



“A Speech-Activated Personal Safety and Emergency Alert System”

Nilakshi Sarade¹, Shivani Wasekar², Shruti Bansod³, Prof. Jagruti Ghatole⁴, Dr. Bharti Sayankar⁵,
Dr. Sudhir Shelke⁶

¹²³ UG Students, Department of Computer Science and Engineering Gurunanak Institute of Technology, Nagpur,
Maharashtra, India

⁴ Assistant Professor, Department of Computer Science and Engineering
Gurunanak Institute of Technology, Nagpur, Maharashtra, India

⁵ Associate Professor, Department of Computer Science and Engineering
Gurunanak Institute of Technology, Nagpur, Maharashtra, India

⁶ Professor and Principal, Gurunanak Institute of Technology, Nagpur, Maharashtra, India

How to Cite this Article:

Sarade, N., Wasekar, S., Bansod, S., Ghatole, J. & Sayankar, B. (2026). A Speech-Activated Personal Safety and Emergency Alert System. International Journal of Creative and Open Research in Engineering and Management, 2(10), 1-9.
<https://doi.org/10.55041/ijcope.v2i10.131>

License:

This article is published under the terms of the Creative Commons Attribution 4.0 International License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author(s) and the source are credited.

© The Author(s). Published by International Journal of Creative and Open Research in Engineering and Management.



<https://doi.org/10.55041/ijcope.v2i10.131>

ABSTRACT

Personal safety during emergency situations requires a rapid and reliable method for requesting help and providing useful information to trusted contacts. The proposed Voice Controlled Emergency SOS system is designed to provide an automated emergency-response mechanism using a predefined voice command. When the emergency command is detected, the system initiates the SOS process by recording the surrounding audio as evidence and storing the recorded audio in cloud storage. It also captures the user's live location and a live photograph of the surrounding situation. The system then sends an SOS notification through SMS/email to trusted emergency contacts along with relevant emergency information, including the live location and captured image. By integrating voice-based activation, audio evidence collection, cloud storage, location tracking, live image capture, and automated emergency communication, the proposed system provides a unified approach for assisting users during emergency situations and preserving supporting evidence for later use.

Keywords: Voice Controlled SOS, Emergency Voice Command, Audio Evidence, Cloud Storage, Live Location Tracking, Live Image

Capture, SOS Alert, SMS/Email Notification, Trusted Contacts.

I. INTRODUCTION

Emergency situations such as accidents, threats, harassment, or other dangerous circumstances may prevent a person from manually operating a mobile device to request help. In such situations, a quick and hands-free emergency mechanism can help the user communicate the situation to trusted contacts. Voice-controlled technology provides a suitable approach because an emergency process can be initiated using a predefined voice command without requiring extensive interaction with the device.

The proposed Voice Controlled Emergency SOS system is designed to provide an automated and evidence-oriented emergency response. When the predefined emergency voice command is detected, the system activates the SOS process and records the surrounding audio to preserve the emergency situation as evidence. The recorded audio is then stored in cloud storage so that it can be accessed when required.

In addition to audio evidence, the system captures the user's live location and a live photograph of the surrounding emergency situation. An SOS message is then sent through SMS/email to trusted emergency contacts, providing important information such as the user's emergency status, live location, and captured photograph. The stored audio evidence can also support further understanding of the incident.

Thus, the proposed system combines voice-based emergency activation, audio evidence recording, cloud storage, live location tracking, live photograph capture, and automated SOS communication within a single workflow. This integrated approach is intended to provide faster emergency notification while also collecting supporting information that can help trusted contacts understand and respond to the situation.

II. LITERATURE REVIEW

The literature used for this research was taken mainly from five studies related to keyword



spotting, speech recognition, speech enhancement, voice-based emergency alerts and GPS-based emergency communication. The role of each study in the present work is clearly indicated below.

A. Convolutional Neural Networks for Small-Footprint Keyword Spotting – 2015

The first study investigates the use of Convolutional Neural Networks (CNNs) for small-footprint keyword spotting. The study focuses on detecting specific keywords from speech while maintaining low computational and memory requirements [1]. This study is used in Voice Controlled Emergency SOS mainly for detecting a predefined emergency voice command. It supports the idea that a lightweight speech-processing model can recognize an emergency keyword without requiring a large computational system. The original study mainly focuses on keyword detection and does not include emergency SMS/email communication, live location, live image capture, audio evidence recording or cloud storage [1].

B. Keyword Spotting for Google Assistant Using Contextual Speech Recognition – 2017

The second study focuses on keyword spotting for voice-activated devices using contextual speech recognition. It addresses the problem of false accepts and false rejects during keyword detection [2]. The important idea used in the present work is reliable recognition of the emergency voice command before activating the SOS process. Accurate keyword detection is important because accidental activation may result in unnecessary emergency alerts, while failure to detect the command may prevent the SOS process from starting. The original study is mainly designed for voice-assistant applications and does not provide an integrated emergency response mechanism involving location, live photographs, audio evidence and emergency contacts [2].

C. Speech Enhancement for Wake-Up-Word Detection in Voice Assistants – 2021

The third study investigates speech enhancement techniques for wake-up-word detection in noisy environments [3]. The study

is relevant to the present work because an emergency may occur in a noisy environment containing traffic, people, music or other background sounds. The concept supports improving the reliability of emergency voice-command detection under such conditions. The original study mainly concentrates on speech enhancement and wake-up-word detection and does not provide emergency evidence collection, cloud storage, live location sharing, live image capture or SOS SMS/email functionality [3].

D. Voice-Based Emergency Alert System with GPS Location Sharing for Android – 2026

The fourth study presents a voice-based emergency alert system for Android that uses predefined distress keywords to activate an emergency alert and shares the user's GPS location with registered contacts [4]. The system demonstrates the integration of voice recognition, GPS location and automated emergency communication. This study is directly related to the proposed Voice Controlled Emergency SOS system because it provides the foundation for activating an emergency response through voice and sharing the user's location. However, the reviewed system does not provide the complete evidence-based workflow proposed in the present work, such as recording emergency audio as evidence, storing the recording in cloud storage, capturing a live photograph and sending the complete information through both SMS/email to trusted contacts [4].

E. E-Sentinel: Offline Speech Recognition and GPS-Based SOS Alert System – 2026

The fifth study explores an emergency system using offline speech recognition and GPS-based SOS alerts [5]. The study highlights the importance of lightweight speech recognition for emergency situations where continuous network connectivity may not be available. This concept is relevant to the proposed system because voice-based emergency activation should work as reliably as possible in real-world emergency situations. The present work extends this concept by combining voice activation with audio evidence recording, cloud storage, live location, live picture



capture and SOS SMS/email notification to trusted contacts. The reviewed study mainly focuses on offline speech recognition and SOS functionality and does not implement this complete multimedia evidence and notification workflow [5].

III. RESEARCH GAP

The reviewed studies mainly focus on keyword spotting, contextual speech recognition, speech enhancement, and GPS-based emergency alerts. Studies [1] and [2] focus on reliable detection of predefined voice commands, while study [3] improves voice-command detection in noisy environments. Studies [4] and [5] extend voice-based systems to emergency alerts and GPS-based location sharing. However, these studies do not provide a complete integrated system that combines emergency voice activation with audio evidence recording, cloud storage, live location, live photograph capture, and SOS communication through SMS/email. Therefore, the proposed Voice Controlled Emergency SOS system aims to address this gap by integrating voice detection, emergency evidence collection, cloud storage, location tracking, live image capture, and automated notification to trusted contacts within a single workflow.

IV. METHODOLOGY

The proposed Voice Controlled Emergency SOS system follows an automated workflow that starts with voice-command detection and continues through evidence collection, cloud storage, location and image capture, and emergency notification. The methodology is divided into the following stages:

A. Emergency Voice Command Detection

The system continuously monitors for a predefined emergency voice command. When the specified command is detected, the system identifies it as an emergency trigger and initiates the SOS process.

B. Emergency Audio Recording

After activation, the system records the surrounding audio during the emergency situation. The recorded audio is preserved as

evidence so that it can be reviewed later if required.

C. Cloud Storage of Audio Evidence

The recorded audio file is uploaded and stored in cloud storage. This provides remote access to the evidence and prevents the recorded information from being limited to the user's local device.

D. Live Location Capture

Once the SOS process is activated, the system obtains the user's current live location using the device's location services. The location information is prepared for sharing with the registered trusted contacts.

E. Live Photograph Capture

The system captures a live photograph of the surrounding emergency situation. The captured image provides visual information about the situation and is included as part of the emergency information.

F. SOS Notification

After collecting the required emergency information, the system generates an SOS notification and sends it through SMS/email to the user's trusted emergency contacts. The notification contains relevant information such as the emergency alert, live location, and captured photograph, while the recorded audio evidence is preserved in cloud storage.

V. RESULTS AND DISCUSSION

The proposed Voice Controlled Emergency SOS system provides an automated approach for requesting emergency assistance using a predefined voice command. The system detects the emergency command and initiates the SOS workflow without requiring extensive manual interaction with the mobile device. After activation, the system records the surrounding audio to preserve the emergency situation as evidence and stores the recorded audio securely in cloud storage.

The system also captures the user's live location and a live photograph of the surrounding emergency situation. This information is used to provide trusted contacts



with important details about the emergency. The SOS notification is sent through SMS/email and contains the emergency alert, live location, and captured photograph. The recorded audio is not sent to trusted contacts; it is preserved separately in cloud storage as supporting evidence.

One of the major advantages of the proposed system is its ability to collect different types of emergency information automatically. Instead of only sending an emergency message, the system can capture the user's location, record surrounding audio, and capture a live photograph. These features help provide more useful information about the emergency situation while reducing the need for manual actions by the user.

Table I: Data Required for the Proposed System

The data collected by the proposed system covers the main information required for detecting and responding to an emergency situation. The predefined emergency voice command is used to activate the SOS workflow. Audio recorded during the emergency is stored as evidence, while live location and live photograph provide important information for trusted contacts. The emergency alert message contains the necessary information required to notify the registered contacts.

Information Collected	Purpose
Predefined Emergency Voice Command	To detect and activate the emergency SOS workflow.
Emergency Audio Recording	To preserve surrounding audio as evidence.
Cloud Storage Information	To securely store the recorded audio and captured picture evidence for later access.
Live Location	To identify the user's current location during the emergency.
Live Photograph	To provide visual information about the surrounding emergency situation.

SOS Alert Message	To communicate the emergency status to trusted contacts.
Trusted Contact Information	To identify the recipients of the SOS SMS/email notification.

After collection, the required information is processed by the system and used to execute the emergency-response workflow. The recorded audio is uploaded to cloud storage as evidence, while the live location, live photograph, and emergency alert are included in the SOS notification sent to trusted contacts. Thus, the collected information forms the basic foundation of the proposed Voice Controlled Emergency SOS system. By combining voice-based activation, audio evidence preservation, cloud storage, live location capture, live photograph capture, and automated SOS communication, the system provides a practical approach for supporting users during emergency situations.

Figure 1: Performance of the Proposed System



The system architecture of the Voice Controlled Emergency SOS system represents how different components communicate during an emergency. The architecture mainly consists of the Voice Command Detection, Emergency Processing, Audio Recording and Cloud Storage, Location and Image Capture, and SOS Notification modules.

The Voice Command Detection Module detects the predefined emergency voice command and activates the SOS process. The Emergency Processing Module coordinates



the complete emergency workflow after activation.

The Audio Recording and Cloud Storage Module records the surrounding audio and stores it in cloud storage as evidence.

The Location and Image Capture Module captures the user's live location and a live photograph of the surrounding situation. The SOS Notification Module sends an emergency alert through SMS/email to trusted contacts along with the live location and captured photograph.

Overall, the architecture provides an automated flow from voice activation → audio evidence storage → live location and image capture → SOS notification, enabling a hands-free emergency response system.

VI. CONCLUSION

The proposed Voice Controlled Emergency SOS system provides an automated and hands-free approach for emergency communication and evidence preservation. The system uses a predefined voice command to activate the emergency workflow without requiring extensive manual interaction from the user.

After activation, the system records the surrounding audio and stores it in cloud storage as supporting evidence. It also captures the user's live location and a live photograph of the surrounding emergency situation. The collected location, photograph, and emergency alert are then communicated to trusted contacts through SMS/email, while the audio recording remains securely stored in the cloud as evidence.

The integration of voice command detection, audio evidence recording, cloud storage, live location tracking, live image capture, and automated SOS notification makes the proposed system a unified emergency-response solution. The system can help provide faster emergency information to trusted contacts while preserving additional evidence that may be useful after the incident. Overall, the proposed approach demonstrates how voice-based automation and multiple information sources can be combined to support personal safety during emergency situations.

VII. FUTURE SCOPE

The proposed Voice Controlled Emergency SOS system can be further enhanced to improve its reliability, accuracy, and practical usability in real-world emergency situations. Future developments may include the following:

Improved Voice Recognition: Advanced speech-recognition and noise-reduction techniques can be implemented to improve emergency command detection in noisy environments and different accents.

Offline Emergency Detection: The system can be enhanced to detect the predefined emergency command without continuous Internet connectivity, allowing faster activation in areas with poor network coverage.

Advanced Cloud Security: Strong encryption and secure authentication mechanisms can be implemented to protect the recorded audio evidence stored in cloud storage.

Multiple Emergency Contacts: Future versions can support multiple trusted contacts and emergency services for wider and faster notification.

Real-Time Tracking: Continuous live-location tracking can be added after SOS activation so that trusted contacts can monitor the user's movement during an emergency.

Automatic Evidence Management: The system can be extended to automatically organize and timestamp audio recordings, photographs, location information, and emergency alerts for easier evidence management.

Integration with Smart Devices: The system can be integrated with smartwatches and other wearable devices to provide additional methods for activating an emergency SOS.

Overall, these improvements can make the proposed system more reliable, secure, and suitable for real-world personal safety applications.

ACKNOWLEDGMENT

We would like to express our sincere gratitude to our project guide and faculty members for their valuable guidance, encouragement, and



continuous support throughout the development of the Voice Controlled Emergency SOS project.

We are also thankful to the authors and researchers of the previous research papers reviewed for this work. Their studies on voice command detection, speech recognition, speech enhancement, GPS-based emergency alerts, and SOS systems provided valuable knowledge and guidance for understanding the existing approaches and developing the proposed system.

REFERENCES

- [1] T. N. Sainath and C. Parada, "Convolutional Neural Networks for Small-Footprint Keyword Spotting," *Proceedings of INTERSPEECH*, 2015, pp. 1478–1482
- [2] B. Michael, X. Zhang, G. Simko, C. Parada, and F. Beaufays, "Keyword Spotting for Google Assistant Using Contextual Speech Recognition," *2017 IEEE Automatic Speech Recognition and Understanding Workshop (ASRU)*, 2017, pp. 272–278.
- [3] A. Bonet, A. López, J. S. P. Fernández, and others, "Speech Enhancement for Wake-Up-Word Detection in Voice Assistants," *Proceedings of INTERSPEECH*, 2021, pp. 41–45.
- [4] Y. Baby Kalphana, P. Prabha, and R. Sandhya, "Voice-Based Emergency Alert System with GPS Location Sharing for Android," *Journal of Research and Review: Fuzzy Logic Design and Fuzzy Systems*, vol. 2, no. 2, 2026.
- [5] "E-Sentinel: Offline Speech Recognition and GPS-Based SOS Alert System," *SoftwareX*, 2026.