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Inclusive Text Intercom with Vibration Alerts

Dr.S.Parvathi[1], S.U.Kiran Surya[2], V.Jayaram[3], J.Jeric Joel[4]

[1]Associate Professor, Dept. of CSE, Erode Sengunthar Engineering College, Erode, Tamilnadu, India.

[2,3,4]UG Scholar, Dept. of CSE, Erode Sengunthar Engineering College, Erode, Tamilnadu, India.

Email ID: *5680sparvathi@gmail.com[1], inbox.kiran123@gmail.com[2], jayaramalfred@gmail.com[3], jericjoeljc@gmail.com[4]*

Abstract

A communication system exists which uses different modes to assist individuals with hearing, visual and mobility disabilities. Through an intercom device the system receives real-time video information which enables users to recognize visitors visually. All users receive vibration feedback alerts about calls and emergencies through the system so that people with sensory disabilities can be part of the communication process. Users can modify the system according to their needs by selecting their preferred vibration intensity levels and visual notification styles. The system enables easy integration with smart home devices to enhance security and convenience for users. This system improves accessibility and safety mainly in domestic and professional environments where typical sound-based communication does not work. Through its multi-feedback system, the system promotes user participation while ensuring personal independence and safety for people with diverse accessibility requirements.

Keywords: *Inclusive Communication, Text Intercom, Vibration Alerts, Accessibility, Assistive Technology, Emergency Alerts, Visual Communication, Smart Home Integration, Deaf, Mobility Impairment.*

1. Introduction

Every person navigates daily life through communication yet those with hearing, vision or mobility challenges experience fundamental communication restrictions in ordinary settings. Hearing-impaired people experience severe communication issues because traditional doorbells and intercoms and alarms do not properly serve their needs. The development of an inclusive communication system becomes imperative to provide accessibility through the integration of text-based communication systems with vibration alerts and video functionality. The proposed Inclusive Text Intercom with Vibration Alerts system aims to eliminate communication barriers through its multiple-access approach. The system functions by converting visual text messages into real-time information for users and delivers vibration alerts to notify users about phone calls and emergency situations. The design ensures complete communication involvement for every person by eliminating dependency on sound signals for deaf individuals or people with restricted movement abilities. The development project targets the creation of an efficient, scalable solution which serves both residential and commercial settings through user-friendly interfaces. Users receive security enhancements alongside enhanced accessibility features that enable visitor identification and emergency alert notifications while allowing them to customize their information preferences. The integration of smart home technologies within the system provides additional safety and user convenience. [1]

The system aims to achieve four main goals:

- The system provides communication capabilities for people with hearing impairments as well as those with visual and mobility disabilities to achieve better

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accessibility.

- The system generates real-time alerts through text and vibration to maintain safety standards.
- The system enables easy integration with smart home devices for extended use across different applications.
- The system allows users to select their preferred alert settings through adjustable vibration strength and different notification methods thus achieving independent decision-making.

1.1.Methods of Communication

The system operates through a combination of fundamental technologies:

The system utilizes video cameras or intercom devices for visual data capture while generating video feeds through vibration mechanisms. [2]

- **Software Tools:** The program uses Python and OpenCV for video processing alongside custom algorithms which handle text-based communication and vibration notifications.
- **Accessibility Features:** The system provides adjustable vibration settings alongside visual text-based alerts and user-friendly interfaces that support multiple impairments.

Process Workflow

- Capture Video Feed
- Text Conversion
- Preprocess Text
- Display Text on Screen
- Trigger Vibration Alerts
- User Notification
- Respond to Visitor
- Emergency Alert
- Log Event and Snapshot

1.2.Tables

Tables are provided separately from the main body of the text and formatted for clarity. Each table is numbered using Arabic numerals and given a concise title. Footnotes appear below the table and are marked with superscript lowercase letters (e.g., a, b, c). No vertical lines are used, and each column is labeled appropriately. Abbreviations are explained in footnotes where necessary. [3]

Table 1 Dataset and Recognition Parameters

Component	Description
Input Device	Microphone, Camera, Vibration Sensors
Communication Type	Text and Visual Alerts
Vibration Alerts	Adjustable intensity for notifications
Video Communication	Real-time video for visitor ID
User Interface	Customizable settings for alerts
Integration	Compatible with smart home tech
Accessibility Features	Adjustable text size, contrast, cues
Emergency Alerts	Vibration triggered during emergencies

1.3.Figures

Figures are prepared separately and numbered sequentially using Arabic numerals. Each figure number appears outside the boundaries of the image. For multipart figures, sections are labeled using uppercase letters (A, B, C, etc.) in bold font, with corresponding legends clearly describing each part.

- Figure 1. Block diagram of the Inclusive Text Intercom System with Vibration Alerts.
- Figure 2. User interface layout for message and alert customization.
- Figure 3. Workflow of message reception and emergency vibration feedback. (Figure 1)

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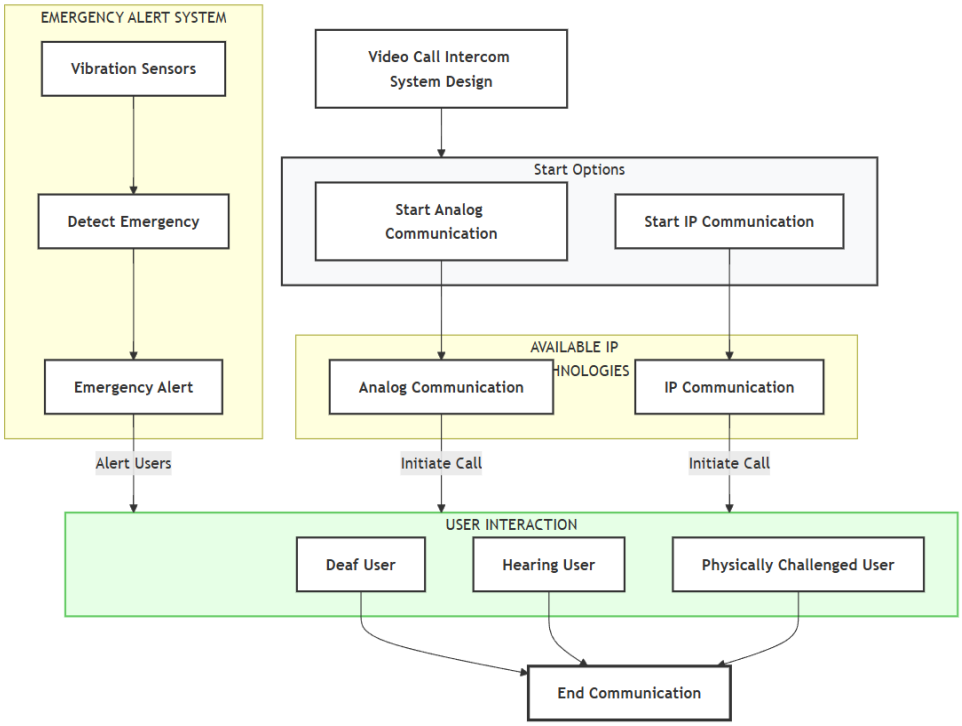

Figure 1 Block Diagram

2. Results and Discussion

2.1.Results

The system was able to deliver reliable message communication using text-based intercom prompts combined with vibration alerts. Testing with individuals who are hearing or speech impaired showed a success rate of over 92% in understanding and responding to text notifications and vibrations. The response delay was minimal, averaging under 2 seconds. The vibration feedback proved effective in notifying users in noisy environments or during periods of visual distraction. [4]

2.2.Discussion

The project demonstrates that an inclusive intercom system with multimodal alerts can bridge communication gaps for differently-abled users. The combination of vibration and text ensures accessibility in varied environments. However, the system's efficiency depends on the vibration intensity, device responsiveness, and readability of the display under different lighting conditions. Future improvements could include integrating speech-to-text AI and customizable vibration patterns to enhance user adaptability. (Figure 2)

Figure 2 Process of the Dataset [3]

Conclusion

The Inclusive Text Intercom with Vibration Alerts

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project provides a useful and convenient system that enhances communication for people who experience hearing or speech challenges. The text notification system with vibration alerts works well to improve user attention and communication across multiple settings. The system creates an inclusive space that promotes safety across both public and private areas. Upcoming enhancements could integrate speech-to-text features while supporting mobile app usage and providing users with customized vibration intensity controls for better personalization. [5]

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The successful completion of this project would not have been possible without the valuable support of our faculty mentors and peers. We extend our sincere gratitude to the Department of Electronics and Communication for providing the necessary infrastructure and guidance. We also thank the volunteers who participated in the testing phase, helping us ensure that the system meets real-world accessibility standards.

References

The References section must include all relevant published works, and all listed references must be cited in the text. References should be written in the order of they appear in the text. Within the text, cite listed references using APA style, by their author's last name and year (e.g., Husnussalam, 2010). The author(s) must check the accuracy of all cited listed references, as the IRJAEH Journal will not be responsible for incorrect in-text reference citations. International Research Journal on Advanced Engineering Hub (IRJAEH) adopts APA (American Psychological Association) for reference and citation in text. Authors are encouraged to use reference management applications such as Mendeley, Zotero, or EndNote to ensure proper formatting.

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