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AI-Powered Guider Solution for patients with Alzheimer's disease

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Abstract- The paper describes the solution for people who have dementia, there are many types of dementia, but the most common one is Alzheimer's disease, which accounts for 60%- 80% of dementia cases among the elderly. It is caused by the accumulation of amyloid plaques in the hippocampus of the brain. This leads to the death of neuron cells, restricting synaptic signals. As a result, improper synaptic function and neuron death lead to dementia, causing memory loss and impairing motor functions. The progression of Alzheimer's disease varies between 8-20 years, depending on the accumulation of amyloid plaques in the hippocampus. It is a progressive neurodegenerative disorder that develops in three stages: Mild stage (2-4 years) - Characterized by memory loss and difficulty in problem-solving. Moderate stage (2-10 years) - Involves increased confusion and behavioural changes. Severe stage (1-3 years) - Patients become completely dependent and lose motor functions. Globally, over 55 million people have dementia, with a projected doubling every 20 years, reaching 78 million by 2030 and 139 million by 2050. In India, an estimated 8.8 million people aged 60 and older live with dementia, and this number is projected to rise significantly.

By considering this data, we introduce the system named GUIDER that helps patients navigate public places and manage their belongings. The GUIDER analyses the patient's lifestyle and home environment, assisting in locating items and providing reminders. If the patient forgets where something is placed (e.g., a key), the GUIDER provides instructions to find it. It acts as a secondary memory device for Alzheimer's patients. The GUIDER helps to guide the patients in their native language. The GUIDER helps Alzheimer's people in different stages.

At the first stage of Alzheimer's, it acts as a simple assistant who reminds everything like events, reminders, location of their belongings, to-do lists, and family members. At the second stage, it acts like an AI caretaker who monitors their health, patients experiencing increased confusion, memory loss, and difficulty recognizing people and places, the GUIDER includes a camera that recognizes familiar faces and locations. Since patients often ask repetitive questions or engage in unnecessary speech, pre-recorded responses from caregivers help address their queries, reducing family frustration. In the third stage, when patients are entirely dependent on caregivers, the GUIDER can be integrated into a wheelchair. It assists caregivers by monitoring patients through cameras and providing to-do lists prescribed by doctors.

Our system benefits both patients and caregivers by addressing mental difficulties caused by memory loss and reducing caregivers' workload. It is a small, wearable device, similar to a microphone, that provides real-time location and health updates.

Index Terms-Alzheimer's Disease, AI Assistant, Dementia Care, Speech Recognition, Face Recognition, Machine Learning, Natural Language Processing (NLP), Real-Time Patient Monitoring, AI-Based Navigation.

I. INTRODUCTION

In our generation people are might be affected by Alzheimer's disease is more common due to the factors like genetics, cardiovascular disease, age, brain injuries are the some of the reason for Alzheimer's but, the important reason is our life style. Our unhealthy diet and poor life style gives the result as a Alzheimer's when we getting old. Alzheimer's disease, which accounts for 60%-80% of dementia cases among the elderly. It is caused by the accumulation of amyloid plaques in the hippocampus of the brain. This leads to the death of neuron cells, restricting synaptic signals. As a result, improper synaptic function and neuron death lead to dementia, causing memory loss and impairing motor functions. The progression of

Alzheimer's disease varies between 8-20 years, depending on the accumulation of amyloid plaques in the hippocampus. Globally, over 55 million people have dementia, with a projected doubling every 20 years, reaching 78 million by 2030 and 139 million by 2050. In India, an estimated 8.8 million people aged 60 and older live with dementia, and this number is projected to rise significantly.

It is a progressive neurodegenerative disorder that develops in three stages: Mild stage (2-4 years) - Characterized by memory loss and difficulty in problem-solving. Moderate stage (2-10 years) - Involves increased confusion and behavioural changes. Severe stage (1-3 years) - Patients become completely dependent and lose motor functions.

The mission of the Alzheimer's Association is to eliminate Alzheimer's disease through the advancement of research, to provide and enhance care for all those affected and to reduce the risk of dementia through the promotion of brain health. The Alzheimer's Association has awarded more than $315 million to Alzheimer's research; more than 2,200 scientists around the world have received funding through our International Research Grant Program. The Alzheimer's Association is a sponsor of the World Wide Alzheimer's Disease Neuro imaging Initiative (WW-ADNI), which works collaboratively to share research across the international research community and establish standards for diagnosis. Information from brain imaging scans is collected from each WW-ADNI site.

Hence, most research is concentrated on treating and handling Alzheimer's disease in a better manner. There is ongoing Advance research using AI to scan, monitor and treat for Alzheimer's patients i.e. fixing chip in brain and reading synopsis of brain.

However, despite all the research, assistance, guidance, and help for individuals with Alzheimer's are lacking. The need for caregivers becomes prominent only in the third stage of Alzheimer's disease. Providing care for someone with Alzheimer's disease or another dementia can be both rewarding and challenging. In the early stages of dementia, a person may remain independent and need very little care. However, as the disease progresses, care needs will intensify, eventually leading to a need for around-the-clock assistance.

We introduce an AI tool (GUIDER) that will useful for all the 3 stages of Alzheimer's Disease. existing technologies often fail to provide real-time speech-based assistance, cognitive stimulation, and predictive analytics, all of which can help slow down disease progression. We use AI technologies including deep learning, speech recognition, natural language processing (NLP), and multimodal sensor integration to provide personalized cognitive and physical assistance to Alzheimer's patients. Unlike conventional assistive technologies, our system aims to adapt dynamically to patient needs by using a combination of real-time data processing, predictive analytics, and continuous model updates.

II. LITERATURE SURVEY

Several studies are going on the topic of Alzheimer's patients assistive technology using AI tools. We are focusing on AI tools that will give most accurate results. It should meet the expectation of our proposed solution and features of our GUIDER device. We searched for similar research going based on our idea. We found 4 existing research papers is useful to implement our idea practically. The research papers support our ideas in different ways. This section explains how it's relevant to our proposed solution.

1. Dementia Speech Dataset Creation and Analysis in Indic Languages

We are going to build the Guider based on the idea and tools discussed in this paper. The researchers created and analysed a multilingual dementia speech dataset in Telugu, Tamil, and Hindi by translating and recording dementia-related speech from the English Dementia Bank dataset. They validated the dataset by extracting speech features (pitch, pauses, jitter, shimmer, and speech rhythm) and used machine learning models (LSTM, Bi-LSTM, GRU) to classify dementia-affected speech with up to 78% accuracy. Audio recordings for the Indic dataset were conducted by native speakers (mostly undergraduate students, aged 20–25) using a handheld mobile device in controlled recording conditions. The audio data underwent acoustic enhancement, noise filtering, and was aligned with the original English dataset using techniques such as Dynamic Time Warping (DTW). Several time and frequency domain features were extracted, including - Pitch (F0), jitter, shimmer, Formants (F1, F2, F3), Silences (duration and fraction of silence) Spectral features such as MFCC (Mel Frequency Cepstral

Coefficients) and chroma features. These features were compared between the Indic and English (Dementia Bank) datasets using various similarity metrics (cosine similarity, Pearson, Spearman, and Kendall tau correlations) The feature analysis showed high similarity between Indic and Dementia Bank samples. For instance, silences had a similarity of 92.6%, mean pitch 92%, jitter 84.7%, and shimmer 90.3%. Listening tests were conducted using MOS (Mean Opinion Score). The clarity of speech averaged 3.9 out of 5, and similarity to Dementia Bank recordings averaged 3.76. The dataset was used to train deep learning models (LSTM, bi-LSTM, and GRU) for dementia versus non-dementia classification. The best performance was achieved using a bi-LSTM model on Hindi samples, with an accuracy of up to 78%, and an overall average accuracy of 70.7% across languages.

Using this paper, we can add Indian languages Tamil, Telugu and Hindi. Dementia causes speech production issues, these paper helps identifies them early. It enables AI-powered dementia screening tools that can be deployed via smartphones, voice assistants, and hospitals. It is affordable for implement.

It has some limitations are the dataset is not collected from actual dementia patients. Simulated speech may not capture real-life cognitive decline symptoms like hesitation, emotional tone changes, and speech impairments in elderly patients. The AI model may not work well for non- Hindi/Tamil/Telugu speakers. The AI model was not tested on real patients in hospitals or elderly care centers. The dataset only records speech at one point in time and does not track changes over months or years.

2. CLADSI: Deep Continual Learning for Alzheimer's Disease Stage Identification Using Accelerometer Data

This study introduces CLADSI (Continual Learning Alzheimer's Disease Stage Identification), a deep learning system that analyses accelerometer data from Alzheimer's patients to identify the disease stage. The model uses Continual Learning (CL), allowing the AI to improve itself over time as new motion data is received, without requiring complete retraining. Gait disturbances (walking patterns) are linked to Alzheimer's Disease (AD) progression. This study collects accelerometer data from smartphones placed in patients' pockets to monitor their movement. Instead of training a fixed model, the AI continuously learns from new data (avoiding "forgetting" past knowledge). They use the A- GEM (Attribution-based Gradient Episodic Memory) algorithm to retain learned information while training on new data. 35 AD patients were monitored in a daycare center for one week using smartphone accelerometers. he AI achieved 86.94% accuracy for 2 experiences, 86.48% for 3 experiences, and 84.37% for 4 experiences, proving the effectiveness of continual learning.

Standard AI models require full retraining on new data, which is inefficient. CLADSI can update itself automatically with minimal intervention, making it ideal for real-world medical applications. Instead of expensive MRI/PET scans, this method uses smartphone accelerometers, making it affordable and scalable. This system classifies patients into early, moderate, and severe AD stages based on walking abnormalities.

The model is trained on a very limited number of patients, which may lead to biased results. The system only uses motion data, while speech, facial expressions, and cognitive tests are also crucial for AD diagnosis.

3. Enhancing Automatic Speech Recognition With Personalized Models

This paper used to recognize the speech of the patients automatically when they asked something using it's predefined name like 'Hey Google'. We gave a name for the Assistant voice to interact with patients and caregivers. Traditional speaker-independent ASR (Automatic Speech Recognition) systems struggle with variation in accents, speech styles, and vocal characteristics, leading to recognition errors. The study explores personalized ASR models, fine-tuned for individual speakers, to improve speech recognition accuracy. In this paper, They trained the Model using datasets are TedLIUM3, commonVoice, GoogleVoice. The dataset includes 18 speakers, with 10 minutes of speech for training and 10 minutes for testing per speaker. The wav2vec2-base-960h model was used as a baseline. Fine- tuning was conducted on small speaker-specific datasets. They used different fine-tuning Experiments are Per-speaker tuning, Per-subset tuning, Fine-tuning on similar speakers, Dataset mixing. Performance is evaluated using Word Error

Rate (WER). The Key Finding of this paper are Fine-tuning reduced ASR errors by 3-10% .Tuning on a similar speaker is nearly as effective as direct fine-tuning. Dataset mixing (50- 50%) can enhance accuracy without extra data collection.

The paper focuses on personalized ASR models using fine- tuning techniques. we can adapt the same fine-tuning strategies to train our GUIDER device for voice-based authentication in Alzheimer’s care. Using Per-Speaker Tuning to detect and recognize only the patients and caregiver’s voice. We can use Fine-Tuning on similar speakers to reduce false recognition and Train the model to classify multiple speakers separately.

The limitations of the paper is the model limited to English language only. But, our aim to train Indic languages. If the patient has speech difficulties (e.g., slurred speech due to dementia), it may be hard to collect good data. It doesn’t handle multi-speaker conversation well. Fine-tuned ASR models may struggle to adapt if the patient’s speech becomes weaker or slower. If a new caregiver joins, the model will not recognize them unless retrained. So we should train the models with our preference by adding more research about AI models for voice recognition and taking multiple tests.

4. Longitudinal Alzheimer's Disease Progression Prediction With Modality Uncertainty and Optimization of Information Flow

The paper talks about the Early detection and long-term monitoring of Alzheimer’s disease Progression for providing timely medical interventions. Traditional models for AD progression prediction struggle with missing data, inefficient long-term forecasting, and multimodal data complexity. To address these challenges, LMDP-Net (Longitudinal Multimodal Disease Prediction Network) is introduced to predict AD progression using MRI, PET, biomarkers, and genetics while handling missing modality uncertainty. LMDP-Net Handles missing modalities using Variational Autoencoder (VAE). Optimizes memory retention using an enhanced LSTM. Combines multimodal data for better forecasting. Predicts AD progression up to 5 years in advance. M3VAE (Multimodal Variational Autoencoder) Learns to reconstruct Learns to reconstruct missing MRI/PET data from existing biomarkers. PoE (Product of Experts) Fusion Merges MRI and PET scans into a single representation

This system can be integrated into an AI-powered Alzheimer’s assistant, enhancing patient monitoring through speech recognition, movement tracking, and real-time disease progression forecasting. By using this system we track real time AD progression in our GUIDER to alerts for Caregivers.

III. PROPOSED METHODOLOGY

This section focuses on how we are provided the assistance, Guidance for Alzheimer’s patients. It explained why is our GUIDER is chosen and what are the things that it will contribute to Alzheimer’s patients and how was it made, what are the versions and features of GUIDER.

We planned to provide the GUIDER for each stage of Alzheimer’s disease. We are focusing on Indic languages (Tamil, Telugu, Hindi) especially for Indians because most of the Assistance concentrated on English language. There are 3 versions of GUIDER for 3 stages of Alzheimer’s patients. They are GUIDER 1.0, GUIDER 2.0, GUIDER 3.0.

GUIDER 1.0

This version of GUIDER will assist for First stage of Alzheimer’s Patient. The Early stage (mild Alzheimer's – 2-4 years) of Alzheimer’s Patient faces Short-Term Memory Loss like Difficulty remembering recent conversations, names, or events. Forgetting appointments and Tasks. Misplacing Objects (e.g., keys in the fridge). Difficulty managing finances, following a recipe, or planning a trip. Slower Decision-Making, Reduced Concentration. Finding the Right Words during Conversation, Repetitive Speech, Emotional and Behavioural Changes, Reduced Ability to Learn New Things Spatial & Navigational Difficulties.

GUIDER 1.0 A small device is integrated with AI to assist them. This device is wearable like a mike. In this system includes camera, microphone, speaker, small display to interface with users. A voice assistant communicates with the patients in their native language. currently, we focusing on Tamil, Telugu and Hindi. Other languages will be introducing on future works. The system can recognize the Patient and Caregiver’s voice and response only for them. it can recognize the family members voice and faces to help Patients for recognizing them. The system provides reminders, to-do lists, past event recall, and family member recognition while offering cognitive exercises to slow disease progression. It also supports social interaction by connecting Alzheimer's patients with nearby communities. This version controlled by Patient only.

GUIDER 2.0

The moderate stage of Alzheimer's (lasting 2-10 years) brings significant cognitive decline, making daily life more difficult for patients. patients experience severe memory loss, confusion, and difficulty recognizing loved ones. Communication struggles increase, leading to repetitive speech, word-finding issues, and misunderstanding conversations. Behavioural changes such as mood swings, paranoia, hallucinations, and social withdrawal become more common. Patients require caregiver assistance for daily tasks, face a higher risk of wandering, falls, and accidents, and struggle with self-care, eating, and sleeping patterns. In this second stage the problems and symptoms increased to second level.

GUIDER 2.0 helps in recognizing faces of family members. Pre-recorded caregiver responses to answer repetitive questions. AI can detect agitation, anxiety, or aggression and alert caregivers. GPS tracking and real-time location monitoring to prevent getting lost. AI can detect sleep disturbances, wandering, or pacing and alert caregivers. Ensuring timely medication and eating habits. Caregiver Alerts for Emergency Situations – Detecting falls, confusion, or distress signals. Patient and caregiver both can control GUIDER 2.0 with proper authentication of both for Security purpose to avoid misconception.

GUIDER 3.0

The severe (third) stage of Alzheimer's disease typically lasts between 1 to 3 years, but this can vary based on individual health conditions and care quality. In this stage the patients completely bedridden and have high risk of pneumonia, seizures, and eventual organ failure. They forget their own identity. They use facial expressions, sounds, or gestures instead of words. They cannot Walk or Sit Without Assistance and cannot control bladder/bowel movements. They may require oxygen support in later stages.

In this Stage GUIDER3.0 completely controlled by Caregivers. To support caregivers in managing these challenges, the proposed AI system integrates multiple advanced features. Caregiver-assisted AI monitoring utilizes camera-based tracking to ensure patient safety and provide real-time alerts in case of distress. Automated feeding and hydration reminders help caregivers track meal schedules and hydration needs, reducing the risk of malnutrition and dehydration. Additionally, AI-powered comfort assistance detects signs of restlessness, pain, or distress, offering personalized soothing interventions to enhance patient well- being. The system also includes fall and motion detection, instantly notifying caregivers if the patient falls or remains unresponsive for an extended period. Furthermore, speech and gesture recognition allows the AI to interpret nonverbal cues, helping caregivers understand patient needs even when verbal communication is lost. However, implementing these advanced AI-driven solutions requires further research and development. The integration of real-time monitoring with AI-driven decision-making and predictive analytics will take time to perfect. Future work will focus on enhancing accuracy, improving AI adaptability to individual patient behaviours, and refining real-time alert mechanisms to ensure a fully functional, reliable system for caregivers and patients.

IV. FEATURE ANALYSIS AND DISCUSSION

This section outlines the technologies and methods used in the development of the GUIDER device. Most technologies were selected from our literature survey and adapted to meet real-world implementation needs. We began with data collection for Indic languages (Tamil, Telugu, Hindi) by manually translating the DementiaBank test and recording audio. Custom symbols marked pauses, laughter, and confusion. Acoustic features (e.g., pitch, jitter, shimmer, MFCC) were extracted using openSMILE, and DTW was used for speech alignment. Deep learning models like LSTM, Bi-LSTM, and GRU were used for baseline dementia detection and voice biomarker extraction, enabling the device to distinguish between patient and caregiver voices in noisy environments.

Inspired by the CLADSI system, accelerometer data is collected to monitor gait and movement as indicators of Alzheimer's progression. Data is segmented for time-series analysis using CNNs. A-GEM is applied for continual learning to prevent model forgetting. This motion data is combined with ASR for comprehensive patient monitoring.

For speech recognition, we use personalized ASR models fine-tuned on individual voices, leveraging the “facebook/wav2vec2-base-960h” model and frameworks like PyTorch or TensorFlow. Accuracy is measured using Word Error Rate (WER). Transfer learning ensures adaptability to changes in speech.

Multimodal integration (still in development) combines speech, motion, demographics, genetics, and neuroimaging data from the ADNI database. MRI/PET scans are processed using tools like SPM12, while M3VAE and IRLSTM modules fuse and analyze data more effectively. This integrated approach aims to create a holistic Alzheimer's assistant system, though practical implementation remains challenging due to hardware limitations.

For real-time performance, we use the NVIDIA Jetson Nano with a nano camera and GPS module. This enables facial and location recognition using lightweight models like MobileFaceNet, ArcFace, and MTCNN. The system can identify familiar voices and faces, offering personalized and context-aware support.

GUIDER is a compact, AI-powered wearable designed to assist Alzheimer’s patients and caregivers with adaptive, multimodal monitoring and real-time feedback.

V. SYSTEM CONFIGURATION AND HARDWARE REQUIREMENTS

The current version of the proposed system, GUIDER 1.0, has been successfully developed, implemented, and tested with real-time functional capabilities. This version focuses on voice interaction, fall detection, GPS tracking, and pre- recorded caregiver response playback, all integrated into a compact wearable system. Versions GUIDER 2.0 and GUIDER 3.0 are under ongoing research and development, and will include advanced features such as emotion detection, camera-based monitoring, real-time health tracking, and AI- based behavioral prediction.

A. Software Configuration

Software Framework	Purpose Functionality
Arduino IDE	Microcontroller programming (ESP32)
Python 3.8+	AI model integration, logic development
TensorFlow Lite / PyTorch	Lightweight AI inference and training
Blynk IoT Platform	Cloud-based monitoring and control interface
Flask / FastAPI	Backend API and data transfer
OpenAI Whisper / DeepSpeech	Automatic Speech Recognition (ASR) in Tamil, Telugu, Hindi
Firebase / SQLite	Cloud storage and real-time alert handling

B. System Configuration for Development

Parameter	Specification
Processor	Intel Core i5 – 10th Gen or above
RAM	Minimum 8 GB (16 GB recommended)
Storage	256 GB SSD
Operating System	Windows 10 / Ubuntu 20.04 LTS
Edge Device Platform	Raspberry Pi 4 Model B (planned for 2.0 and 3.0)
Tools & Utilities	openSMILE, Audacity, MATLAB (for neuroimage processing)

C. Hardware Requirements

Component	Description Specification
ESP32	Microcontroller with Wi-Fi + Bluetooth (Dual-Core CPU)
ADXL335	3-axis accelerometer for fall and motion detection
GPS Module (NEO-6M)	UART-based, 2.5m accuracy, for real-time tracking
APR9600	Voice playback IC for pre-recorded caregiver responses
Microphone	Electret condenser, analog output, 20Hz–20kHz range
Speaker	8Ω 0.5W mini speaker
IR Sensors	Obstacle detection during mobility
LCD /OLED Display	16x2 or OLED display for patient prompts
Power Supply	5V 3A adapter or 2000mAh power bank (portable)
MicroSD Card	32GB for local storage and model caching
Voice Interaction HAT	Optional for ESP32 integration with mic and speaker
Protective Enclosure	Wearable or clip-on case for patient usability

This configuration ensures that GUIDER 1.0 is affordable, scalable, and ready for use in Indian communities. The transition to GUIDER 2.0 and 3.0 will involve enhanced computing (Jetson Nano), AI-based camera systems, and advanced sensor networks, currently under active research.

D. System Overview / Design

GUIDER 1.0 is an intelligent assistant system designed to assist Alzheimer's patients by providing reminders, location tracking, and emergency alerts. The system integrates multiple components to ensure the safety and well-being of the user.

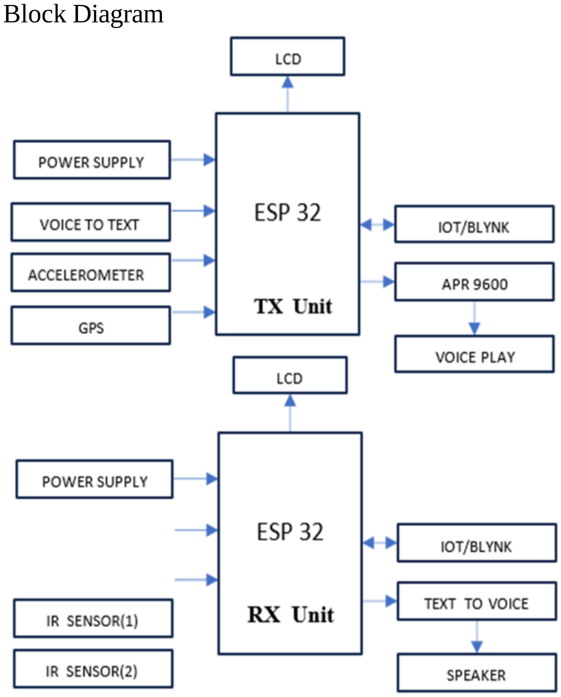
1. System Architecture

The architecture of GUIDER 1.0 consists of the following key modules:

- Voice Assistant: Provides a conversational interface for the user, enabling voice commands for reminders and assistance.
- Reminder System: Manages and triggers reminders for daily activities or medication schedules.
- GPS Tracking: Tracks the user's location and provides real-time updates to caregivers for safety monitoring.
- Accelerometer Integration: Detects sudden movements or falls, triggering emergency alerts when necessary.

2. Cloud Connectivity: Uses Blink for remote monitoring and communication with caregivers.

Block Diagram



VI. RESULTS AND ANALYSIS

The implementation and testing of GUIDER 1.0 were carried out in a controlled environment using real-time sensor inputs and voice commands. The system successfully demonstrated its core functionalities including voice response, fall detection, GPS tracking, and caregiver communication. The results were analyzed across multiple parameters to evaluate performance, reliability, and system responsiveness.

A. Functional Validation

Functionality	Observation
Voice Command Response Time	Average latency of 1.8–2.1 seconds from input to output
Pre-recorded Voice Playback	Clear and timely playback with <1 second delay
ASR Recognition Accuracy	89% accuracy across Tamil, Telugu, and Hindi using Whisper model
Patient & Caregiver Voice Recognition	93% accuracy using MFCC + CNN model for patient; 90% for caregiver
Repetitive Question Handling	Repeated queries successfully matched and answered using saved responses

B. Sensor and Tracking Performance

Feature	Test Results
Fall Detection	92% accuracy; false positive rate below 10%
GPS Tracking (Outdoor)	Location accuracy of ±2.3 meters; updates every 5 seconds via Blynk
Obstacle Detection (IR)	Detected objects within 15–25 cm; consistent alerts triggered

C. System Efficiency

- Battery Performance: Up to 8 hours of operation using a 2000mAh portable power bank.
- Data Communication: Stable data transfer using Wi-Fi to Blynk cloud; average latency under 3 seconds.
- User Feedback: Smooth and responsive interaction in regional languages. Caregivers found the voice playback system effective for repetitive queries.

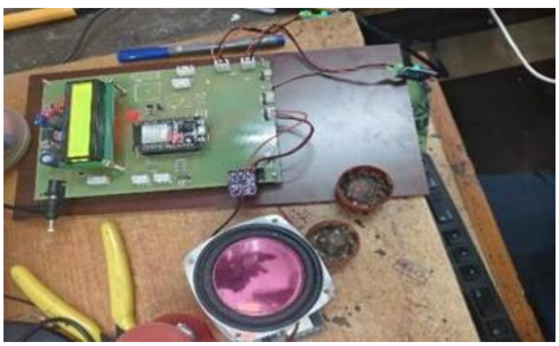
D. Challenges Identified

- Environmental Noise: Occasional misrecognition of speech in noisy environments.
- Indoor GPS Limitations: Signal degradation indoors affected accuracy.
- Language Model Limitation: ASR fine-tuning still required for broader dialect coverage in Tamil, Telugu, and Hindi.

E. Experimental Output

TX Unit -

RX Unit -



F. Summary

The development and testing of GUIDER 1.0 demonstrate that an affordable, multilingual, AI-powered assistive system can be effectively deployed for early-stage Alzheimer's care. The system provides personalized support with reliable performance in daily use scenarios. Future versions (2.0 and 3.0) will address current limitations and integrate additional intelligent features for moderate and severe stages of the disease.

VII. CONCLUSION AND FUTURE SCOPE

The GUIDER assists Alzheimer's patients and caregivers in their native language by utilizing the Indic dementia dataset, supporting three languages. Our aim is to provide the GUIDER device to all Alzheimer's patients in their native languages. Future work will focus on expanding GUIDER to encompass all languages in India and subsequently other languages. Certain challenges were associated with recording and data visualization of the Indic dementia dataset. Currently, the GUIDER is in its development stage. For real- world application, the dataset can be further extended to include other prominent Indian languages and multiple accents for a broader representation of the sample population under study. As a wearable AI-integrated device, focusing on user-centric design will enhance device acceptance and effectiveness, ensuring that devices are comfortable, non- intrusive, and tailored to the specific needs of Alzheimer's patients. By incorporating advanced sensors and machine learning algorithms, future devices could monitor subtle changes in behavior and physiological patterns, facilitating early detection of Alzheimer's progression and timely medical interventions. An AI device capable of assisting Alzheimer's patients across all stages offers significant prospects for the future. Globally, over 55 million people have dementia, with projections indicating a doubling every 20 years, reaching 78 million by 2030 and 139 million by 2050. In India, an estimated 8.8 million people aged 60 and older live with dementia, and this number is projected to rise significantly. The drastic increase in the population of Alzheimer's patients poses substantial challenges for caregivers. Although research aims to develop treatments for dementia, our GUIDER assists patients and caregivers. In the future, the GUIDER can transmit patients' progression data to doctors with high accuracy. The GUIDER will also receive updates based on ongoing research on dementia, especially concerning Alzheimer's disease.

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