T$O Gen-AI Hackathon – Guardian AI Submission Document

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Project Title: Guardian AI – A Fully Independent Gen-AI Emergency Wearable

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1. Problem Statement

In India, over 140 million elderly individuals are vulnerable to falls, blackouts, and silent emergencies—especially when living alone. Existing devices rely on physical buttons or static sensors that fail when the user is unconscious, disoriented, or unable to react. What's truly missing is **understanding.** Can a device not only detect a fall, but **listen, comprehend, and decide** what to do—just like a human would? Guardian AI aims to solve this gap using Generative AI, by turning an emergency wearable into a voice-powered, context-aware **AI caregiver** that understands distress through natural speech and acts accordingly.

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2. Target Audience & Context

Our solution targets elderly individuals who live independently, particularly those prone to falls or sudden confusion. The supporting users are their caregivers—family or professional care staff. In India and globally, most elderly alert systems fail when users are unable to trigger them. These gaps are worsened in rural areas where smartphone literacy is low and emotional health often goes unmonitored. Guardian AI fills this gap by combining **natural speech understanding**, **emotion sensing**, and **offline responsiveness**, built into an affordable wearable. It eliminates dependence on apps, making it accessible, inclusive, and scalable.

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3. Use of Gen-AI

Guardian AI puts Generative AI at the center of care-critical logic. Upon detecting an emergency trigger, the wearable initiates a voice prompt. The user's reply is transcribed using **OpenAI Whisper**, supporting Indian regional languages and slurred/low-volume elderly speech. This text is passed to **GPT-4o** to:

1. Classify urgency: OKAY / DISTRESS / EMERGENCY
2. Detect emotional tone (confusion, fear, silence)
3. Generate a context-rich caregiver alert

Whisper and GPT-4o together create a speech understanding loop that mimics human-level interpretation. These outputs are then dispatched via SMS or email using APIs. We also use large language models (LLMs) to generate empathetic, multilingual responses that adapt to user tone and urgency, ensuring clarity and emotional intelligence in critical situations.

Gen-AI API Stack:

- **OpenAI Whisper –** multilingual STT (*primary*)
- **Vosk –** multilingual STT -- offline (*fallback only*)
- **GPT-4o** – LLM for emergency reasoning + caregiver alert generation
- **Claude 3 –** fallback LLM for high-reliability messaging
- **Hume AI –** tone/emotion detection (*phase 2*)
- **Cohere RAG –** contextual memory and incident logging (*phase 2*)
- **ElevenLabs (***or Google TTS***) –** multilingual voice prompts

These Gen-AI components allow Guardian AI to detect, understand, and act — just like a voice-enabled caregiver.

LM Usage Overview:
Large Language Models (LLMs) form the decision-making core of Guardian AI's emergency response system. Upon receiving transcribed voice input, GPT-4o performs real-time classification and message generation—crafting high-clarity, emotionally appropriate SMS and email alerts. These alerts are instantly routed through automated dispatch APIs: SMS to caregivers for non-critical situations, and escalation to both caregivers and nearby hospitals for EMERGENCY-classified cases. The language, tone, and urgency cues are adapted dynamically for each recipient. Claude 3 Opus ensures redundancy and enhances reliability for structured and multilingual message generation. The system is engineered to maintain a total roundtrip latency under 300ms, ensuring alerts are not just intelligent, but immediate and actionable.

LLM Prompt Example:

Instruction: Classify the message below and generate a caregiver alert.
User: "*I feel really bad, I can't stand up*."
Output:Classification: EMERGENCY

Alert: *"⚠️ Fall detected. User said: 'I feel really bad, I can't stand up.' Immediate attention needed*."

Guardian AI uses **Gen-AI** not as an add-on but as the **core processor of emergency logic**.

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4. Solution Framework

System Architecture (Gen-AI first):

Emergency trigger (fall or stillness) → Voice prompt→ User reply → Whisper (STT) → GPT-4o (reasoning) → GPT-4o classifies situation → Generates message → Triggers SMS alert→ BLE optional app logs event

48-Hour Plan (Timeline Breakdown):

Timeframe	Task
0–6 hours	Fall detection trigger setup, voice prompt playback implementation
6–12 hours	Audio capture + integration with Whisper API
12–18 hours	GPT-4o classification prompt design and response testing
18–24 hours	Caregiver message generation logic and SMS dispatch setup (eSIM)
24–30 hours	BLE dashboard UI for caregivers + local logging
30–36 hours	Vosk integration for offline fallback transcription
36–42 hours	Simulated end-to-end testing of full Gen-AI workflow
42–48 hours	Final tuning, documentation and stage ready

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5. Feasibility & Execution

Our team has already developed BLE alerts, ESP32 mic/audio input, and a backend that connects to Whisper and GPT-4o APIs via Flask. Prompt logic and SMS trigger templates are functional. We have a realistic execution scope with optional offline fallback (TinyML/Vosk) if connectivity drops. The AI processing pipeline has been tested with simulated data. We will complete a working demo with real voice classification in 48 hours.

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6. Scalability & Impact

Guardian AI can deploy across:

- Elderly homes, solo households, rural caregivers
- NGOs supporting dementia or Parkinson's patients
- Hospitals looking for intelligent emergency escalation

Our Gen-AI-first approach is scalable across languages, users, and geographies. The speech pipeline can evolve into chronic condition tracking or sentiment-based mental health alerts.

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7. Conclusion & Minimum Lovable Product

Guardian AI isn't about sensors—it's about **language understanding in real-time danger**. Our MVP includes: fall/stillness detection, voice prompt, Whisper + GPT-4o classification, SMS alert with caregiver language. It requires no smartphone, and speaks the language of care.

Citations:

- Whisper STT: https://openai.com/research/whisper
- GPT-4o: https://openai.com/gpt-4o
- Claude 3: https://www.anthropic.com/index/claude
- Hume AI: https://www.hume.ai/
- Cohere: https://docs.cohere.com/
- Vosk STT: https://alphacephei.com/vosk/
- WHO Elderly Stats: https://www.who.int/news-room/fact-sheets/detail/ageing-and-health