

## **Background:**

Alzheimer's disease (AD) is one of the most common neurodegenerative disorders, affecting millions worldwide. Early diagnosis can significantly improve quality of life and treatment effectiveness, but traditional detection methods are often costly, complex, and delayed. In many regions, especially rural and under-resourced areas, the lack of medical expertise and diagnostic infrastructure further worsens timely detection.

There is a need for a **cost-effective, AI-driven solution** that can assist healthcare professionals, caregivers, and families in identifying and monitoring Alzheimer's progression efficiently.

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## **Challenge:**

Develop an **AI-powered analysis platform** for **early detection, diagnosis, and progression tracking** of Alzheimer's disease using diverse data sources such as:

- **Medical imaging** (MRI, CT, PET scans),
- **Cognitive or behavioral tests**, or
- **Speech and facial expression analysis**.

## **The solution should aim to:**

- Provide **predictive analysis** using AI/ML to identify early signs or risk factors.
  - Be **cost-efficient** and **accessible** for both urban and rural healthcare environments.
  - Support **low-resource scenarios**, functioning even with **limited connectivity or local data storage**.
  - Offer an **intuitive dashboard** for doctors and caregivers to visualize patient progress and AI-based insights.
  - Ensure **data privacy and ethical AI** compliance in healthcare applications.
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## **Technical Expectations:**

Participants are encouraged to incorporate:

- **Machine learning or deep learning** models trained on medical or behavioral datasets.
  - **Explainable AI (XAI)** for interpretable decision-making in health diagnostics.
  - **Offline-ready systems or edge AI solutions** to work in low-connectivity zones.
  - **Visualization dashboards** for tracking patient cognitive decline trends.
  - Integration of **natural language or audio processing** to detect speech-related cognitive impairments.
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## **Impact Goal:**

Create an intelligent, affordable, and accessible platform that leverages AI to **bridge the diagnostic gap** in Alzheimer's care—enabling early detection, improved monitoring, and greater support for healthcare providers and families worldwide.

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## **Expected Deliverables:**

- A **working prototype or MVP** capable of analyzing or predicting Alzheimer's progression.
- A **technical report or presentation** describing data sources, AI models, and ethical considerations.
- Demonstration of **scalability, affordability**, and **social impact** in real-world healthcare contexts.