making it suitable for a variety of settings, whether the user is commuting, exercising, or going about her daily routine.Paired with a mobile application, the Automatic Emergency Help Tag allows users to configure their emergency contacts, set up custom notifications, and even receive regular updates on the device's battery and functionality. The app provides a user-friendly interface where settings can be easily adjusted, ensuring the device is tailored to the individual's needs. Moreover, the application can record past incidents and maintain a log that can be helpful in legal follow-ups or further enhancing personal safety planning.In today's world, where women's safety remains a critical issue, this tag represents a proactive approach to personal security. It empowers users with an added layer of protection, giving them the confidence to navigate public spaces with reduced anxiety. The Automatic Emergency Help Tag is a promising step toward utilizing technology to create safer environments for women, enabling them to access immediate help if they are in danger. Through its innovative features and user-cantered design, the tag stands as a testament to the potential of wearable technology in addressing social challenges and safeguarding personal freedom and security.

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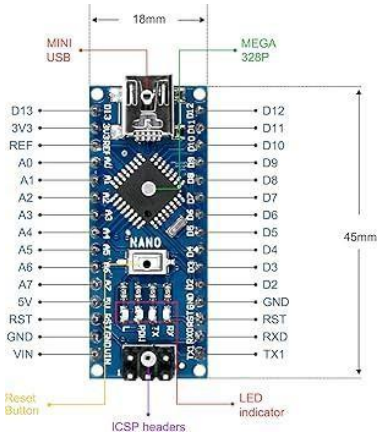
OPERATION OF THE TAG:

The Automatic Emergency Help Tag for Women operates through a combination of manual and automated safety protocols designed to ensure swift assistance in critical situations. The device is wearable and compact, allowing it to be discreetly incorporated into daily attire without drawing unwanted attention. The primary function of the tag is its SOS alert system. If the user feels threatened or is in immediate danger, she can press a hidden button on the tag to activate an emergency alert. This signal is then instantly transmitted to pre-designated emergency contacts and, if set up, local authorities or volunteer responders. Each alert includes the user's real-time GPS location, enabling quick intervention by that notified. Beyond manual activation, the tag also includes biometric sensors that detect abnormal physical patterns, such as sudden accelerations or elevated heart rates. If these sensors detect signs of distress—such as a sharp increase in pulse or a fall—the device automatically triggers an alert without user intervention. This feature is especially valuable in cases where the user is incapacitated or unable to press the button herself. All alerts and data are processed through a connected mobile application, where users can configure emergency contacts, adjust sensitivity levels of the sensors, and check device status. The app maintains a record of past alerts and can monitor battery life to ensure the tag is always operational.

REQUIRED COMPONENTS

ArduinoNano:

The Arduino Nano is a compact, versatile microcontroller board based on the ATmega328, popular for embedded systems and DIY electronics projects. It's small (18 x 45 mm), making it ideal for portable applications and space-constrained projects. With 14 digital input/output pins, 8 analog inputs, a mini-USB connection, and a clock speed of 16 MHz, it offers powerful functionality for a range of tasks. The Nano is programmed via the Arduino IDE, making it accessible to beginners and experts alike. Its popularity stems from its affordability, ease of use, and compatibility with various sensors, actuators, and communication modules.



GPS Tracker ESP32:

A GPS module is a compact device that receives signals from GPS satellites to determine geographic location in real time. Widely used in navigation, tracking, and timing applications, GPS modules provide coordinates like latitude, longitude, and altitude, and can calculate speed and direction of movement. Modules like the NEO-6M or the u-blox series are commonly paired with microcontrollers in robotics, vehicle tracking, and outdoor projects, where precise location data is essential. Many GPS modules support serial communication, making integration with Arduino, Raspberry Pi, and other platforms straightforward. They are indispensable for applications requiring accurate positioning and navigation capabilities.

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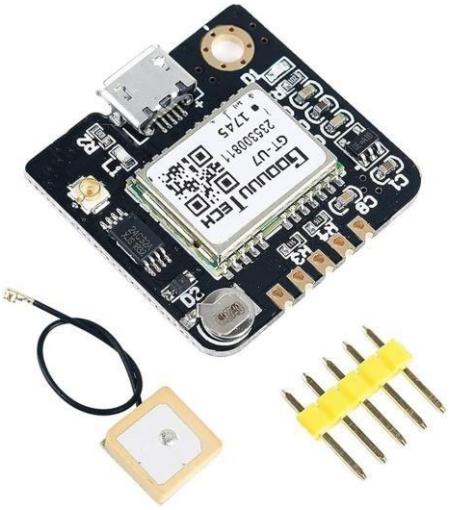

SIM800L V2:

A SIM module, or GSM module, is a device that enables cellular communication by using a SIM card, commonly for mobile data, SMS, and voice applications in IoT projects. Modules like the SIM800L or SIM900 support GSM networks, allowing microcontrollers to send and receive messages, make calls, and access the internet. They're widely used for remote monitoring, SMS alerts, and asset tracking, especially in areas without Wi-Fi access. By integrating a microcontroller with a SIM module, devices can operate independently, exchanging real-time data over cellular networks, making them ideal for security systems, smart agriculture, and other mobile-connected applications**.**

AI thinker VC-2:

A voice recognition module allows devices to interpret and respond to spoken commands. These modules, like the Elec house AI thinker vc, convert voice inputs into digital signals that microcontrollers or computers can process. Typically equipped with built-in microphones and customizable command sets, they can recognize a limited set of words or phrases. Commonly used in smart home systems, robotics, and accessibility devices, voice recognition modules enable hands-free control and interaction. While they don't match the complexity of cloud-based systems like Alexa or Siri, they're ideal for simple, offline voice-controlled applications in DIY and embedded projects.

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Block diagram:

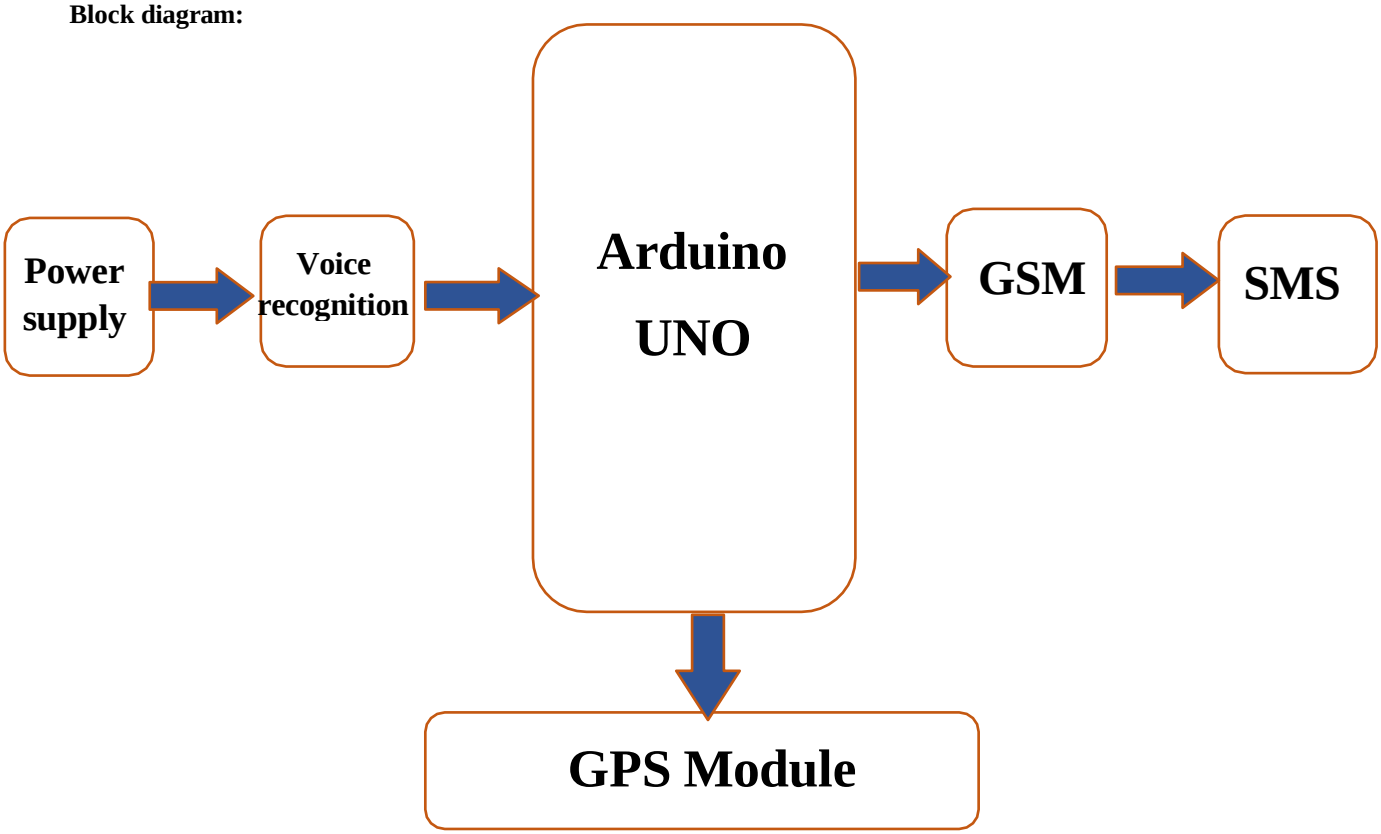

Fig: 1.Block Diagram Explanation of Self Activating Emergency Voice-Based Help Tag for Women Safety:

Self Activating Emergency Voice-Based Help Tag for Women Safety system is designed to enhance women's security by triggering an emergency alert automatically based on voice commands or keywords in distress situations. Here's a breakdown of the block diagram components and their roles in the system:

A. Power Supply Unit
Provides power to the entire circuit, including the microcontroller, sensors, and communication modules.

B. Microcontroller
Acts as the brain of the system, controlling all components and processing the input from the sensors and microphone. It detects the activation command and triggers the necessary actions.

C. Microphone/Speech Recognition Module
Captures voice input from the user and recognizes specific distress keywords or phrases (e.g., "Help me", "Save me").
The module processes voice data to determine if an emergency condition is present.

D. GPS Module
Provides the real-time location of the user. The microcontroller fetches location data from the GPS module to send with the emergency alert.

E. GSM Module or IOT Communication Module
Responsible for sending an emergency SMS or call to preconfigured contacts or authorities. It Can be used to send the user's location and a distress message.

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WORKING

The system is powered ON and remains in standby mode, continuously listening for specific voice commands. When a distress keyword is detected by the microphone, the microcontroller activates the emergency process. The microcontroller collects location data from the GPS module and sends it along with a pre-set message via the GSM module to emergency contacts. The system may also trigger an IoT-based alert if integrated with a cloud platform

EXPECTED OUTPUT RESULTS

The expected output results of a Self-Activating Emergency Voice-Based Help Tag for Women Safety would include several key features and functionalities designed to ensure the safety of women in emergency situations. These are:

Voice Activation
Voice Command Recognition: The device should recognize specific voice commands like "Help," "Emergency," or a unique phrase (e.g., "Activate SOS") to trigger an emergency alert.
Voice Feedback: After activation, the device should provide voice feedback confirming the SOS signal has been sent.

Real-time Location Tracking
GPS Integration: The tag should automatically capture and send the exact location coordinates to a pre-set emergency contact or local authorities.
Location Updates: Continuous updates about the woman's location in case the situation escalates or changes.

Instant Alert to Pre-defined Contacts
SMS/Call Alerts: Upon activation, the device should send an SMS or make a call to pre-configured contacts, alerting them to the emergency situation and providing location information.
Multi-Channel Notification: Notifications could also be sent through mobile apps, email, or social media.

Automatic Audio and Visual Alerts
Loud Sound or Siren: The device can emit a loud siren or a distress sound, drawing attention to the situation and potentially scaring off attackers.
Flashing Lights: Visual signals such as flashing lights (LEDs) could be triggered to alert others nearby.

Silent Mode Option
Discreet Alerts: In some cases, women might not be able to speak aloud. The device should allow for silent activation through voice recognition that doesn’t require audible speech, ensuring safety in covert situations.

Emergency Response Communication
Built-in Microphone: The tag should have a microphone for live audio communication with emergency responders or contacts, allowing them to hear what’s happening in real time.
Two-Way Communication: Ideally, the device should allow for two-way communication with emergency services, ensuring they can provide help or gather more information if needed.

Battery Life & Charging
Long Battery Life: The device must have a battery that can last for extended periods and should be rechargeable, ensuring reliability during an emergency.
Low Battery Alerts: Automatic notifications or alerts when the battery is low, ensuring the device doesn’t fail at crucial moments.

Integration with Personal Safety Apps or Systems
App Syncing: The tag could be synced with a smartphone app, where women can set preferences for alerts, contacts, and settings.
Integration with Police/Local Authorities: In some cases, the device may integrate directly with emergency services or local law enforcement to streamline response times.

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Tamper-Proof Design
Secure Fastening Mechanism: The tag should be physically secure and tamper-resistant, preventing attackers from easily deactivating it or removing it.
Unobtrusive Design: Lightweight and unobtrusive, the tag should be easy to wear and blend into everyday clothing (e.g., as a bracelet, necklace, or clip).

Privacy and Security
Encrypted Communication: All messages, location data, and audio should be encrypted to ensure privacy and prevent unauthorized access.
Minimal Data Storage: The device should store minimal personal data, protecting the user's information while still ensuring that help can be delivered.

Fallback Mechanisms
Manual Activation: In case voice recognition fails or is unavailable, the device should have a manual button or emergency override.
Auto-Dial Feature: If the voice command is not heard or a person is incapacitated, the device can automatically dial emergency services or pre-set contacts.

Ease of Use
Simple Setup: Setting up the device, including adding contacts and emergency information, should be easy and straightforward.
Clear Instructions: Clear, user-friendly instructions for activation and deactivation should be available through both written and voice formats.

Affordable & Widely Accessible
Cost-Effective: The device should be affordable and accessible to a wide range of users, making it practical for daily use by women in all economic backgrounds.
Available in Multiple Languages: The voice prompts and commands should be available in multiple languages to cater to different regions and populations.

Durability
Water-Resistant/Weatherproof: The tag should be weather-resistant, so it functions properly even in rain, sweat, or other environmental conditions.
Shockproof: The device should also be built to withstand physical shocks (e.g., if it is dropped).

Integration with Wearable Technology
Smart Watch/Phone Compatibility: If integrated with a smartwatch or smartphone, it would enhance the functionality (e.g., allowing activation from the watch or phone directly).
In essence, the expected output results of this device would be to provide women with a highly responsive, secure, and discreet tool that can quickly alert authorities and contacts during a crisis, ultimately increasing personal safety in emergency situations.

CONCLUSION:

The Self-Activating Emergency Voice-Based Help Tag represents a ground breaking step toward enhancing women's safety through technology. By leveraging voice recognition, GPS, and IoT connectivity, this device offers a discreet, reliable, and accessible solution in emergency situations. Its ability to activate automatically in response to specific distress signals ensures timely help without requiring manual intervention, which may be impossible during critical moments. Future advancements will make this technology more accurate and inclusive. Wearable designs embedded in everyday accessories ensure convenience and discretion, encouraging widespread adoption. Integration with emergency response systems and law enforcement agencies can significantly improve response times and outcomes, making it a vital tool in combating safety threats. Beyond its immediate functionality, the device symbolizes empowerment by giving women a proactive means to address safety concerns. Its potential to adapt and evolve with technological innovations ensures that it will remain relevant and effective in diverse scenarios and geographies. In conclusion, the Self-Activating Emergency Voice-Based Help Tag is not just a product but a vision for a safer world. It combines innovation with purpose, offering a lifeline in emergencies and fostering a sense of security and independence for women everywhere.

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FUTURE SCOPE:

The Self-Activating Emergency Voice-Based Help Tag for women's safety has significant future potential in addressing safety concerns through advanced technology. Future developments can include integration with Artificial Intelligence (AI) for enhanced voice recognition and analysis, ensuring activation only during genuine emergencies while reducing false alarms. Machine learning algorithms can enable the system to adapt to user-specific speech patterns and detect distress tones more accuratelyAdditionally, GPS and IoT connectivity can be optimized for faster location tracking and immediate alert transmission to emergency services, family, or local authorities. Further enhance activation reliabilityWearable design improvements, such as embedding the tag in everyday accessories can make it discreet and user-friendly. Aiding in predictive safety measures. Furthermore, multilingual voice recognition capabilities will expand its usability across diverse populations.Collaboration with law enforcement and safety organizations can enhance response effectiveness. With these advancements, the device holds the potential to become a comprehensive, proactive safety solution for women worldwide, empowering them with reliable and accessible technology in critical situations.

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