HMR INSTITUTE OF TECHNOLOGY AND MANAGEMENT

TECHEXPO 2K25 PROJECT EXHIBITION

PROJECT TITLE - Smart Stick for Visually and Hearing Impaired with IoT Integration

CATEGORY - Hardware

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COLLEGE NAME – HMR Institute Of Technology And Management

DEPARTMENT – CSE Department

Smart Assistive Stick – A Ray of Hope for the Blind, Deaf & Mute

- Thousands suffer from **multi-sensory disabilities**, especially in **rural areas**.
- Existing aids (like canes or hearing aids) serve only one challenge at a time.

The Need

- There's a need for an affordable, flexible assistive device that integrates real-time tracking, emergency response, and IoT connectivity, addressing multiple disabilities.

PROBLEM STATEMENT STATISTICS

Millions of visually and hearing-impaired individuals face difficulties navigating public spaces safely. Conventional white canes offer limited awareness and no emergency communication in case of langer or disirentation.

253M
people globally are visually **impaired**
WHO, 2023

430M
people globally **have disabling hearing loss**
WHO, 2021

70%
of blind individuals rely on white canes include blow walst level

SOLUTION RELEVANCE STATISTICS

Our IoT-based Smart Stick integrates ultrasonic sensing, GPS tracking, GSM alerts, vibration, and sound detection to provide real-time obstacle detection, emergency SOS alerts with **location**, and tactile feedback. It empowers differentty-abled users with independence and safety in day-to-day trave!

₹2.48 TN
projected **assistive** technology market by 2026

78%
of visually impaired individuals interested in **smart canes**

65%
reduction in **collision** risk from **IoT smart sticks**

TECHNOLOGY STACK AND ARCHITECTURE

Technology Stack:

Actuators: Buzzer, LED, Vibration motor

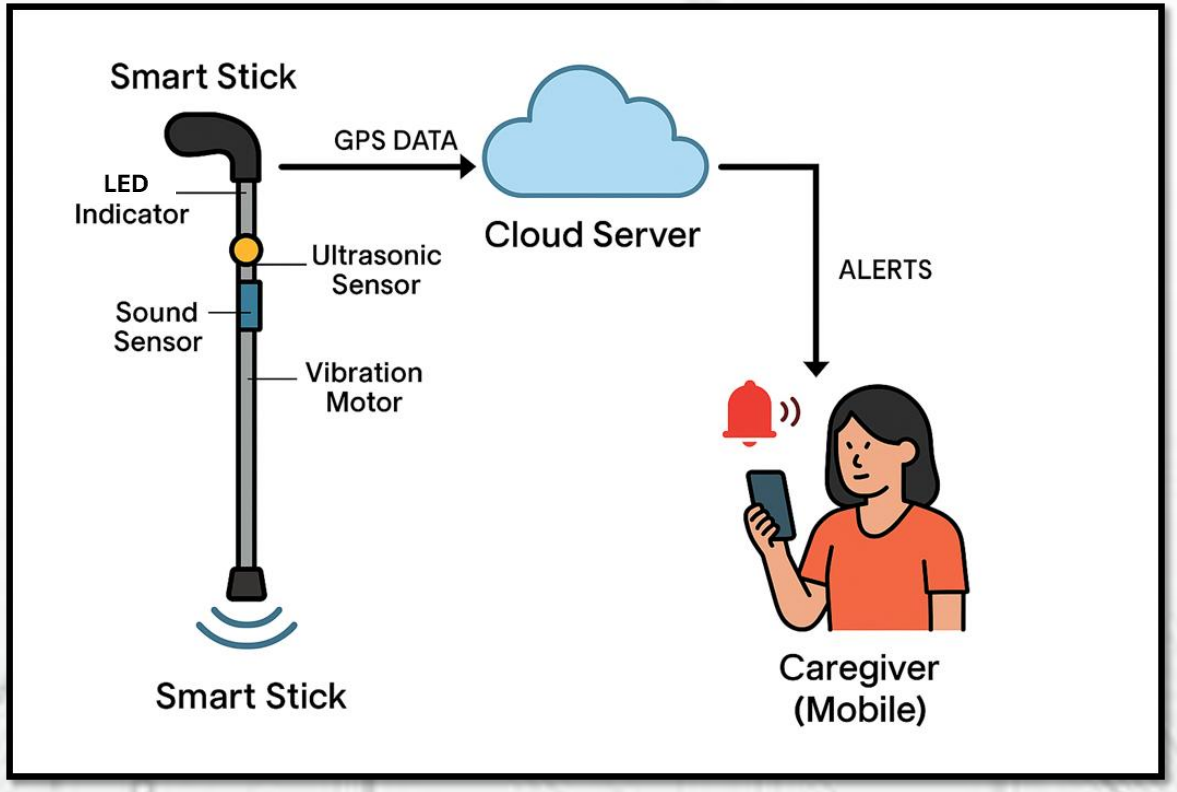
Micro controllers: Arduino Uno + NodeMCU (ESP8266)

Sensors: Ultrasonic sensor, Sound sensor, GPS (NEO-6M), Push button

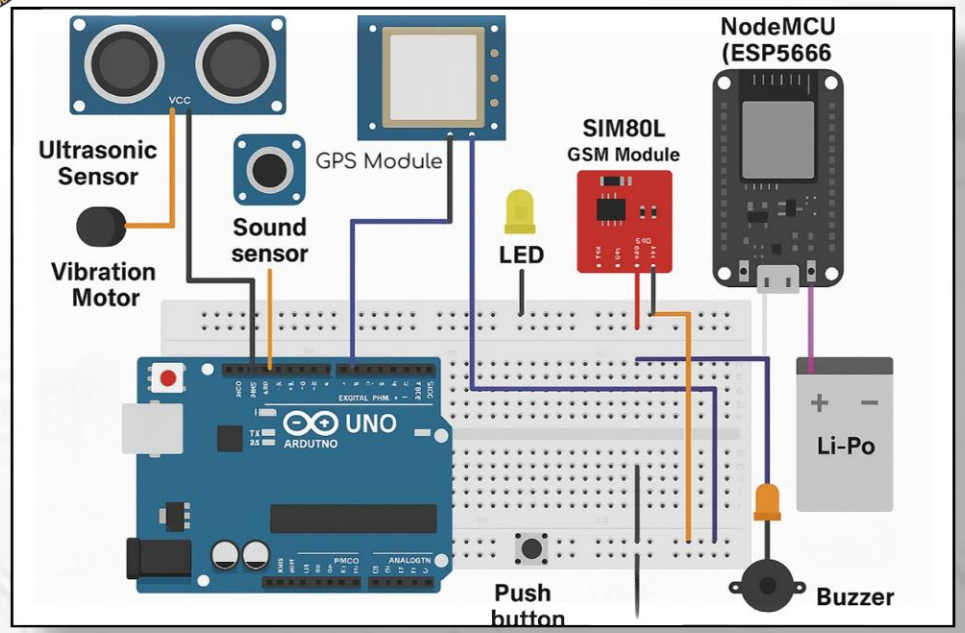
Communication Modules: SIM800L GSM Module, Wi-Fi (via ESP8266)

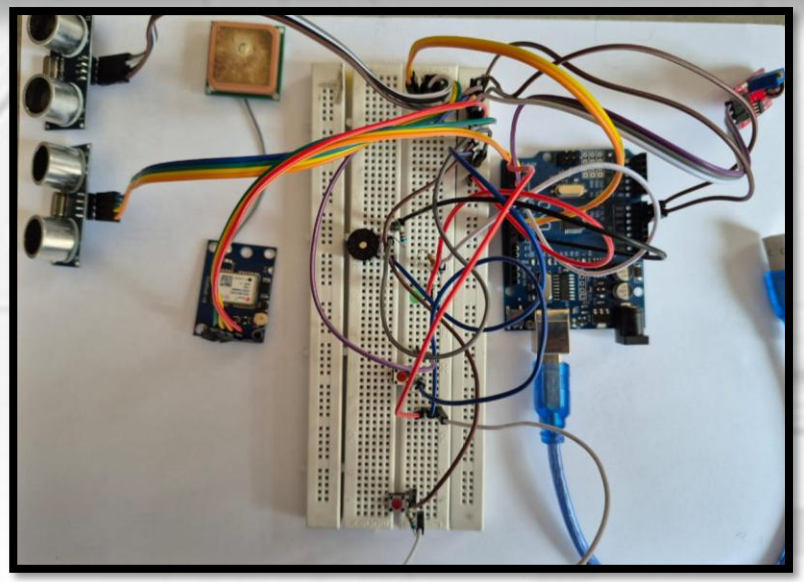
Power: Li-ion battery (7.4V) + Buck converter

Software Platforms: Arduino IDE, Blynk/Firebase(for IoT dashboard), TinkerCAD (for simulation), ThingSpeak



IMPLEMENTATION AND PROTOTYPE

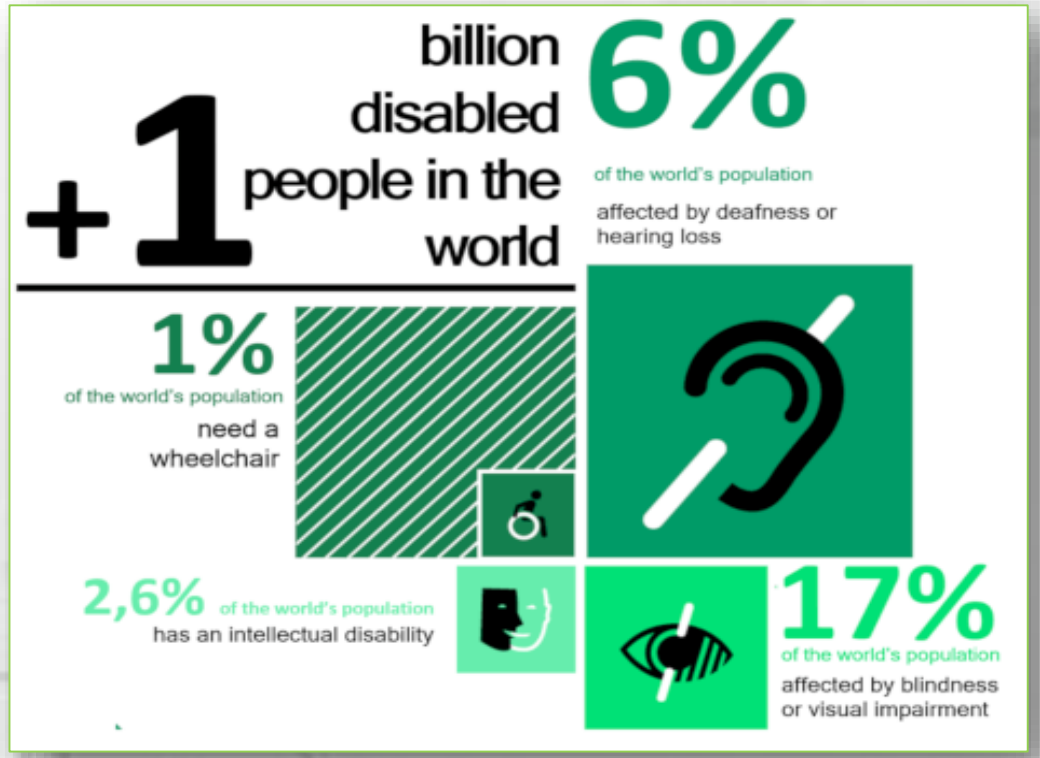




VIDEO LINK :

https://drive.google.com/file/d/1oDhDBlUERXorA6EPc0wYgwR3tNAbTcZs/view?usp=sharing

IMPACT AND UNIQUENESS



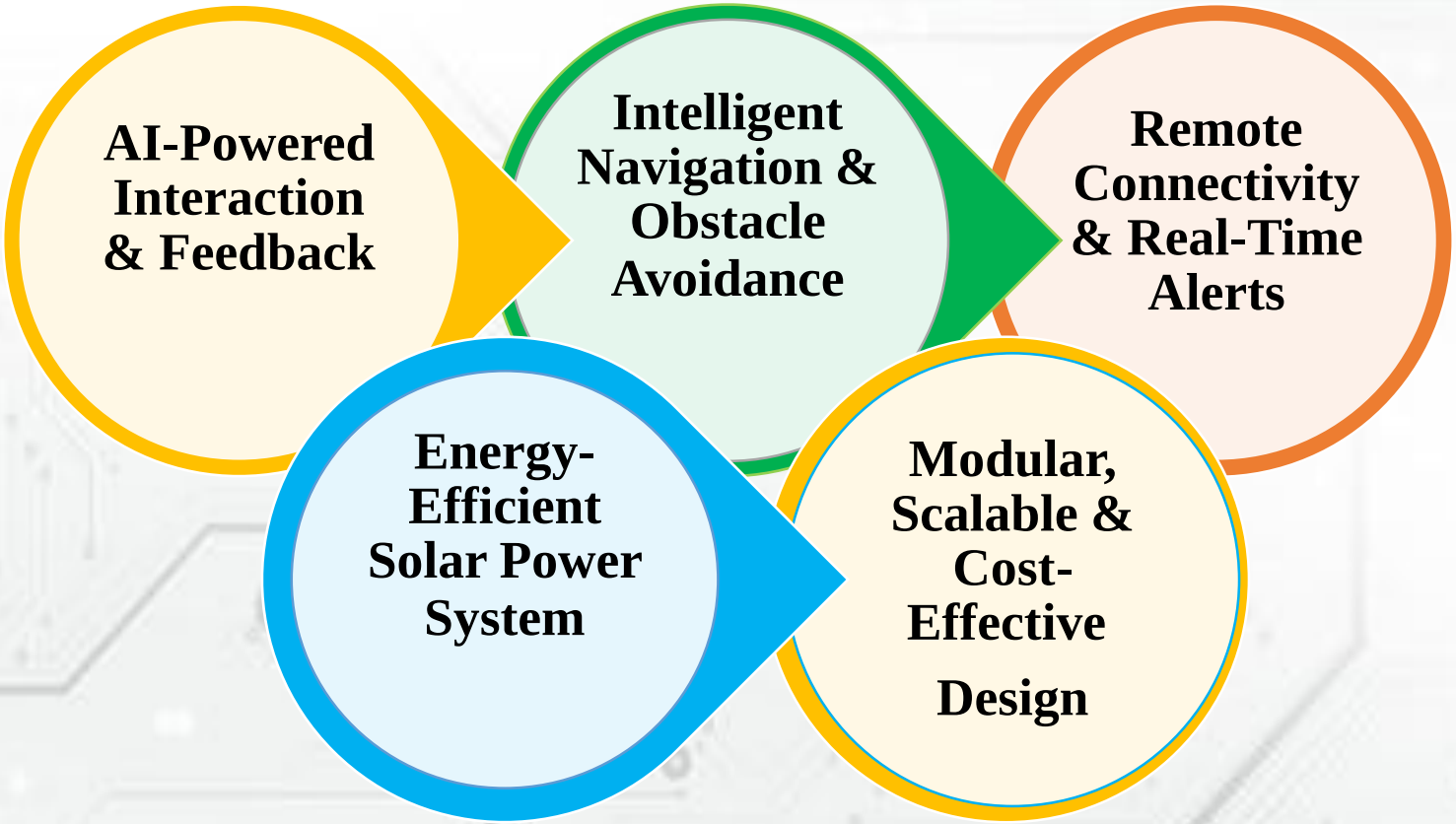
Impact :

- ❑ Enables safe, independent mobility for blind, deaf, mute, and multi-disabled users.
- ❑ Sends instant SOS alerts with live location—no internet needed.
- ❑ Works seamlessly in both urban and rural areas, reducing caregiver dependence.

UNIQUENESS :

- ❑ Combines ultrasonic + vibration + LED + buzzer for **both visual and hearing-impaired users.**
- ❑ Integrated **GPS + GSM** for real-time location updates.
- ❑ Works even without internet via SMS fallback (GSM-based alert).
- ❑ Designed to be **affordable and accessible** for people with disabilities, even in **low-income communities.**
- ❑ Compact, **energy-efficient**, with **rechargeable Li-ion power making it perfect for long-lasting, portable use.**

FUTURE SCOPE AND REFERENCES



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