RESEARCH ARTICLE OPEN ACCESS

ResQher - Women Safety Guardian/Voice Activated SOS

Vinusha S, Preethi R, Yamuna Rupini J, E.Padma Sundari
Computer Science, Francis Xavier Engineering College, Tirunelveli – TamilNadu - India
vinushas.ug22.cs@francisxavier.ac.in
Computer Science, Francis Xavier Engineering College, Tirunelveli – TamilNadu-India
preethi.ug.22.cs@francisxavier.ac.in
Computer Science, Francis Xavier Engineering College, Tirunelveli – TamilNadu-India
yamunarupinij.ug22.cs@francisxavier.ac.in
Computer Science, Francis Xavier Engineering College, Tirunelveli – TamilNadu-India
padma@francisxavier.ac.in

Abstract:

The mobile safety solution powered by artificial intelligence delivers three essential functions which include real-time personal safety monitoring together with automated emergency detection and emergency response services that operate through its mobile-based technology platform which does not require any wearables. The system employs cutting-edge artificial intelligence technology to process multiple functions which include voice-activated distress detection and custom speaker authentication and sound environment monitoring and continuous GPS position tracking and protected real-time video transmission to detect security threats without needing users to initiate the process. The application lets users create voice profiles through their selected voice samples which then decreases false alarm rates which happen because of harmless background noises. The system generates location-based timestamps when it detects distress which then starts camera recording and streams protected live video to specific emergency contacts while sending SMS and WhatsApp alert notifications for instant emergency alerts. The solution provides offline emergency support through its ability to send SMS alerts while tracking local GPS information which enables system performance in areas with poor internet access. The monitoring system operates through a web-based dashboard which shows ongoing incidents and creates danger heatmaps and provides real-time intelligence to authorities and emergency responders. The technology-enabled safety platform uses artificial intelligence and secure communication methods together with adaptive threat evaluation and current intelligence to create a complete system which works on both mobile devices and web platforms for emergency response. The system enables safety management through its proactive features together with its capacity for fast emergency response and its ability to make decisions based on data from intelligent systems.

Keywords —**Cloud-Based Monitoring, Predictive Risk Intelligence, Secure Mobile Safety Systems, Digital Safety Infrastructure, Intelligent Voice Recognition, Encrypted Communication, Location-Based Safety Alerts, AI-Based Safety Systems, Real-Time Emergency Detection, Intelligent Voice Recognition, Smart City Safety Platforms**

I. INTRODUCTION

The present-day world regards personal safety as an essential need because urban areas expand while social dangers increase and people show greater weakness to threats in both public spaces and private locations. Unsafe conditions which lack immediate help become common for women elderly people, children and people who travel alone. Users who experience physical restraints or become unconscious or panic or lose access to their devices cannot use conventional systems which require them to activate SOS buttons or panic switches according to existing mobile safety applications. Safety systems need intelligent

automated safety systems because current solutions become less reliable during real emergencies according to their existing limitations.

Current emergency applications do not function properly because their systems generate excessive false alerts and become affected by environmental noises and they fail to identify specific threats that users face. Background sounds trigger voice-activated systems to produce unnecessary alerts because they lack intelligent filtering, while users experience emotional or psychological changes that motion-based triggers cannot detect. Many safety platforms operate reactively instead of proactively because they lack secure communication channels, generate real-time evidence, and assess threats according to their current context. Digital safety systems become less trustworthy because their alerts become less reliable and their emergency responses become delayed because of these limitations.

Next-generation safety solutions require mobile computing technology together with artificial intelligence and secure communication systems according to their increasing adoption in contemporary society. AI systems use voice recognition technologies together with emotion detection systems and real-time location tracking and encryption.

II. ALGORITHMS

Intelligent algorithms are integrated into the ResQHer – Women Safety Guardian system to guarantee secure communication, accurate threat analysis, real-time emergency detection, and dependable data storage. The system is designed to provide hands-free emergency assistance through voice-activated mechanisms while minimizing false alarms and ensuring fast response. Algorithms play a crucial role in voice command detection, AI-based threat classification, real-time GPS tracking, alert prioritization, secure cloud storage, anomaly detection, and feedback confirmation. The major algorithms utilized within the system are described below.

The system is designed to provide hands-free emergency assistance through voice-activated mechanisms while minimizing false alarms and ensuring fast response.

A. Voice Command Detection Algorithm

With low-power background operation of the system, it continuously performs audio input scanning with speech recognition and natural language processing methods. Upon the user expression, a speech-to-text engine converts recorded audio signals into text. Preprocessing includes removing redundant words and converting the text to lowercase. Then the command is compared to the predefined emergency keyword such as “Help me”, “SOS”, “Save me”, etc. A cosine similarity matching algorithm measures how similar the spoken command and stored emergency keywords are. If the similarity value is higher than a threshold, the emergency mode is automatically triggered. This algorithm can achieve hands-free activation and reduce human interaction in emergency cases.

When the user speaks, a speech-to-text engine converts recorded audio signal intotext. Preprocessing includes removing redundant words and converting the text to lowercase. Then the command is compared to the predefined emergency keyword such as “Help me”, “SOS”, “Save me”, etc. A cosine similarity matching algorithm measures how similar the spoken command and stored emergency keywords are.

B. AI-Based Threat Classification Algorithm

A system and method for detecting a robot attack event is described. The system includes a front end that receives data of a plurality of vehicles and analyzes the data to detect an event. The front end also passes the data to a back end where a machine learning model, such as a random forest model or a logistic regression model, analyzes the data to determine whether an emergency command was issued by one of the plurality vehicles. The front end receives a likelihood probability of the emergency command. The likelihood probability is used to classify the emergency command as having either a high or low risk.

This allows the system to respond with urgency and to reduce the likelihood of false alerts. The system also includes a front end that receives data of the plurality vehicles and performs global and local feature extraction on the data to analyze the data and detect an event. The front end determines the event to be an emergency command issued by one of the plurality vehicles. The front end receives a likelihood probability of the emergency command, which is used to classify the emergency command as having either a high or low risk. The front end implements an emergency command classification system that reduces false alarms and improves response time. The system includes a front end that receives data of the plurality vehicles. The front end analyzes the data to detect an

C. Real-Time GPS Tracking Algorithm

The GPS tracking algorithm is initiated once the emergency mode is activated. The system queries the GPS module of the device to retrieve the latitude and longitude coordinates in real time. The location is continuously updated at periodic intervals. The coordinates are converted into a link of a Google map and the link is appended to the emergency alert message. In advanced implementations, the distance calculation algorithm can also be invoked to locate the nearest police station or emergency service. The GPS tracking algorithm enables accurate location sharing and enhances rescue operations.

D. Multi-Channel Alert Generation Algorithm

The alerting algorithm: notifying trusted contacts and authorities.

Once the location and risk level information have been retrieved, the system creates an emergency message containing the user's information and a link to the live location. The algorithm then sends the alert through several channels (SMS, push notifications, email). In case of high-risk threat level, the alert is additionally sent to authorities or emergency hotlines in the user's vicinity. The multi-channel-based approach enhances reliability and ensures that at least one of the channels will be successful in sending the emergency notification.

E. False Alarm Reduction and Confirmation Algorithm

To prevent accidental triggering, the system of this invention runs a false alarm reduction algorithm. In the event that an emergency command is detected, the system will allow a short confirmation period in which the user may cancel the alert by giving a cancellation phrase or PIN. If a cancel is not entered within the time limit, the alert process will continue. This safeguard mechanism provides for both reliability and rapid emergency response.

III. PROPOSED SYSTEM

ResQHer – Women Safety Guardian is a mobile based intelligent emergency assistance system that provides instant protection by using voice activated SOS facilities. The system will incorporate speech recognition, Artificial Intelligence (AI), real time GPS tracking and cloud based secure data storage. The proposed system will not require any hands-on action by users as pre-defined voice activation commands will be used to trigger emergency alerts. The system will also analyze threat severity, track current location and notify trusted contacts and authorities. By using intelligent decision making algorithms the system will provide assurance of data privacy, fault tolerance and avoidance of false alarms.

IV. WEB AND MOBILE PLATFORM BASED

ResQHer system will be a mobile first application. Users will be able to trigger SOS, manage contacts and monitor emergency status via the mobile platform. The user interface will have multi language support and will be designed to be user-friendly and intuitive. A web based dashboard will be available for the authorities and administrators to monitor the current status of emergency alerts, risk levels in real time. Cloud services will be used for seamless multi device synchronization and remote access.

V. AI-BASED VOICE AND THREAT RECOGNITION

Emergency systems require accurate recognition of threats with a low false-alarm rate. ResQHer uses AI-based speech recognition and machine learning models to recognize emergency voice commands. Audio input is recorded continuously, speech is transcribed to text using a speech-to-text engine and this recognized command is compared with predefined emergency keyword sets using NLP techniques.

We do the same thing here, using acoustic feature extraction techniques like MFCC, pitch detection and amplitude to determine voice stress. We then use a supervised learning model to detect whether the threat is low, medium or high threat. The AI-based approach learns over time and adapts to the voice of the individual user, resulting in a personalized and more accurate emergency detection.

VI. INTEGRATED SMART ALERT SYSTEM

The system utilizes multi-channel alerts for emergency response. Once threat level has been determined, the system dispatches push notifications, SMS and email alerts to designated contacts. In the event that a location is unsafe, the alerts are also sent to local authorities or emergency hotlines. Each alert also includes a link to the victim's real-time location on Google Maps to aid emergency responders in locating the victim quickly. The redundancy of the smart alert system minimizes the chances of communication failure in an emergency.

VII. SECURE DATA MANAGEMENT AND PRIVACY

Since the data and location information obtained in emergency situations are very sensitive in nature, ResQHer uses robust security mechanisms. All audio recordings and associated metadata are encrypted using Advanced Encryption Standard (AES) before being uploaded onto the cloud. Cloud storage such as Firebase or AWS can be used to store the data and make it accessible in a scalable and secure manner. Blockchain integration can be used for tamper-evident record maintenance to satisfy the legal requirements of data integrity. The stored data can be accessed only by the authorized users.

VIII. LOCATION TRACKING AND IoT INTEGRATION

The system employs real time location tracking based on GPS to obtain accurate user coordinates during emergencies. The GPS unit periodically updates latitude and longitude coordinates. In advanced embodiments, IoT based wearable devices such as smart band or panic button can be integrated through Bluetooth connectivity. This provides users with the ability to send SOS alerts when mobile devices are not readily available. IoT integration can enhance accessibility and real-time emergency detection.

IX. USER SAFETY ENGAGEMENT AND AWARENESS

In order to promote preventive safety knowledge, the application may include safety training modules and periodic emergency simulations. The user may receive notifications including safety tips, safety awareness alerts, and emergency preparedness tips. A trusted contact verification system may limit notifications to verified contacts. By promoting awareness and preparedness, the system may also promote preventive safety actions besides reactive emergency response.

X. TECHNOLOGY

The ResQHer system comprises Artificial Intelligence and Machine Learning algorithms that can be used for voice recognition and threat classification. The ResQHer application can be integrated with a

GPS tracking module for location tracking and a cloud computing system for elastic data storage. Bluetooth and Internet of Things technologies are used for integration with wearable safety devices. The backend infrastructure is cloud-enabled for elastic scaling and real-time data synchronization. Data is encrypted using secure encryption protocols such as Advanced Encryption Standard, during transmission and storage. The combination of AI, IoT, cloud computing, and secure communication protocols creates a trusted and intelligent emergency response environment.

XI. EXPECTED BENEFITS

ResQHer system is able to enhance women's safety by real time, immediate hands-free emergency activation, and threat prioritization intelligence. It is capable of reducing response time by real time GPS, multi-channel alert notifications. AI-based classification reduces false alerts, but can prioritize high risk case alerts. The ResQHer system is also a candidate to provide secure evidence, data cloud storage. With the augmentation of accessibility, automation, and security, the system is also able to facilitate making the world safer for women with the guard of technology.

XII. RESULT AND DISCUSSION

A significant advancement in intelligent personal safety systems has been made with the development and deployment of the AI-powered mobile safety app, which integrates secure communication technologies, real-time mobile computing, and artificial intelligence. The system effectively addressed one of the biggest shortcomings of conventional safety applications by achieving fully automated emergency detection without requiring manual user activation. The voice-trained speaker recognition and panic-level emotion detection mechanisms significantly reduced the generation of false alarms by successfully differentiating between normal speech and environmental noise and genuine distress scenarios, according to experimental evaluations carried out in controlled testing and real-world simulations.

The customized voice training model allowed for accurate user identification and ensured that emergency triggers were only activated when the registered user'sThe system effectively addressed one of the biggest shortcomings of conventional safety applications by achieving fully automated emergency detection without requiring manual user activation. Experiments in controlled testing and real-world simulations showed that the voice-trained speaker recognition and panic-level emotion detection mechanisms effectively distinguished between real-world distress scenarios and normal speech and background noise, thereby reducing the generation of false alarms.

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XIII. CONCLUSIONS

The intelligent, fully automated AI-powered mobile safety system that this research project successfully designs and develops turns

traditional applications into proactive, self-sufficient protection platforms. The suggested system overcomes the drawbacks of manual SOS activation and greatly increases the dependability of emergency response by combining speaker recognition, noise filtering, real-time GPS tracking, encrypted live video streaming, automated emergency communication, and personalized voice-based panic detection. In order to accurately identify actual emergencies while reducing false alarms, the system shows how artificial intelligence can be used to comprehend human distress, context, and behavioral patterns.

A timely, dependable, and verifiable emergency response is facilitated by secure communication methods, location-based timestamping, automated SMS and WhatsApp alert transmission, and real-time evidence generation through live streaming.By combining real-time speech recognition, noise reduction, andThe suggested system removes the drawbacks of manual SOS activation and greatly increases the dependability of emergency response by combining speaker recognition, noise filtering, real-time GPS tracking, encrypted live video streaming, automated emergency communication, and personalized voice-based panic detection. In order to accurately identify actual emergencies while reducing false alarms, the system shows how artificial intelligence can be used to comprehend human distress, context, and behavioral patterns.

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