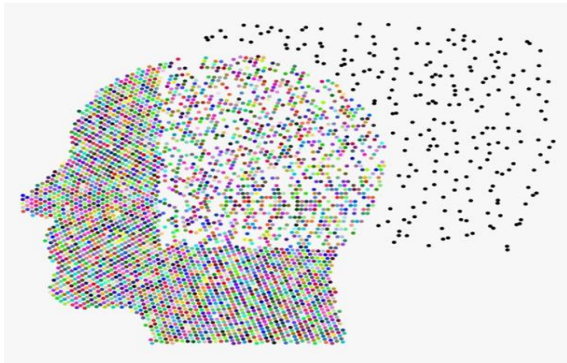# Design Thinking Project Workbook

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Don't find customers for your product but find products for your customers

1. Team

Team Name:

Team Logo (if any):

Team Members:

    1. V. Sai

    2. K. Harshavardhan

    3. A. Mukesh

    4. D. Manideep

2. Problem/Opportunity Domain

Domain of Interest:
In the domain of dementia prediction using machine learning (ML), the focus would likely be on healthcare, particularly in early detection and prevention of neurodegenerative diseases. This could involve applying ML to analyze medical data, such as brain scans, genetic information, and lifestyle factors, to predict the onset of dementia.

Description of the Domain:
Medical Imaging: MRI, PET scans to identify early structural changes in the brain.
Genetic Data: APOE gene and other genetic markers associated with dementia risk.
Cognitive Tests: Standardized tests such as the Mini-Mental State Exam (MMSE) for tracking cognitive decline.
Data Privacy & Security: Handling sensitive medical data poses significant privacy concerns, requiring strict adherence to regulations like HIPAA.
Data Quality & Availability: High-quality, labeled data is necessary for effective model training. Missing, incomplete, or biased datasets can lead to inaccurate predictions.

Why did you choose this domain?
Improving Patient Outcomes: Dementia is a growing global health issue, affecting millions of individuals and their families. Early detection could delay the onset and progression of the disease, enhancing the quality of life for patients.
Aging Population: With the global population aging, the incidence of dementia is expected to rise sharply. By 2050, over 130 million people are projected to suffer from dementia globally. There is significant demand for better diagnostic and predictive tools.
Lack of Early Detection Tools: Currently, most dementia diagnoses happen after significant cognitive decline has occurred, limiting treatment options. ML models can help identify individuals at risk before symptoms are clinically observable.

3. Problem/Opportunity Statement

Problem Statement:

Delaying Progression: Early prediction enables timely interventions such as medication, cognitive therapy, and lifestyle changes, which can delay the progression of dementia, potentially preserving cognitive function for longer periods. The problem, therefore, is the lack of accessible, accurate, and early-stage prediction tools for dementia.

Problem Description: Dementia is typically diagnosed only after noticeable cognitive decline has occurred, by which time treatment options are limited and less effective. Current diagnostic methods rely heavily on clinical assessments, brain imaging, and cognitive tests that often detect dementia too late for early intervention. Additionally, these methods struggle to handle the vast and complex medical data required to accurately predict dementia risk in its earliest stages**.**

Context (When does the problem occur): Dementia is often diagnosed only after cognitive symptoms become apparent, such as memory loss or confusion. By this time, the disease has usually progressed to a stage where interventions are less effective**.**

Alternatives (What does the customer do to fix the problem): These alternatives are either reactive or offer limited predictive capabilities, often leaving patients with few effective options for early-stage intervention. The goal of ML based dementia prediction is to provide more proactive, precise, and scalable tools for early detection.

Customers (Who has the problem most often): Caregivers, particularly family members of individuals showing early signs of cognitive decline, are deeply affected by the delay in diagnosis and the uncertainty surrounding disease progression. They are often the first to notice symptoms and seek more efficient tools for early detection.

Emotional Impact (How does the customer feel): These emotional impacts highlight the urgent need for more effective, early-stage dementia prediction tools, as they address deep-seated fears, frustrations, and desires for greater control and clarity over a complex and distressing condition.

Quantifiable Impact (What is the measurable impact):

Rising Global Costs.

High Per-Patient Cost.

Healthcare System Strain.

Lost Productivity for Caregivers.

Increased Long-Term Care Facility Demand.

Alternative Shortcomings (What are the disadvantages of the alternatives):

1)Delayed Diagnosis and Intervention

 2)Limited Home Care Options:

3)Cost Barriers

 4) nadequate Training for Caregivers

5)Capacity Limits

 Any Video or Images to showcase the problem:
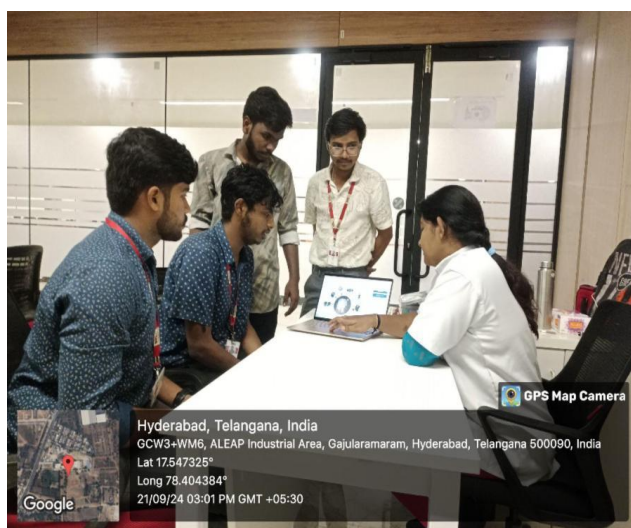
4. Addressing SDGs

Relevant Sustainable Development Goals (SDGs):

Good Health and Well-Being

• This goal aims to ensure healthy lives and promote well-being for all at all ages. Early dementia prediction can significantly improve health outcomes, allowing for timely interventions that enhance the quality of life for patients and their families.

How does your problem/opportunity address these SDGs?:

Good Health and Well-Being

• **Improved Health Outcomes:** By implementing machine learning tools for early dementia prediction, healthcare providers can identify at-risk individuals sooner. This leads to timely interventions that can slow disease progression, reduce complications, and enhance overall patient well-being.

• **Preventive Care Strategies:** Early detection allows for the development of personalized preventive care plans, ultimately reducing the incidence of severe dementia and related health issues.

5. Stakeholders

Answer these below questions to understand the stakeholder related to your project

1. **Who are the key stakeholders involved in or affected by this project?**
   Patients, families, healthcare providers, researchers, technology developers, policymakers, caregivers, and insurance companies.

2. **What roles do the stakeholders play in the success of the innovation? Patients** seek timely diagnosis; healthcare providers need reliable tools; researchers aim for funding and data access.

   3. What are the main interests and concerns of each stakeholder?
   Patients seek timely diagnosis; healthcare providers need reliable tools; researchers aim for funding and data access.

   4. How much influence does each stakeholder have on the outcome of the project?
   Patients and healthcare providers have high influence; technology developers and policymakers also play significant roles.

   5. What is the level of engagement or support expected from each stakeholder?
   Active engagement from patients and families; collaborative support from healthcare providers and researchers.

   6. Are there any conflicts of interest between stakeholders? If so, how can they be addressed?
   Patients may seek more care than insurance covers; address this through advocacy and negotiations.Use regular updates, feedback loops, and stakeholder meetings to maintain engagement and share progress.

   7. How will you communicate and collaborate with stakeholders throughout the project?
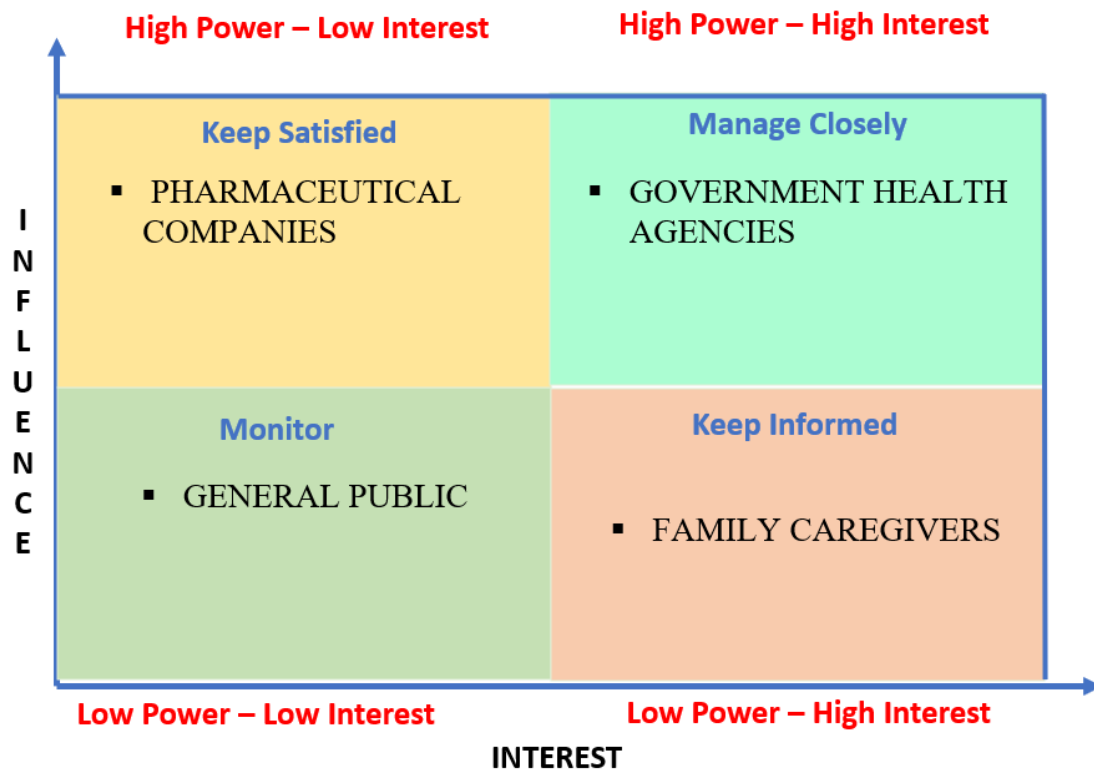   Use regular updates, feedback loops, and stakeholder meetings to maintain engagement and share progress.

   8. What potential risks do stakeholders bring to the project, and how can these be mitigated?
   Resistance to change can occur; mitigate through training and demonstrating benefits of the prediction tools.

6. Power Interest Matrix of Stakeholders

Power Interest Matrix: **Provide a diagrammatic representation of Power Interest Matrix**

High Power – Low Interest   **High Power – High Interest**

INFLUENCE

Keep Satisfied
- PHARMACEUTICAL COMPANIES

Manage Closely
- GOVERNMENT HEALTH AGENCIES

Monitor
- GENERAL PUBLIC

Keep Informed
- FAMILY CAREGIVERS

Low Power – Low Interest   **Low Power – High Interest**

INTEREST

- HighPower,HighInterest:[GOVERNMENTHEALTHAGENCIES]
- HighPower,LowInterest:[PHARMACEUTICALCOMPANIES]
- LowPower,HighInterest:[FAMILYCAREGIVERS]
- LowPower,LowInterest:[GENERALPUBLIC]