

# LIFE BEEP

Presented by H4 HYPERS



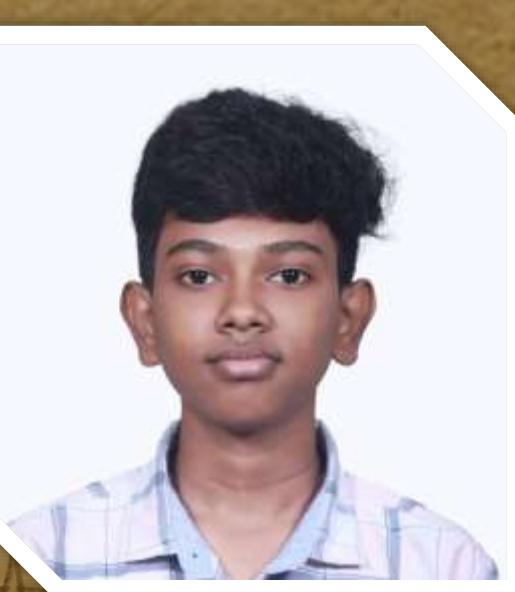
PROJECT TITLE  
LIFE BEEP



SUBJECT : Analog Integrated Circuit  
DEPT : ECE  
SECTION : B  
DATE : 14.11.2025

GUIDED BY  
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# INTRODUCTION

The Smart Alert Notifier Watch is an assistive wearable designed for elderly and hearing-impaired users. It captures surrounding sounds, enhances them using Op-Amps, and employs an ESP32 to classify events such as a baby's cry, doorbell, or vehicle horn. Detected sounds are instantly conveyed through vibration and visual alerts, ensuring safety, awareness, and independence.



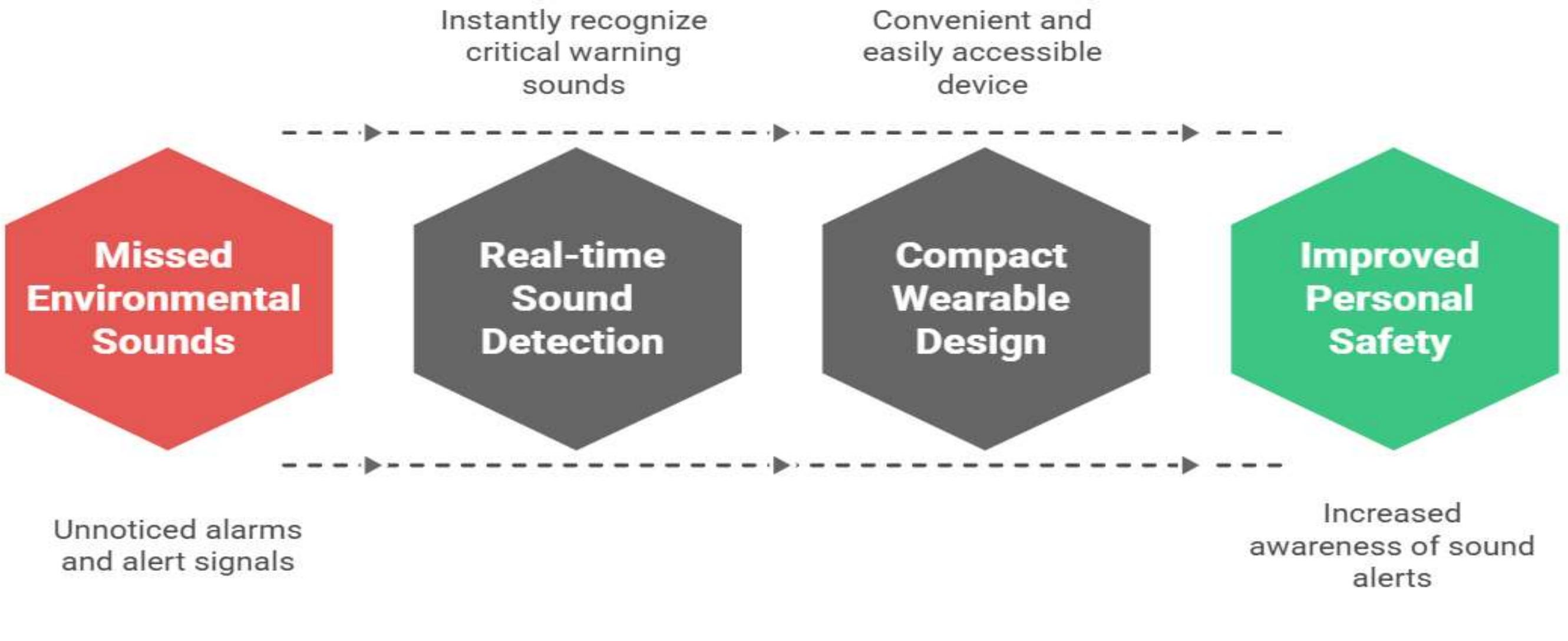
# PROBLEM STATEMENT

Many individuals often miss important environmental sounds such as alarms, sirens, and alert signals in their daily lives. This is especially challenging for people with hearing difficulties and elderly individuals who may not notice these sounds, increasing their safety risks. Heavy sleepers also struggle to recognize critical warnings during emergencies. Since there is no compact wearable that provides instant sound-based alerts, a reliable real-time system is needed to enhance awareness and improve personal safety.



# OUR SOLUTION

## Enhancing Safety with Sound Alerts



# PROJECT OVERVIEW

## SMART ALERT NOTIFIER WATCH

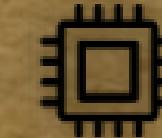
An assistive wearable designed for elderly and hearing-impaired users



Captures surrounding sounds



Conveys alerts through vibration



ESP32  
Classifies events such as a baby's cry, doorbell, or vehicle horn



Conveys visual alerts

# PROJECT CONCEPTS

- Detects and classifies environmental sounds
- Provides multi-modal alerts: vibration + light
- Compact, wearable, and user-friendly design
- Low power consumption with rechargeable battery

# OBJECTIVE



The objective of this project is to develop a compact and portable device that converts important surrounding sounds into vibration alerts, thereby assisting people with hearing impairments in their daily activities.

# TARGET AUDIENCE



**People with  
Hearing Loss**

**Elderly  
Living Alone**

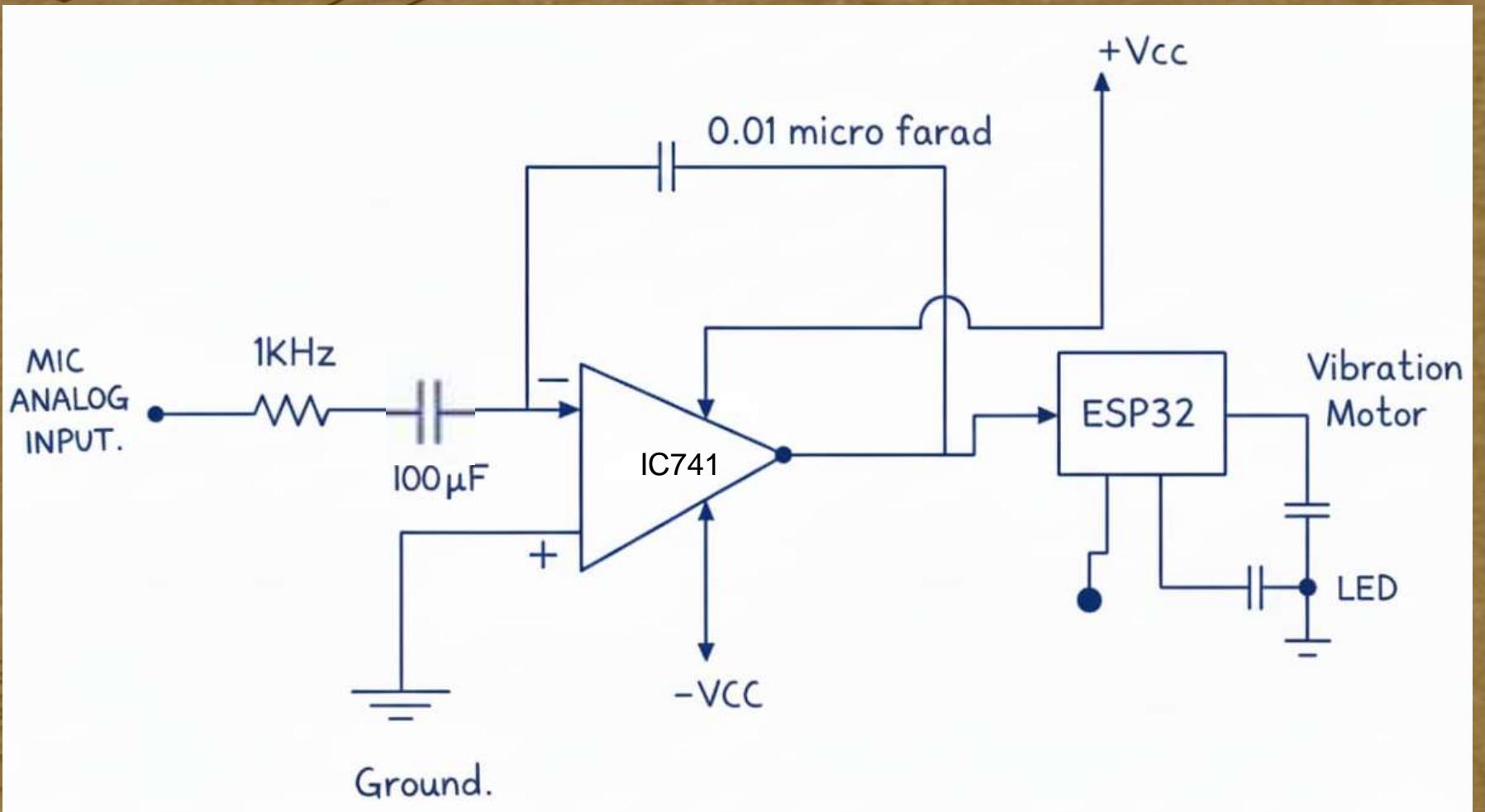
**Outdoor  
Enthusiasts**

**Heavy  
Sleepers**

# PRINCIPLE

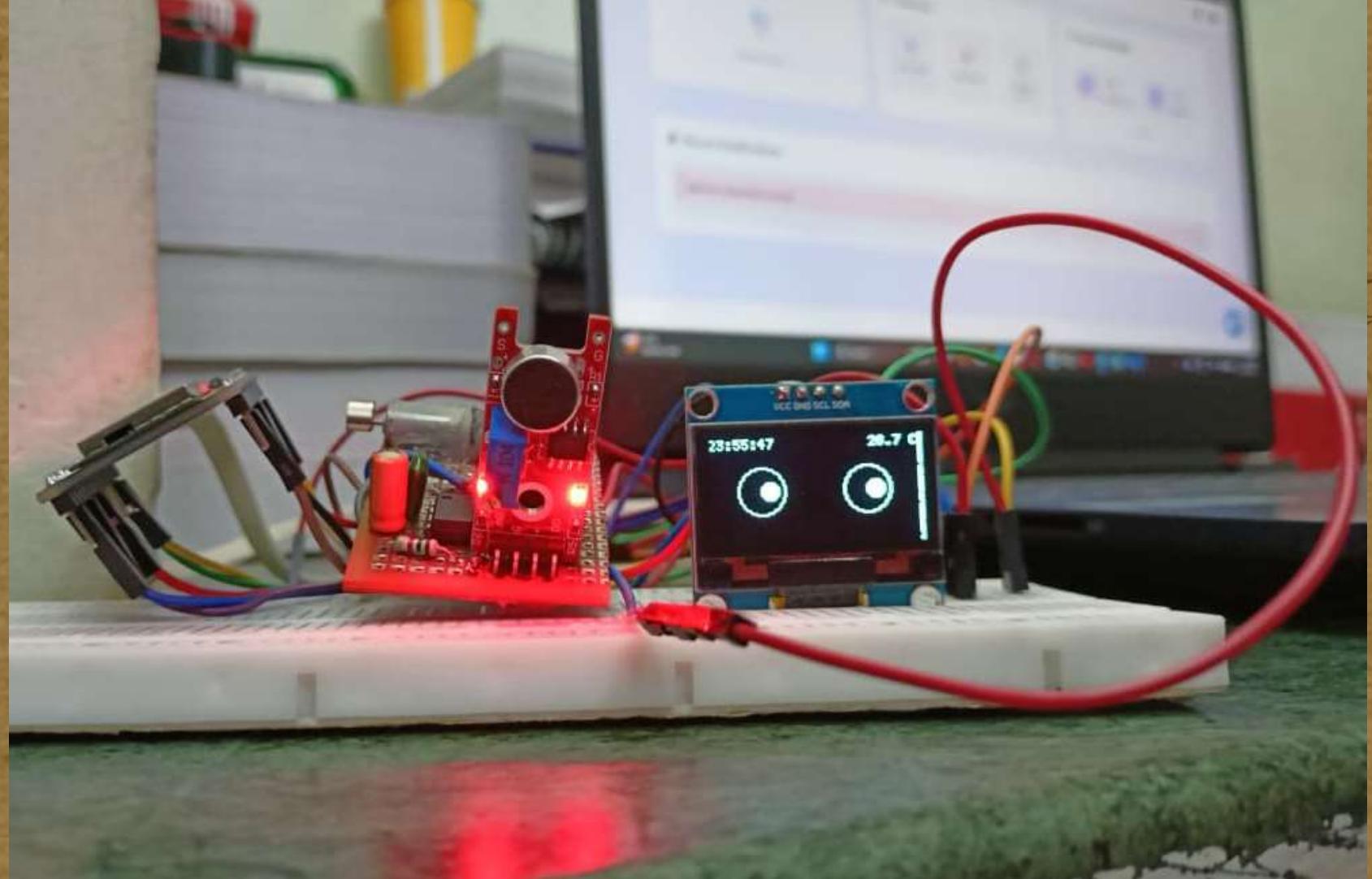
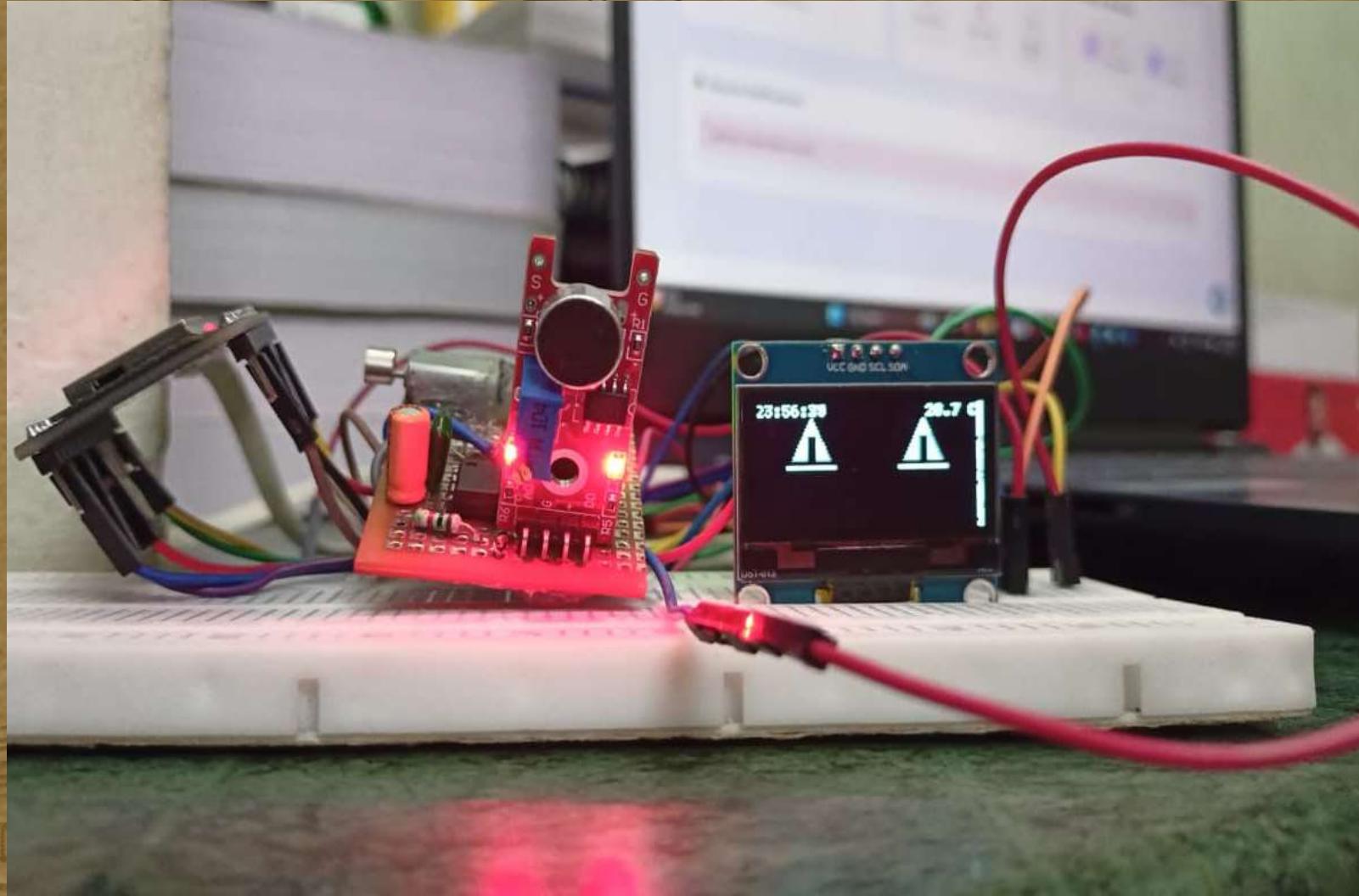
1. Sound Capture & Enhancement → Microphone + Op-Amp preamplifier
2. Filtering & Noise Reduction → Band-pass filter (Op-Amp)
3. Sound Analysis & Classification → ESP32
4. Alert System → Vibration motor + LED light indicators

# CIRCUIT DIAGRAM

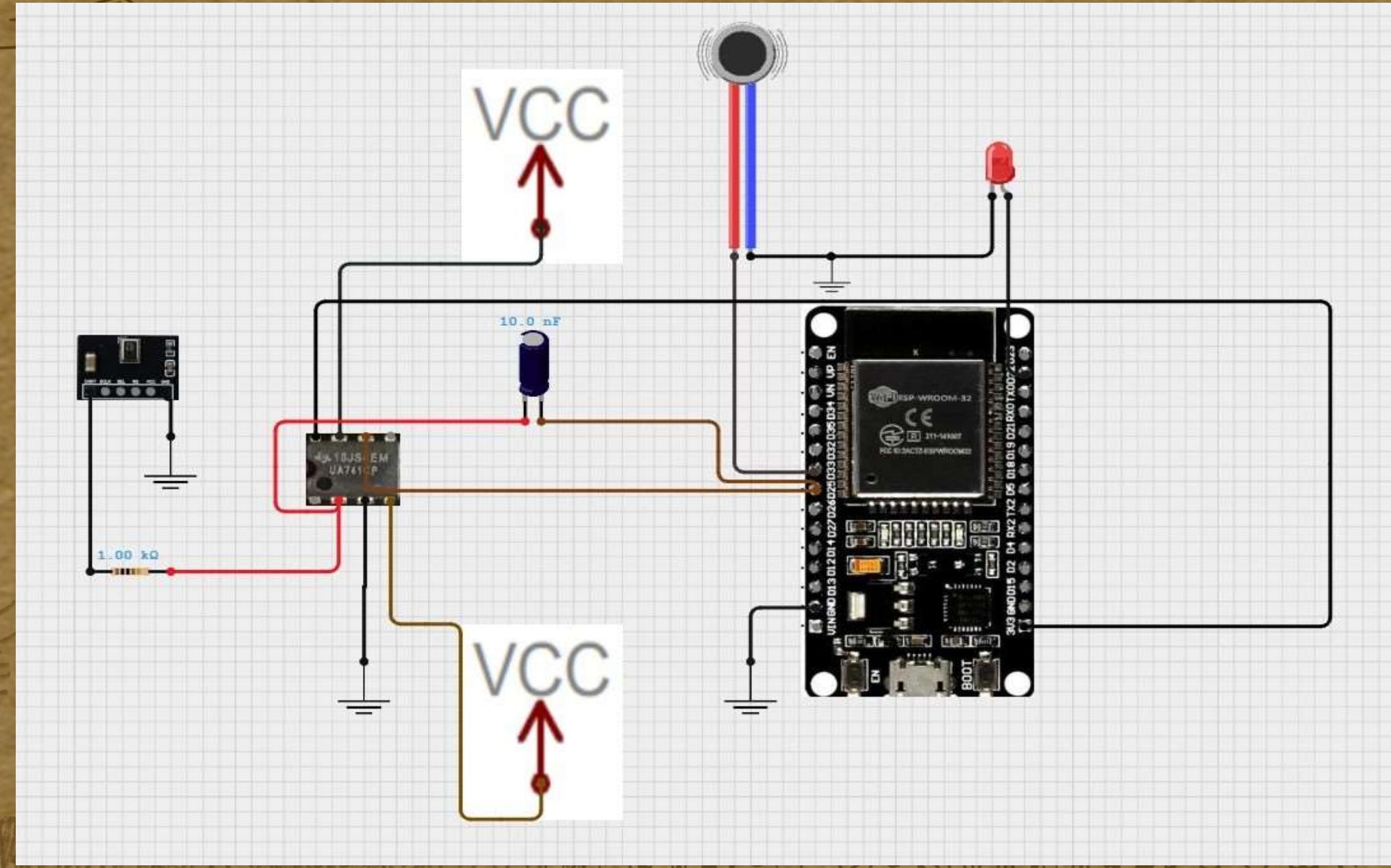


INTELLIGENT SOUND-TO-VIBRATION  
NOTIFIER FOR HEARING IMPAIRED

# PROTOTYPE

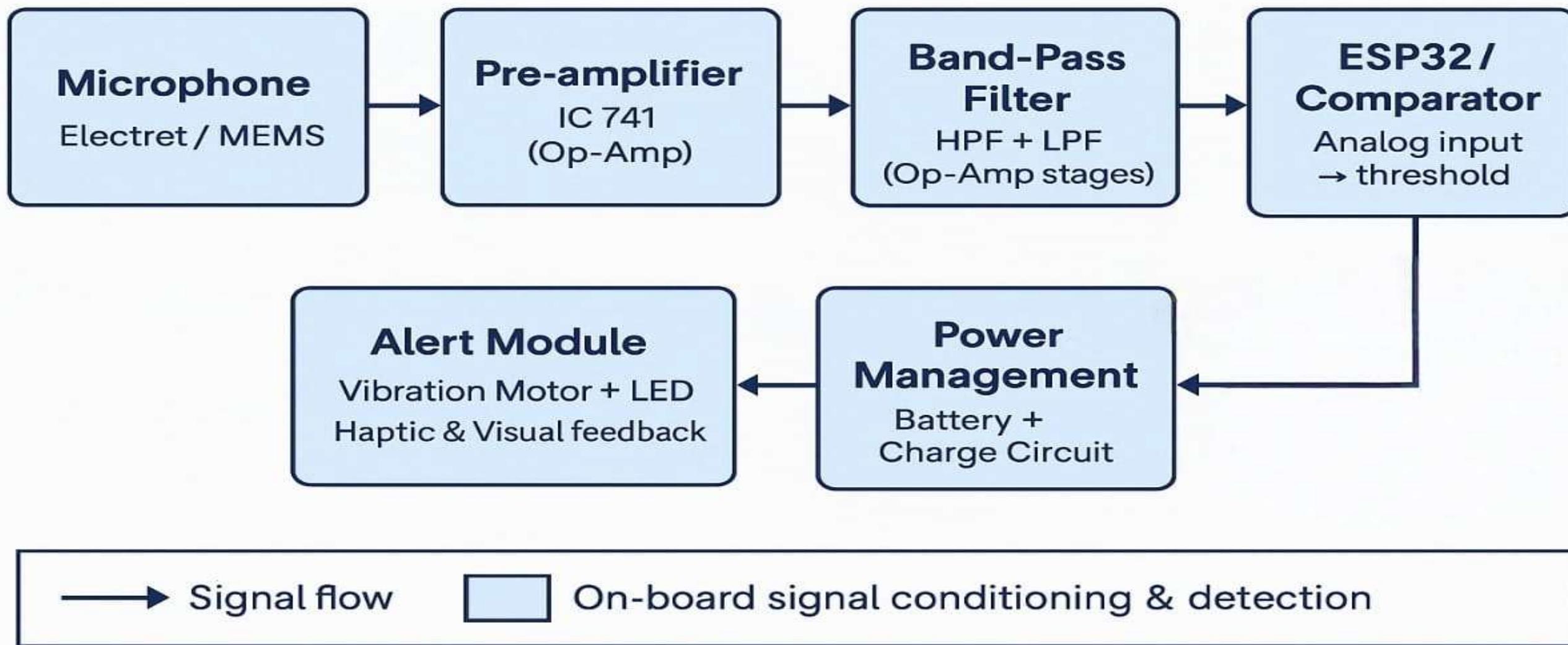


# CIRCUIT CONNECTION



# BLOCK DIAGRAM

## LIFE BEEP — Block Diagram



# COMPONENTS USED

Jumper Wires



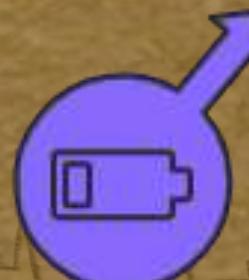
Capacitors



Resistors



Rechargeable Battery



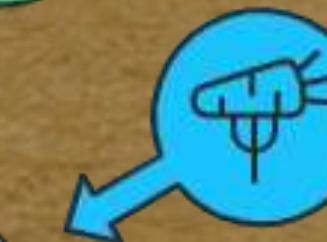
LED Indicator



ESP32 Board



Microphone



Op-Amp IC



Vibration Motor



# COMPONENTS DESCRIPTION



## ESP32 Development Board (DevKit)

\***Description:** High-performance microcontroller with Wi-Fi + Bluetooth.

\***Role in Project:** Runs edge-AI sound classification and controls the alert system.

### \*Key Points:

- Real-time audio detection

- Supports ML models

- Compact & power-efficient

## Microphone Module

\***Description:** Sensitive sensor that converts sound waves into electrical signals.

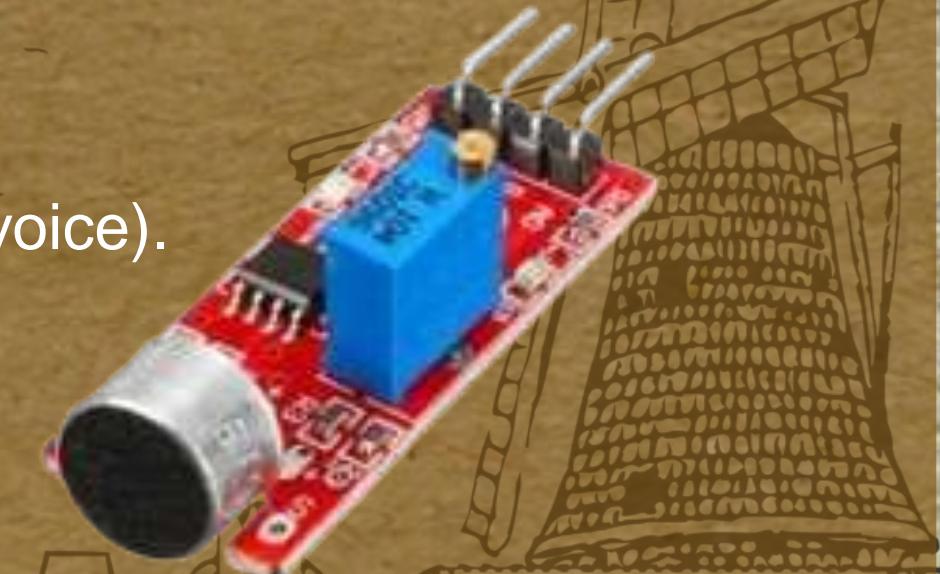
\***Role in Project:** Captures environmental emergency sounds (horns, ambulance, voice).

### \*Key Points:

- High sensitivity

- Low noise

- Ideal for wearable devices



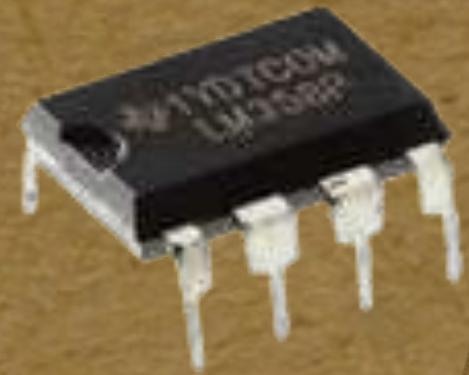
# PUPOSE OF LM741 IC

The LM741 is an operational amplifier used to boost the tiny audio signals captured by the microphone.

In our project, it amplifies weak sound inputs so the system can accurately detect and classify important sounds.

By providing stable and clean amplification, the LM741 ensures the vibration motor and alert system respond correctly even to low-volume noises.





## LM741 Op-Amp IC

\*Description: Dual operational amplifier for analog signal conditioning..

\*Role in Project:

- \*Amplifies weak mic signals
- \* Implements band-pass filtering for emergency frequencies

\*Key Points:

- \*Clean signal amplification
- \*Enhances overall detection accuracy

## Vibration Motor (3V)

Provides tactile alert when critical sound is detected.  
Compact and ideal for wearable feedback.



## LED Indicator

Visual alert when ESP32 detects emergency frequencies.  
Low-power and easy to drive.



# VISUAL SCREEN

OLED DISPLAY (0.96" I2C – SSD1306)

## Description:

A compact, high-contrast OLED screen designed for low-power, high-clarity visual output.

## Role in Project:

Shows real-time updates and alert icons when emergency sounds are identified.

## Key Points:

- High brightness and crisp visibility
- Very low power usage — perfect for wearable devices
- Displays clear warning signs and status updates
- Uses a simple I2C interface for smooth integration with ESP32



# FUTURE INTEGRATIONS

## Future Integrations

### Mobile App

Connect to a mobile app for notifications and history.



### GPS Integration

Integrate GPS to automatically detect location-based emergencies.



### AI Updates

Update the AI model to recognize more sound types.



### Cloud Analysis

Use cloud-based sound analysis for better accuracy.



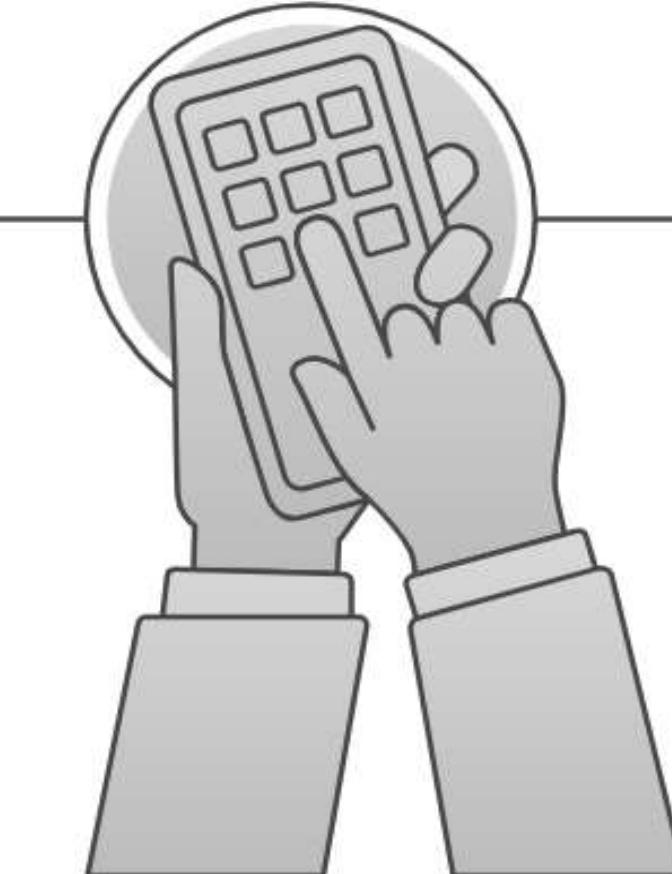
### Bluetooth Pairing

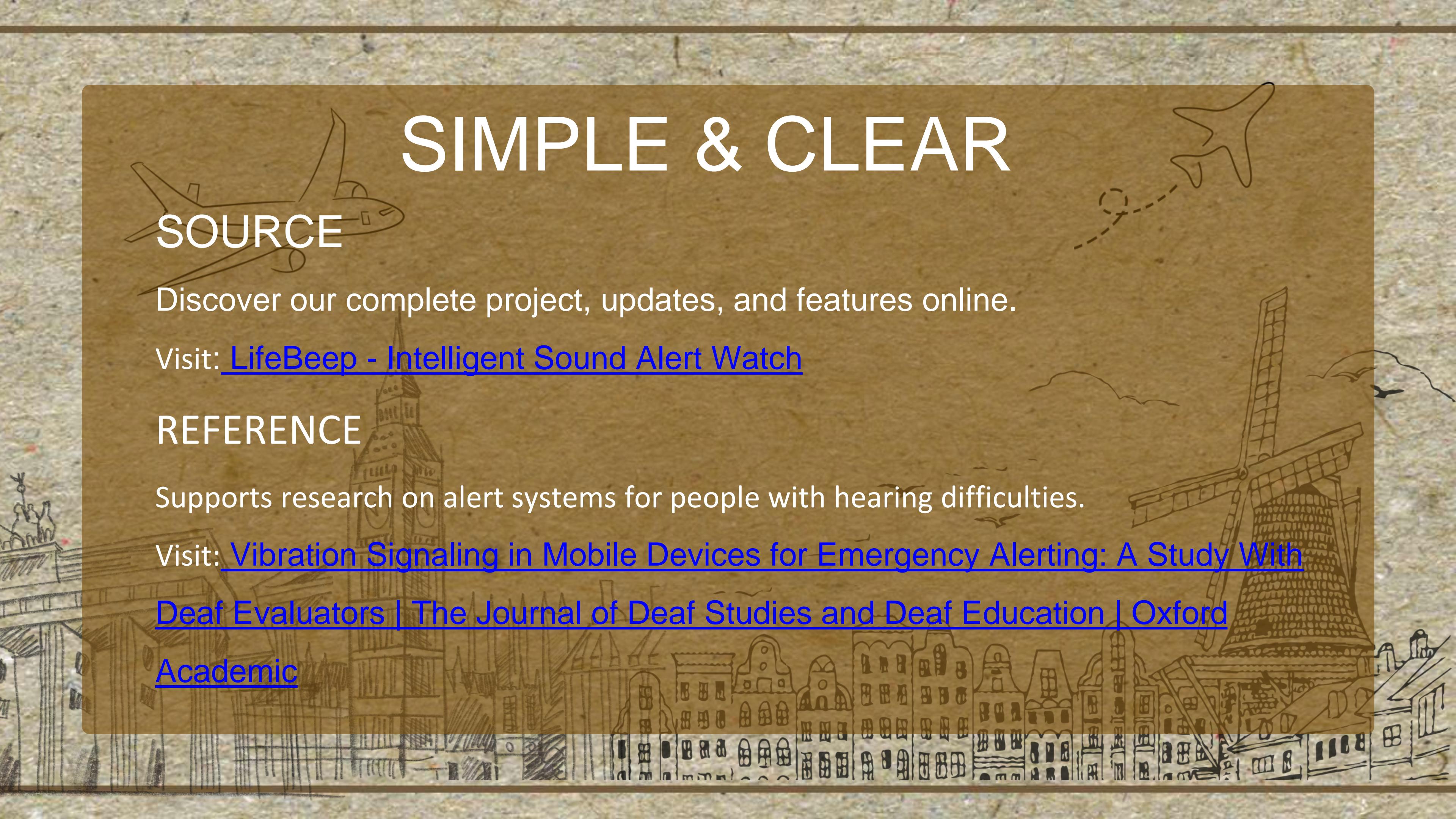
Pair with smart home devices for automated responses.



### Smartwatch Sync

Sync with smartwatches for a seamless wearable experience.





SOURCE

# SIMPLE & CLEAR

Discover our complete project, updates, and features online.

Visit: [LifeBeep - Intelligent Sound Alert Watch](#)

REFERENCE

Supports research on alert systems for people with hearing difficulties.

Visit: [Vibration Signaling in Mobile Devices for Emergency Alerting: A Study With](#)

[Deaf Evaluators | The Journal of Deaf Studies and Deaf Education | Oxford](#)

[Academic](#)

# CONCLUSION

The Smart Alert Notifier Watch provides a reliable assistive solution for elderly and hearing-impaired users. By detecting important sounds and converting them into vibration and light alerts, it improves safety, awareness, and independence in daily life. This project demonstrates how simple hardware and AI integration can create impactful wearable technology.



# THANK YOU

Presented by H4 HYPERS