# PROJECT GENOVA — REMORA

### 1. Problem Statement

People with dementia often forget names, faces, events, and what they're doing — leading to confusion, repeated questions, and emotional stress. Most existing tools are either too basic or don't adapt to the person's life. They lack context, personalization, and data privacy. Our solution — **Remora** — is a personalized memory assistant designed to help people recall their day-to-day life through voice, photos, and smart notifications. It builds and recalls memories contextually, supports caregivers, and keeps the user oriented throughout the day. It works fully on-device and evolves with the user — without needing the internet or storing sensitive data on the cloud.

### 2. Target Audience & Context

Remora is built for people in the early to moderate stages of dementia — especially those who can interact via voice or touch. The app is designed for use in Indian households but supports any user who needs personalized memory help. It also includes features for caregivers who support or monitor the user. Whether the user is living independently or with family, Remora works locally on their phone to help them remember people, places, and routines — and keeps their family informed and reassured via a separate dashboard.

### 3. Use of Gen-AI

Remora uses lightweight Generative AI in the following ways:

- **Query Understanding**: When a user asks "Who is this?" or "Where was I yesterday?", we use a fine-tuned DistilBERT model for Gen-AI-based intent detection.
- **Context Summarization**: TinyLlama or Phi-2 (running via ONNX Runtime) generates personalized summaries based on journal data and past interactions.
- **Memory Matching**: Image-based face recognition uses FaceNet and CLIP embeddings to retrieve semantically and emotionally relevant memory entries
- **Speech-to-Text**: Whisper Tiny runs on-device to transcribe voice inputs without relying on cloud services.
- **Reminders & Routine Detection**: Gen-AI identifies daily activity patterns and dynamically creates lock screen cues and behavioral nudges.
- **Privacy-Preserving Learning**: Through **Federated Learning**, our models update using user behavior locally — applying Gen-AI personalization while ensuring no data is transmitted off-device. TensorFlow Federated enables this adaptive training securely and efficiently.

All Gen-AI components run fully on-device, making Remora private, responsive, and context-aware — even without internet access.

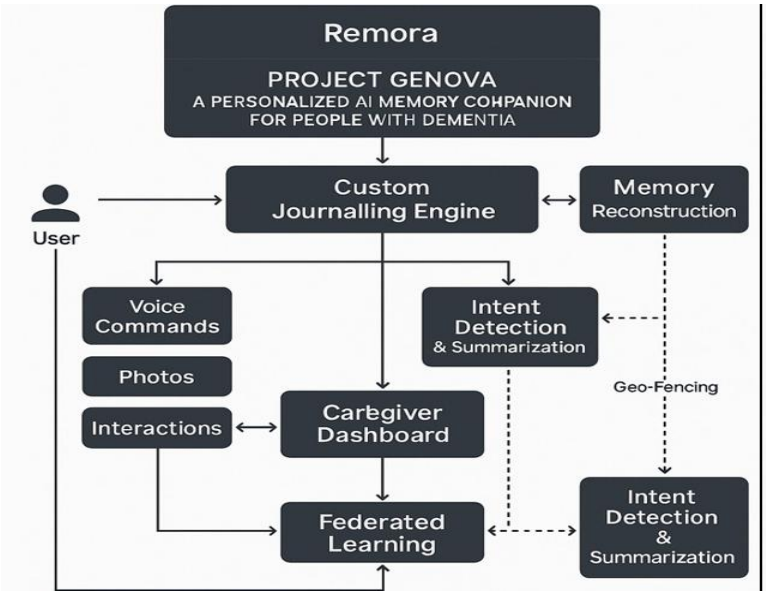
### 4. Solution Framework

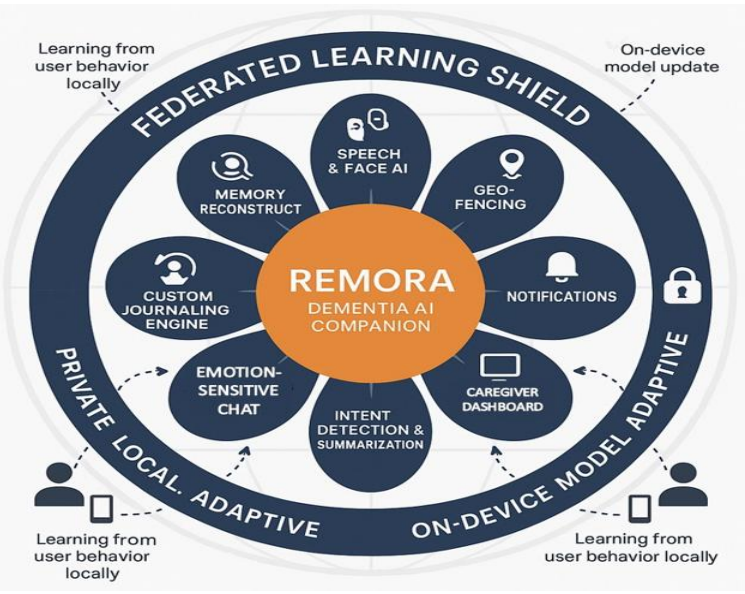
Remora is a mobile app that helps users with dementia **remember people, events, and routines** using a personalized journaling system and AI logic built from scratch.

- When a user speaks or uploads a photo, Remora creates a memory entry by logging their action with metadata (timestamp, tags, etc.).
- If they forget someone, they can click a photo. The app detects faces using **MediaPipe + MobileSAM**, generates embeddings with a **custom FaceNet, CLIP model**, and finds the closest past match.
- When the user asks something like "Who is this?" or "Where was I yesterday?", the query is processed by our **DistilBERT intent model**, which pulls related memory entries. These are summarized using **TinyLlama** (or Phi-2) running locally via ONNX.
- Remora also learns daily behavior patterns — and shows **lockscreen reminders** like "You're at home" or "It's time for lunch."
- To avoid disengagement, it sends **gentle time-to-time notifications** so the user doesn't forget about the app.
- A **Geo-Fencing module** monitors the user's location. If they move beyond a 3 km safe zone, their caregiver is notified with a live location update.

- The **Caregiver Dashboard** lets families set medicine reminders, see daily activity, and get nudges like "Alert if Dad hasn't logged anything today."
- **Federated Learning** (via TensorFlow Federated) ensures that the app adapts over time, learning from behavior — without sending any data outside the device.

Every feature works offline and is designed to run smoothly on mid-range smartphones.




**5. Feasibility & Execution**

The entire system is built using Flutter for frontend and Firebase for real-time sync.

- **MediaPipe + MobileSAM** handle image face detection
- **Whisper Tiny** runs speech-to-text
- **DistilBERT** and **TinyLlama** are hosted locally using **ONNX runtime**
- **TensorFlow Federated** handles adaptive learning
- Geo-fencing and map tracking are powered by Google Maps SDK
- We've modularized every component to ensure seamless execution within the **48-hour hackathon**. Our final build will include:

✔ Journaling (Flutter, SQLite)
✔ Memory Reconstruction (MediaPipe, FaceNet, CLIP)
✔ Lock Screen Cues & Notifications (behavior-based triggers)
✔ Geo-Alerts (Google Maps SDK)
✔ Caregiver Dashboard (Firebase, Flutter Web)

All powered by GenAI (DistilBERT, TinyLlama via ONNX) and on-device Federated Learning (TensorFlow Federated) — built entirely with original logic, not off-the-shelf tools.

**6. Scalability & Impact**

Remora is designed to grow with its users. Its core features — memory journaling, face recall, reminders, and caregiver tools — run directly on the device, making it accessible even in areas with limited internet. This allows Remora to reach elderly users in both urban and rural settings without needing heavy infrastructure. The true impact lies in restoring a sense of control, confidence, and connection for people with dementia, while reducing the emotional burden on families. Over time, Remora can evolve into a full ecosystem for memory care, supporting communities through partnerships with elder care homes, hospitals, and mental health NGOs.

**7. Conclusion & MLP**

Remora is not just an app — it's a compassionate AI memory companion designed to restore autonomy, dignity, and connection for those living with dementia. Every feature is built from scratch, focused on real-world usability, privacy, and care.

Our Minimum Lovable Product (MLP) includes a freemium mobile app with core features like journaling, face-based recall, reminders, and geo-alerts. The caregiver dashboard is offered as a subscription-based SaaS. We plan B2B partnerships with elder care homes, NGOs, and health tech providers to integrate Remora into larger care ecosystems.