Hackathon Project Phases Template for the **Advancing Nutrition Science through Gemini AI web** project.

Hackathon Project Phases Template

Project Title:

Advancing Nutrition Science using GeminiAI

Team Name:

Digital Miners

Team Members:

- M.Veda Shree
- M.Sanjana
- K.Lakshanya
- L.Pravalika

Phase-1: Brainstorming & Ideation

Objective:

To advance nutrition science by utilizing Google Gemini AI to generate accurate and comprehensive dietary analyses and personalized meal recommendations..

Key Points:

1. **Problem Statement:**

   o The heterogeneity of individual dietary needs remains inadequately addressed by current generalized nutritional guidance, leading to suboptimal health outcomes.
   o A critical deficiency exists in the synthesis and personalized application of complex nutritional data, hindering effective dietary management for diverse populations.

2. **Proposed Solution:**

   o **NutriGen AI** is a web application providing secure user authentication and a platform for **accessing nutritional data**, designed for future integration with Gemini AI for personalized dietary recommendations.
   o It offers a web-based interface for food item analysis and user management, with plans to expand functionality via **API integration** and **enhanced AI-driven features.**

3. **Target Users:**

   o **Health-conscious users** and professionals looking for accessible, AI-powered nutritional analysis and recommendations.
   o **Professionals** in the health and **wellness** sector who require AI-powered nutritional analysis and recommendations.
   o **Individuals** seeking personalized dietary insights and meal planning to improve their health and nutritional awareness.

4. **Expected Outcome:**

   o NutriGen AI innovatively delivers secure, user-authenticated access to placeholder nutritional data, paving the way for future generative **AI-powered, real-time dietary insights.**

Phase-2: Requirement Analysis

Objective:

Define the technical and functional requirements for the NutriGen AI web.

Key Points:

1. **Technical Requirements:**

   o Programming Language: **HTML**
   o Backend: **Nde.js (integrated with API)**
   o Frontend: **HTML, CSS, JAVASCRIPT**
   o Database: **Server.js**

2. **Functional Requirements:**

- **Leverage GeminiAI** to analyze nutritional data and create personalized dietary recommendations.
- **Generate tailored mea**l plans and recipes that cater to individual needs and preferences.
- Provide accessible and **understandable nutritional information** to promote healthier choices.
- Facilitate research by identifying patterns and **generating hypotheses** within nutrition science.

3. **Constraints & Challenges:**

- Data quality and privacy are major hurdles in using AI for personalized nutrition.
- **Ensuring AI recommendations** are accurate, trustworthy, and ethically sound is a key challenge.

Phase-3: Project Design

Objective:

Develop the architecture and user flow of the application.
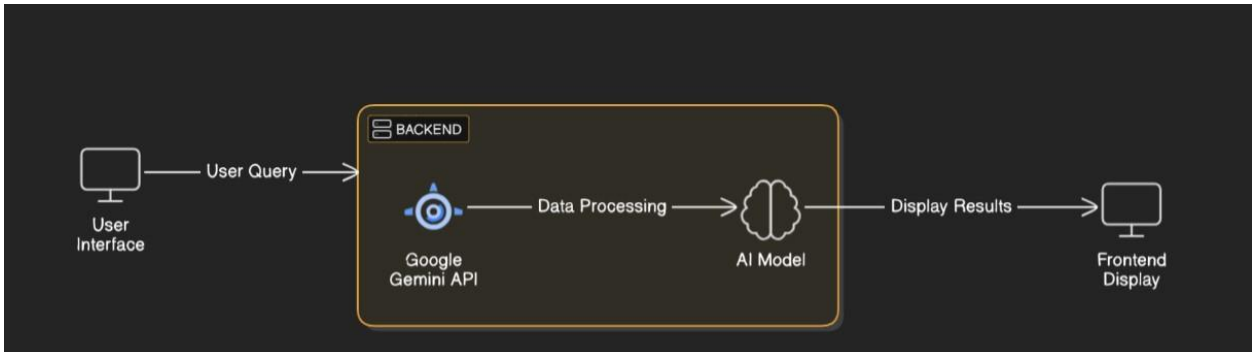
Key Points:

1. **System Architecture:**

- **User Input & Front-End:** Users interact through a web/mobile interface, sending requests to the back-end.
- **Back-End Processing & API Integration:** The server processes requests, integrates with the Gemini API for AI analysis, and manages data.
- **Data Storage & Output:** Processed data is stored/retrieved from databases, and results are delivered back to the user interface.

2. **User Flow:**

   ○ Step 1: Users **log in** or **register** to access the app.
   ○ Step 2: They can then **input** a food item and see its nutritional data.
   ○ Step 3: The app securely stores user **credentials**.

3. **UI/UX Considerations:**

   ○ **Keep the interface clean** and easy to navigate.
   ○ **Provide clear feedback** and helpful error messages.
   ○ **Present nutritional data** in a readable and understandable format.

Phase-4: Project Planning (Agile Methodologies)

Objective:

Break down development tasks for efficient completion.

Sprint	Task	Priority	Duration	Deadline	Assigned To	Dependencies	Expected Outcome
Sprint 1	Data Collection & Preprocessing	◉ High	6 hours (Day 1)	End of Day 1	Veda	Access to high-quality nutrition databases, and Gemini AI integration	Clean, Structured and relevant nutrition data
Sprint 1	Frontend UI Development	◎ Medium	2 hours (Day 1)	End of Day 1	Pravalika & Sanjana	API response format finalized, Gemini AI outputs standard	Interactive UI for users to input nutrition-related queries
Sprint 2	Building Solution	◉ High	3 hours (Day 2)	Mid-Day 2	Lakshanya & Sanjana	Pre-trained Gemini AI model, labelled nutritional datasets	A refined model for accurate nutrition analysis
Sprint 2	Error Handling & Debugging	◉ High	1.5 hours (Day 2)	Mid-Day 2	Veda	API logs, Gemini AI error reports, and user feedback	Improved model accuracy and stability
Sprint 3	Validation & Accuracy testing	◎ Medium	1.5 hours (Day 2)	Mid-Day 2	Pravalika & Lakshanya	Ground truth nutritional data, test cases	Reliable AI driven nutrition insights
Sprint 3	Final Presentation & Deployment	◉ Low	1 hour (Day 2)	End of Day 2	Entire Team	Working AI prototype	Demo-ready AI-powered nutrition tool

Sprint Planning with Priorities

Sprint 1 – Setup & Integration (Day 1)

(◉ **High Priority)** Set up the **environment** & install dependencies.

(◉ **High Priority)** Integrate **Google Gemini API**.

(◎ **Medium Priority)** Build a basic UI with input fields.

Sprint 2 – Core Features & Debugging (Day 2)

(◉ **High Priority)** Implement **search & comparison functionalities**.

(◉ **High Priority)** Debug API issues & handle **errors in queries**.

Sprint 3 – Testing, Enhancements & Submission (Day 2)

(◎ **Medium Priority)** Test API responses, refine UI, & fix UI bugs.

(◍ **Low Priority)** Final **demo preparation & deployment**.

Phase-5: Project Development

Objective:

Implement core features of the Advancing Nutrition Science through GeminiAI.

Key Points:

1. **Technology Stack Used:**

   - **Frontend:** HTML, CSS, JAVASCRIPT
   - **Backend:** Node.js (integrated with API)
   - **Programming Language:** HTML
2. **Development Process:**

   - Personalized nutrition insights via Gemini API.
   - Gemini-powered synthesis of nutrition research.
   - Interactive AI nutrition consultations.

3. **Challenges & Fixes:**

   ○ **Challenge:** Nutrient deficiencies in diets.
     Fix: Promote balanced meal planning and fortification of staple foods with essential vitamins and minerals.
   ○ **Challenge:** Misinformation about nutrition.
     Fix: Encourage evidence-based dietary guidelines and public awareness campaigns led by experts.

Phase-6: Functional & Performance Testing

Objective:

Ensure that the Advancing Nutrition Science through Gemini AI works as expected.

Test Case ID	Category	Test Scenario	Expected Outcome	Status	Tester
TC-001	Functional Testing	Query "Best protein sources for muscle gain"	Relevant high-protein foods should be displayed	☑ Passed	Veda
TC-002	Functional Testing	Query "Healthy meal plan for diabetics"	AI should suggest a balanced meal plan for diabetes.	☑ Passed	Lakshanya
TC-003	Performance Testing	API response time under 500ms	AI should return results quickly.	⚠ Needs Optimization	Tester-3
TC-004	Bug Fixes & Improvements	Fixed incorrect Calorie counts in nutrition database	Data accuracy should be improved.	☑ Fixed	Developer tool
TC-005	Final Validation	Ensure UI is responsive across devices.	UI should work on devices.	✖ Failed - UI broken on web	Tester 2
TC-006	Deployment Testing	Host the AI-powered nutrition.	App should be accessible online.	🚀 Deployed	DevOps

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Final Submission

1. **Project Report Based on the templates**
2. **Demo Video (3-5 Minutes)**
3. **GitHub/Code Repository Link**
4. **Presentation**