Food and Nutrition Database

Submitted to

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SCHOOL OF SCIENCE AND MATHEMATICS
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M.Sc. BIOINFORMATICS
by
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Under the guidance of
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1. INTRODUCTION

Nutrition plays a vital role in maintaining good health, especially for women who experience hormonal, metabolic, and physiological changes throughout different stages of life.
Women in different conditions—such as menstrual phase, PCOD, PCOS, pregnancy, and post-menopause—have **unique nutritional needs** and deficiencies.

To address this, a **Database Management System (DBMS)** is implemented to organize food data and generate **personalized diet plans**.
This database includes nutritional details of various foods and recommends breakfast, lunch, and dinner meals tailored for each category of women.

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2. IDEA OF THE PROJECT

The idea behind this project is to create a system that:

- Stores nutritional information of foods in a structured way

- Identifies which foods are beneficial for specific health conditions

- Helps produce a diet plan based on nutrient deficiencies

- Makes nutrition-based decision-making easier using SQL queries

By bringing foods, nutrients, and women's health stages together in a single database, this system acts as a **nutritional recommendation engine**.

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3. WHY THIS PROJECT?

This project was chosen because:

Women frequently experience nutrient deficiencies such as:

- Iron deficiency during menstruation

- Calcium deficiency during menopause

- Low glycemic index needs during PCOD/PCOS

- High folate need during pregnancy

A diet plan is essential for:

- Hormonal balance

- Managing symptoms

- Preventing long-term health issues

- Maintaining metabolic stability

DBMS provides:

- A structured, efficient way to store large food datasets

- The ability to perform meaningful analysis

- Accurate recommendations via SQL queries

This project connects **nutrition science + database technology**, making it both useful and educational.

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4. PURPOSE & OBJECTIVES

Purpose

To design a database system that organizes nutritional information of food items and generates diet recommendations for women based on their dietary needs and health conditions.

Objectives

1. To collect and store nutritional values of various food items in different categories.

2. To classify women into categories such as menstrual, PCOD, PCOS, pregnant, and post-menopausal.

3. To identify nutrient deficiencies for each women category.

4. To recommend breakfast, lunch, and dinner meals tailored to each category.

5. To implement SQL concepts such as views, joins, primary keys, foreign keys, and filtering queries.

6. To demonstrate how DBMS can assist in real-life healthcare and nutrition planning.

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5. DATABASE DESIGN

5.1 Food Category Tables

The database includes tables for:

- Vegetables

- Fruits

- Nuts

- Seeds

- Herbs

- Beverages

- Cereal-Grains-Pulses

- Milk & Dairy

- Fats & Oils

- Sugars & Sweeteners

Each table stores nutritional attributes such as:
calories, protein, fiber, fat, vitamins, minerals, glycemic index, season, etc.

5.2 Women Category Table

This table stores all categories of women:

category_id category_name

1	Menstrual Women
2	PCOD Women
3	PCOS Women
4	Post-Menopausal Women
5	Pregnant Women

5.3 Meal Type Table

Stores the type of meal:

meal_id meal_name

1	Breakfast
2	Lunch
3	Dinner

5.4 All_Foods View

This view combines all food tables into a **single unified dataset** for easier querying.

Columns include:
food_name, category, calories, protein, fiber, vitamins, minerals, season.

5.5 Diet_Plan Table (Main Table)

Column	Description
plan_id (PK)	Unique diet entry
category_id (FK)	Links to Women_Category

Column	Description
meal_id (FK)	Links to Meal_Type
food_name	Recommended food
nutrient_focus	Nutrient deficiency addressed

This table stores the full meal plans for each category.

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6. ER DIAGRAM (EXPLANATION)

Entities:

- Women_Category
- Meal_Type
- Diet_Plan
- Food Tables
- All_Foods View

Relationships:

- One woman category → many diet plan foods
- One meal type → many foods
- All_Foods provides the food list used in Diet_Plan

Diet_Plan is the central table connecting everything.

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7. DIET PLANS CREATED FROM THE DATABASE

7.1 Menstrual Women

- Rich in iron, folate, magnesium, Vitamin C
- Example foods: spinach, beetroot, chia seeds, sweet potato, basil seeds

7.2 PCOD Women

- Low GI foods, omega-3, anti-inflammatory
- Example foods: oats, apple, flax seeds, pistachio

7.3 PCOS Women

- High protein, omega-3, low GI
- Example foods: greek yogurt, chia, hemp seeds, cabbage

7.4 Post-Menopause Women

- Calcium, Vitamin D, magnesium

- Example foods: ragi, sesame seeds, almond, poppy seeds

7.5 Pregnant Women

- Folate, iron, calcium, hydration

- Example foods: spinach, beetroot, orange, milk

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8. SQL QUERIES USED

8.1 Show meal plan for PCOS women

SELECT mt.meal_name, dp.food_name, dp.nutrient_focus

FROM Diet_Plan dp

JOIN Meal_Type mt USING(meal_id)

WHERE category_id = 3;

8.2 Show calcium-rich foods

SELECT * FROM All_Foods

WHERE minerals LIKE '%Calcium%';

8.3 Show all foods for breakfast for a specific category

SELECT food_name, nutrient_focus

FROM Diet_Plan

WHERE meal_id = 1 AND category_id = 4;

8.4 Show full diet plan for Post-Menopausal Women

SELECT wc.category_name, mt.meal_name, dp.food_name

FROM Diet_Plan dp

JOIN Women_Category wc USING(category_id)

JOIN Meal_Type mt USING(meal_id)

WHERE dp.category_id = 4;