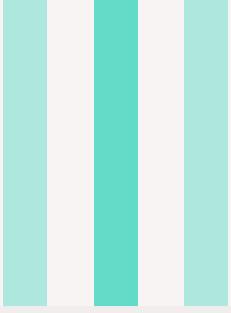


# **PROJECT EXHIBITION-1**

***FITNESS TRACKER***



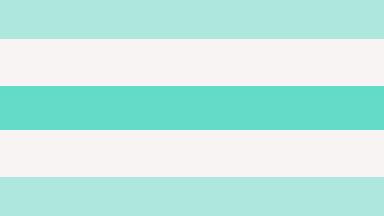
# *team members*

**Anshuman Nayak- 23BCE11468**

**Vaibhav Verma- 23BCE11700**

**Charu Jagguka- 23BCE11698**

**Ritisha Jadhao- 23BCE11707**



## **GUIDE**

**Dr. Vijendra Singh Bramhe**

# *Introduction*

FitPal is an interactive fitness platform designed to help users achieve their health and fitness goals through customized workout plans, progress tracking, and a seamless user interface. Make fitness tracking simple, accessible, and engaging.

# EXISTING WORK WITH LIMITATIONS

The current fitness website ecosystem includes several popular solutions. While these apps offer significant functionality, they have critical limitations that leave users underserved. For example:

1. All-in-One Fitness Platforms like Apple Fitness+, Peloton, etc
2. Diet-Focused Apps like Noom, Cronometer.
3. Workout Generator Apps (e.g., Nike Training Club, Freeletics)

## Limitations

- Limited personalization
- Complicated interfaces for beginners
- Minimal progress visualization
- Require costly subscriptions or hardware (e.g., Peloton bikes).
- Less accessible to users without advanced fitness equipment.

# PROPOSED WORK AND METHODOLOGY

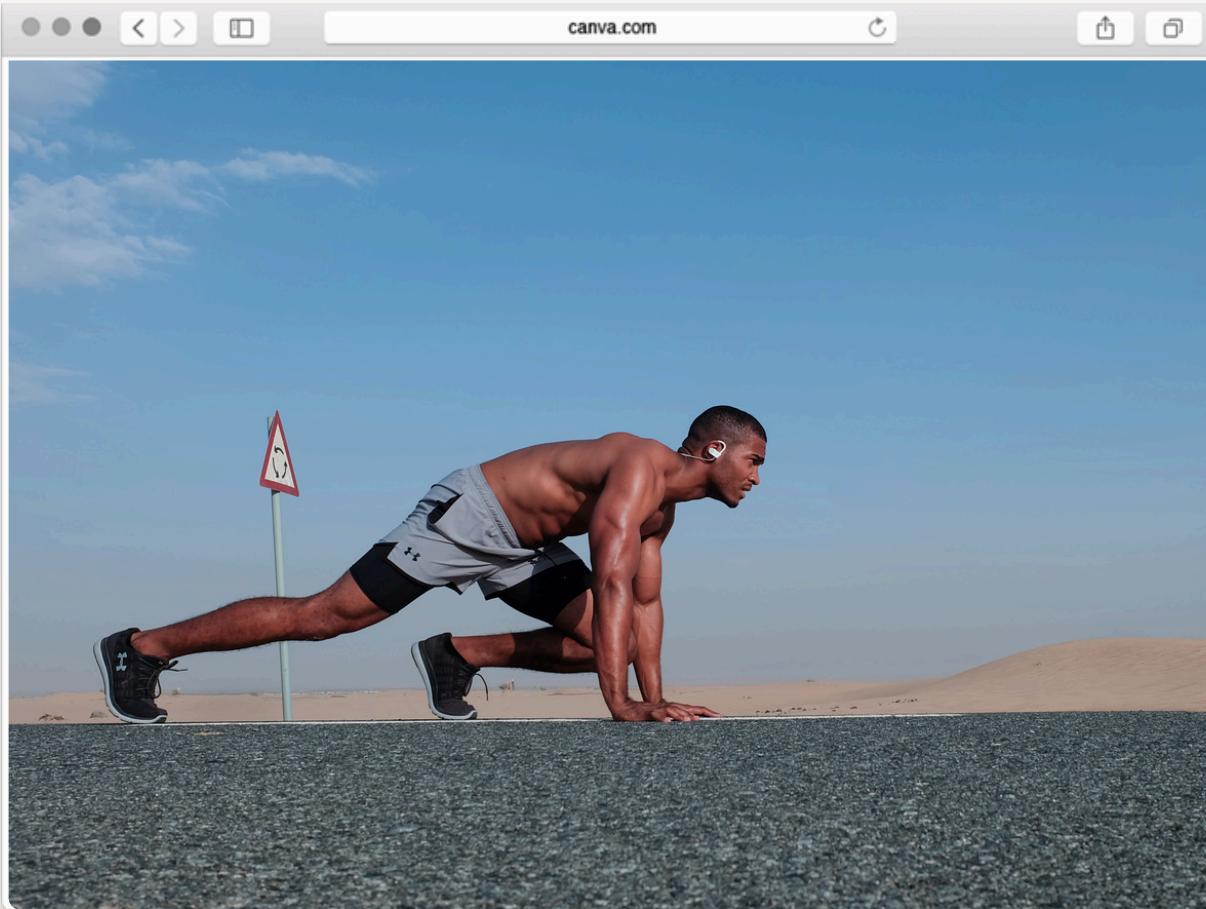
FitPal is a fitness tracking app that integrates BMR calculation, nutrition analysis, and workout tracking. It leverages modern technologies (React.js, Tailwind CSS, Node.js, MongoDB) and Calories Ninja API for accurate data. Secure authentication ensures user safety, and the app is designed for scalability and ease of use.

## Core Features :

1. User Account Management: Secure registration/login, profile updates.
2. Dashboard: Central hub with fitness insights and navigation.
3. BMR Calculator: Calculates and provides caloric recommendations.
4. Nutrition Checker: Fetches detailed food nutrition data.
5. Workout Analytics: Tracks and visualizes user workout progress.
6. Update Profile: Maintains accurate and personalized recommendations.
7. About Us: Showcases the team behind FitPal.

## Future Enhancements:

- Integration with wearable trackers.
- Meal planner with calorie-based recipes.
- Gamification through challenges and achievements.



# NOVELTY OF THE PROJECT

## 1. Integration of Fitness and Nutrition

Unlike many fitness apps that focus solely on workouts, it provides a comprehensive fitness solution by integrating both workout tracking and nutritional analysis. This dual approach offers users a one-stop platform for achieving their health goals.

## 2. Analytics-Driven Progress Tracking

The app's focus on workout analytics helps users visualize their journey, motivating them to stay consistent and set measurable goals.

## 3. Tailored Approach with BMR Calculation

The inclusion of a BMR calculator aligns workouts and dietary recommendations with individual caloric needs, providing users with a more targeted and effective fitness journey.

## 4. Use of Advanced Technologies

The use of Framer Motion for animations creates a visually appealing experience, and APIs for real-time nutrition and exercise databases offer unparalleled convenience. This advanced technology stack ensures the app remains modern and competitive.

# *Real time usage*

- **BMR Updates:** Instant BMR recalculation after profile changes.
- **Workout Tracking:** Real-time display of workout metrics.
- **Nutrition Logging:** Immediate calorie intake updates.
- **Notifications:** Alerts for reaching calorie goals.

## Technical Approach:

- **WebSockets:** Efficient data exchange between client and server.
- **Database Optimization:** Indexes for faster data retrieval.
- **Rate Limiting:** Prevents excessive API requests.

## Benefits:

- **Improved User Experience:** Immediate feedback and engagement.
- **Enhanced Accuracy:** Up-to-date data for better tracking.
- **Motivation:** Real-time progress boosts user motivation.

# **Hardware & software requirements**

## **1. Hardware Requirements**

### **For Development**

- Developer Machines:
  - Processor: Intel Core i5 (or equivalent) or higher.
  - RAM: Minimum 8 GB (16 GB recommended for faster builds).
  - Storage: At least 256 GB SSD (512 GB recommended).
  - Graphics: Basic integrated graphics for frontend rendering.

### **For Backend Server**

- Server Specifications:
  - Processor: Multi-core processor (e.g., Intel Xeon or equivalent).
  - RAM: 8 GB or more (to handle database queries and API requests).
  - Storage: 100 GB SSD or higher (to store user data and logs).
  - Network: High-speed internet connection for real-time data exchange.

### **For End Users**

- Devices Supported:
    - Smartphones: Android (version 8.0 or later) and iOS (version 12 or later).
    - Tablets: Devices with 2 GB RAM and modern browsers.
    - PCs/Laptops: Any device with an internet connection and modern browsers like Chrome, Firefox, or Edge.
    - Wearables (Future Scope): Integration with fitness wearables for step counting and heart rate monitoring.
- a little bit of body text

# 2. Software Requirements

## For Development

- Frontend Development Tools:
  - React.js for building user interfaces.
  - Tailwind CSS for styling.
  - Framer Motion for adding animations.
  - Node Package Manager (NPM) or Yarn for managing dependencies.
- Backend Development Tools:
  - Node.js for backend server logic.
  - Express.js for API creation.
  - MongoDB as the database for storing user data.
- APIs:
  - Nutrition API for retrieving food data.
  - Exercise Database API for workout plans and exercise recommendations.
- Version Control:
  - Git for version control.
  - GitHub or GitLab for code repository hosting.

## For Testing

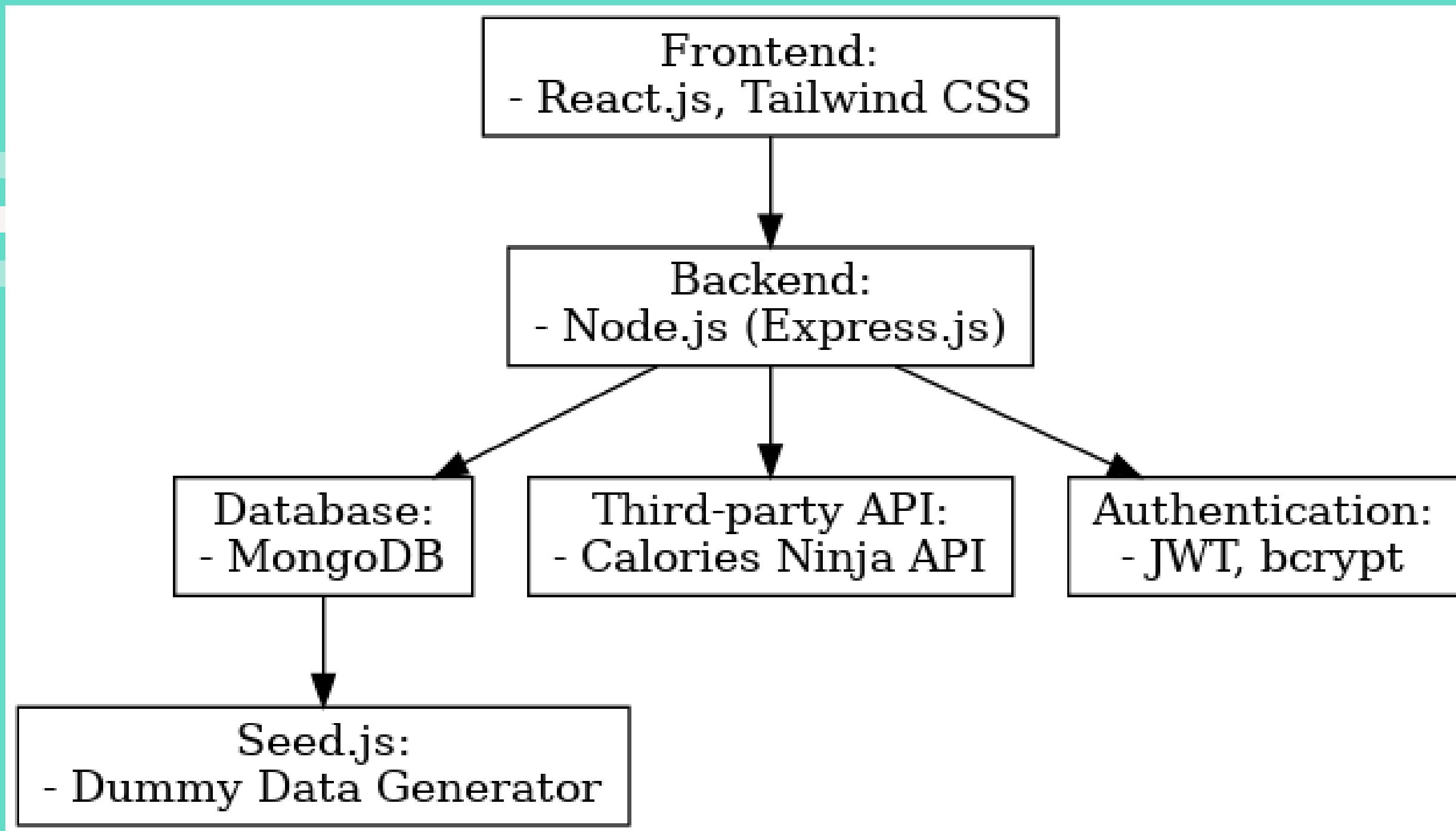
- Tools:
  - Jest and React Testing Library for frontend testing.
  - Postman for API testing.
  - MongoDB Compass for database testing.

## For Deployment

- Frontend Deployment:
  - Vercel for hosting the React application.
- Backend Deployment:
  - Render for hosting backend services (Node.js server).
- Database Deployment:
  - MongoDB Atlas for cloud database services.

# OVERALL SYSTEM ARCHITECTURE DIAGRAM.

Works for iOS and Android



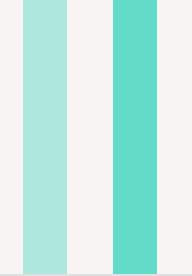
# LITERATURE REVIEW

Title	Objective	Dataset Used	Methodology	Result	Major Highlight	Techniques Used	Remarks
The use of mobile apps and fitness trackers to promote healthy behaviors during COVID-19: A cross-sectional survey	To explore the impact of mobile apps and fitness trackers on health behaviors during the COVID-19 pandemic	Data from a cross-sectional survey	Cross-sectional survey analysis	Increased use of apps and trackers was associated with healthier behaviors during lockdowns	Highlighted the role of digital tools in maintaining physical activity	Survey analysis	Useful insights for public health strategies during pandemics
Using Fitness Trackers and Smartwatches to Measure Physical Activity in Research: Analysis of Consumer Wrist-Worn Wearables	To evaluate the accuracy and usability of consumer wrist-worn wearables for physical activity measurement	Data from various consumer wearables	Systematic review and meta-analysis	Identified variability in accuracy across different devices	Emphasized the need for standardization in wearable technology	Meta-analysis	Important for researchers using wearables in studies
How can Activity Trackers be Useful? A Scoping Literature Review	To review the usefulness of activity trackers for patients with heart failure and sedentary individuals	Literature from multiple studies	Scoping literature review	Identified benefits and challenges of activity trackers	Highlighted potential for improving patient adherence to activity	Literature review	Provides a comprehensive overview for healthcare professionals

Gamified Wearable Fitness Tracker for Physical Activity: A Comprehensive Literature Review	To examine the impact of gamification on physical activity engagement through wearables	Various academic and industry sources	Literature review	Gamification elements positively impact user engagement	Identified key gamification elements that enhance user motivation	Literature review	Useful for developers of fitness technologies
Fitness Trackers: Understanding How User Experience Impacts Motivation	To investigate the impact of user experience on motivation for long-term use of fitness trackers	User surveys and interviews	Qualitative analysis	User experience significantly impacts motivation and adherence	Detailed user feedback on design and usability	Qualitative analysis	Important for improving user-centered design in fitness trackers
The Role of Wearable Fitness Trackers in Promoting Physical Activity: A Systematic Review	To systematically review the effectiveness of fitness trackers in promoting physical activity	Data from multiple clinical studies	Systematic review	Found moderate evidence supporting effectiveness	Provided guidelines for future research and development	Systematic review	Helps guide development of effective fitness interventions
Wearable Activity Trackers: A Systematic Review and Meta-Analysis	To assess the accuracy and efficacy of wearable activity trackers	Data from various studies	Meta-analysis	Mixed results on accuracy; generally positive impact on activity levels	Highlighted the potential and limitations of wearables	Meta-analysis	Useful for evaluating wearable technology for health promotion

The Impact of Fitness Trackers on Physical Activity and Health: A Systematic Review and Meta-Analysis	To review the impact of fitness trackers on physical activity and health outcomes	Multiple clinical and observational studies	Systematic review and meta-analysis	Demonstrated positive impact on physical activity and health	Emphasized importance of integration with behavior change strategies	Meta-analysis	Supports the use of wearables in health promotion
Evaluating the Accuracy of Wearable Fitness Trackers: A Systematic Review	To evaluate the accuracy of fitness trackers in measuring physical activity	Various consumer and clinical wearables	Systematic review	Found variability in accuracy across devices	Provided recommendations for improving tracker accuracy	Systematic review	Important for both consumers and developers
The Use of Wearable Fitness Trackers in Clinical Research: A Review	To explore the use of fitness trackers in clinical research settings	Data from clinical trials and studies	Literature review	Highlighted potential and limitations of wearables in research	Provided insights into design and implementation in clinical trials	Literature review	Useful for researchers and clinicians

# LITERATURE REVIEW



The app is well-aligned with current trends and research in the field of fitness trackers and health technology. The research highlights several key points:

1. Promoting Healthy Behaviors: Studies show that fitness apps and trackers can effectively promote healthier behaviors and maintain physical activity levels, especially during challenging times such as the COVID-19 pandemic.
2. User Experience and Motivation: User experience plays a crucial role in the sustained use and motivation to engage with fitness trackers. The FitFusion app addresses this by providing a secure, user-friendly interface with personalized features like workout tracking and nutrition checking.
3. Integration of Gamification: Gamification elements, as reviewed in the literature, enhance user engagement and motivation. Although the FitFusion app doesn't explicitly mention gamification, its community support and analytics features can provide similar motivational benefits.
4. Accuracy and Effectiveness: Accurate measurement of physical activity is vital. The app's use of various APIs for nutrition and exercise databases ensures that users receive reliable and useful information, supporting the app's effectiveness.
5. Community Support: The importance of social features and community support in fitness trackers is highlighted in several studies. FitFusion's community feature aligns with this, fostering motivation and adherence to fitness goals through social engagement.
6. Technological Integration: The use of advanced technologies like React, Tailwind CSS, Node.js, and MongoDB ensures that the app is built on a robust and scalable platform. This is crucial for maintaining app performance and providing a seamless user experience.
7. Health and Clinical Use: Fitness trackers can be valuable in clinical settings for monitoring patient activity and health outcomes. While FitFusion is primarily a consumer app, the features and technologies it employs could potentially support clinical research applications in the future.

# MODULE DESCRIPTION

## 1. User Management Module

- **Components:** Signup, Login, Logout.
- **Features:**
  - Secure authentication using bcrypt for password hashing and JWT for session management.
  - Profile management to update user details (e.g., weight, activity level).

## 2. BMR Calculator Module

- **Features:**
  - Input validation for age, weight, height, and activity level.
  - Backend logic for BMR calculation.
  - Dynamic calorie recommendations based on fitness goals (e.g., maintenance, weight loss).

## 3. Nutrition Checker Module

- **Integration:** Calories Ninja API.
- **Features:**
  - Search food items and fetch nutritional data.
  - Display calorie breakdown and macronutrient distribution.
  - Suggest similar food items based on nutrition profiles (future scope).

## **4. Dashboard Module**

### **- Features:**

- Overview of user's fitness journey.
- Recent searches and nutritional logs.
- Caloric intake comparison with BMR goals.

## **5. API Handler Module**

### **- Features:**

- Middleware to handle requests to Calories Ninja API.
- Caching mechanism for frequently searched food items to improve response time.

## **6. Seed.js (Testing Module)**

### **- Features:**

- Script to populate database with sample users and test data.
- Enables testing of BMR calculations and API integration without requiring live inputs.

## **#Future Enhancements**

- Integration with wearable fitness trackers for automated data logging.
- Adding a meal planner that suggests recipes based on calorie goals and available ingredients.
- Gamification features like fitness challenges and achievements.

# MODULE WORKFLOW

## 1. User Account Management

- User accesses the signup page to create an account.
- Backend validates inputs and securely stores the hashed password in the database.
- Upon successful signup, the user logs in using email and password.
- On login, the backend verifies credentials and issues a session token (JWT).

## 2. BMR Calculator Workflow

- User navigates to the BMR calculator page.
- Inputs required data (age, gender, weight, height, activity level).
- Backend processes inputs using the BMR formula:
  - **For men:**  $BMR = 10 \times \text{weight (kg)} + 6.25 \times \text{height (cm)} - 5 \times \text{age (y)} + 5$
  - **For women:**  $BMR = 10 \times \text{weight (kg)} + 6.25 \times \text{height (cm)} - 5 \times \text{age (y)} - 161$
- Result is displayed along with daily caloric recommendations.

## 3. Nutrition Level Checker Workflow

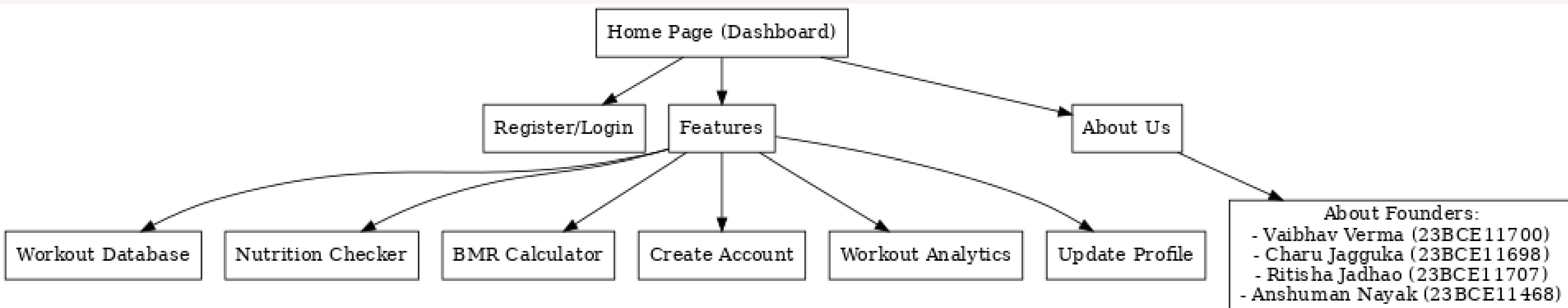
- User enters a food item in the search bar.
- Frontend sends the request to the backend.
- Backend interacts with the Calories Ninja API to fetch nutritional details.
- Fetched data (e.g., calories, protein, fat, carbohydrates) is displayed on the frontend

## 4. Dashboard and Progress Tracker

- After logging in, users access the dashboard.
- The dashboard shows:
  - BMR results and caloric goals.
  - Recently searched food items and their nutritional values.
  - A log of daily caloric intake vs. target goals.

## 5. System Logging with Seed.js

- Developers run the seed.js file to populate the database with:
  - Sample users (e.g., usernames, hashed passwords).
  - Test BMR calculation results.
  - Dummy food search logs for testing API integration.



The screenshot shows a dark-themed interface of the Visual Studio Code code editor. On the left, there is a file tree (Explorer) displaying the project structure:

- gitignore frontend
- gitignore backend
- index.html front...
- FITNESS... (with icons for file, folder, search, and refresh)
- frontend (with a dot icon)
- src (with a green folder icon)
- components (with a yellow folder icon)
- NavLink1.jsx
- context (with a yellow folder icon, currently selected)
- pages (with a red folder icon)
- App.jsx
- index.css (with a purple file icon, currently active)
- main.jsx
- .gitignore
- eslint.config.js
- index.html
- package-lock.json
- package.json
- postcss.config.js

On the right, the main editor area contains the following CSS code:

```
4 @tailwind components;
5 @tailwind utilities;
6
7 body {
8   font-family: "Roboto", sans-serif;
9   background-color: #f5f5f5;
10 }
11 *
12   margin: 0;
13   padding: 0;
14   box-sizing: border-box;
15   scroll-behavior: smooth;
16 }
17
```

At the bottom, there are several status bar items: 'File', 'Edit', 'Search', 'Run', 'Terminal', 'Help', 'VS Code', 'File', 'Edit', 'Search', 'Run', 'Terminal', 'Help', and 'VS Code'.

# FitPal

We are here to help you achieve your fitness dreams.

WHAT WE OFFER



## The Tools for Your Goals

Trying to lose weight, tone up, lower your BMI, or invest in your overall health? We give you the right features to get there.

**Learn. Track. Improve.**  
Keeping a food diary helps you understand your habits and to hit your goals.

**Logging Simplified.**  
Save meals and use Quick Tools for fast and easy food tracking.

**Stay Motivated.**  
Join the World's Largest Fitness Community for advice, tips, and support 24/7.

Start your fitness journey today!

## AppFeatures

**Workout Database**  
Our comprehensive workout database helps you find the perfect routine to target your specific goals.  
[Learn More →](#)

**Nutrition Checker**  
Easily check the nutritional value of any food, including calories, fat, protein, and carbohydrates.  
[Learn More →](#)

**BMR Calculator**  
Calculate your Basal Metabolic Rate (BMR) to determine your daily calorie needs and gain insights into your metabolism.  
[Learn More →](#)

**Create Account**  
Create a personalized account to access additional features, save your progress, and customize your experience.  
[Learn More →](#)

**Workout Analytics**  
Visualize your fitness journey with detailed charts and graphs. Track your progress, identify trends, and optimize your workouts for better results.  
[Learn More →](#)

**Update Profile**  
Update your profile information to keep your account up to date.  
[Learn More →](#)

## The Tools for Your Goals

Trying to lose weight, tone up, lower your BMI, or invest in your overall health? We give you the right features to get there.

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**Stay Motivated.**  
Join the World's Largest Fitness Community for advice, tips, and support 24/7.

## Start your fitness journey today!

Sign up for FitPal and get started on your path to a healthier lifestyle.

[Register](#) [Login](#)



## About FitPal

### Our Story

FitPal was founded in 2024 with a simple mission: to help people achieve their fitness goals and lead healthier lives. We believe that everyone deserves access to high-quality fitness resources and support, regardless of their current fitness level or background.

### Our Team

Charu Jagguka  
300 x 300

Vaibhav Verma  
Founder

Charu Jagguka  
Head of Fitness

FitPal Project Exhibition-1 - Presentation New tab

localhost:5173/NutritionChecker

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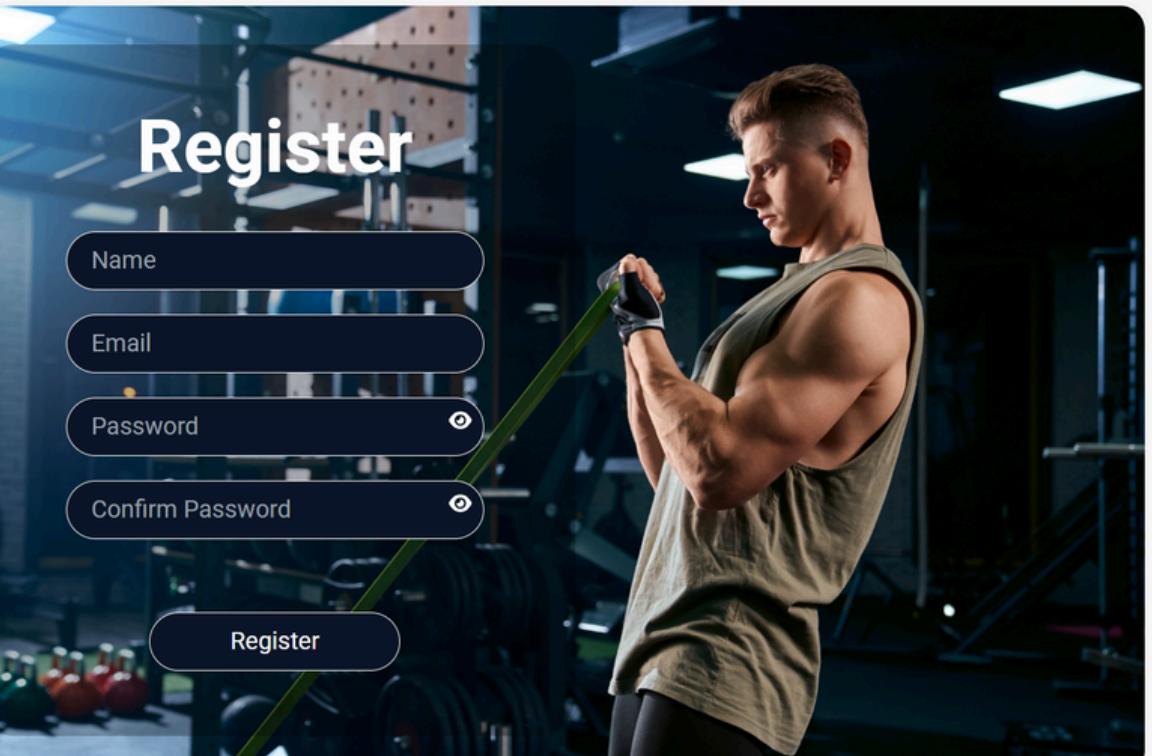
## Nutrition Information Search

chicken

Name	Serving Size	Calories	Total Fat	Saturated Fat	Cholesterol	Sodium	Carbohydrates	Fiber	Sugar	Protein
chicken	100g	222.6	12.9g	3.7g	92mg	72mg	0g	0g	0g	23.7g

57°F Haze

Search



FitPal localhost:5173/Register

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## Register

Name

Email

Password

Confirm Password

FitPal localhost:5173/SignIn

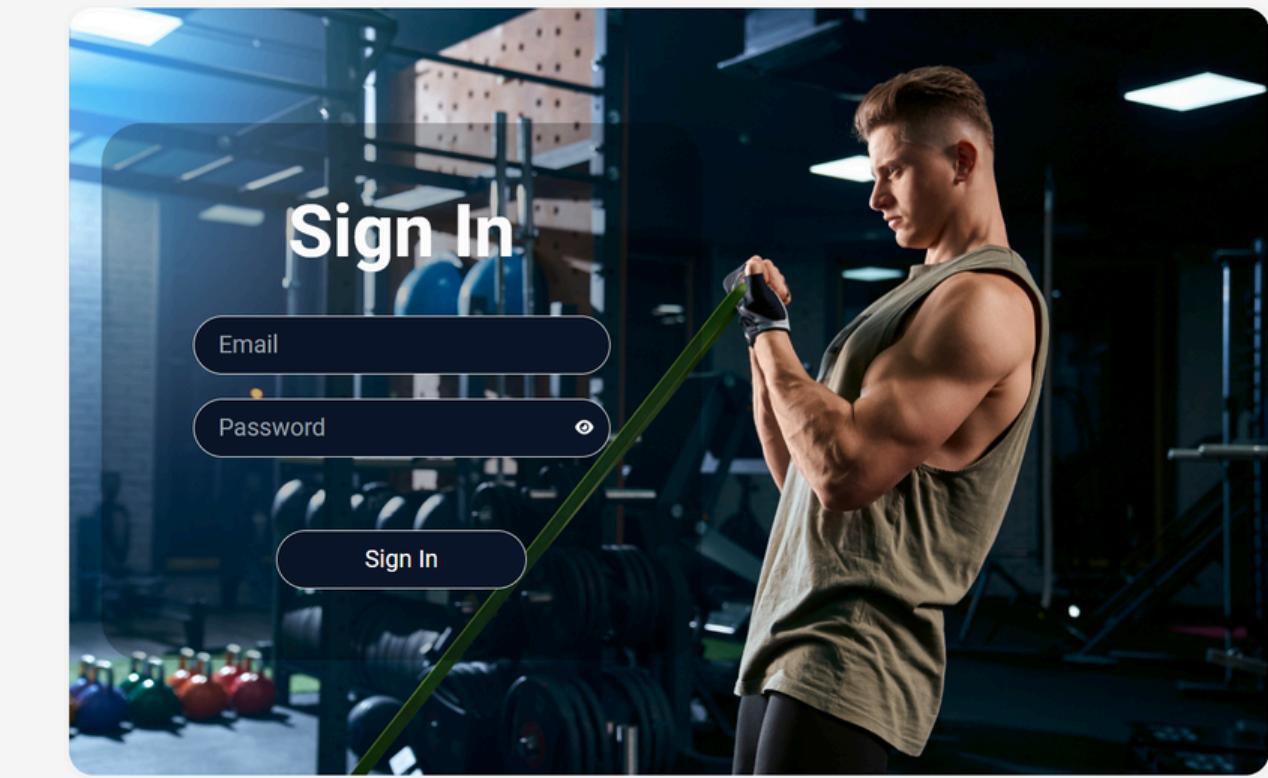
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## Sign In

Email

Password



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## Contact Us

**Get in Touch**

Name

Email

Message

**Contact Information**

 ftracker60@gmail.com

 +91 8806353010

 123 Fitness Street, Healthy City, 12345

**Business Hours**

Monday - Friday: 9:00 AM - 8:00 PM  
Saturday: 10:00 AM - 6:00 PM  
Sunday: Closed

**Get In Touch With Us**

**Quick Response**

We aim to respond to all inquiries within 24 hours. For urgent matters, please call us directly.

# CONCLUSION

FitPal is an innovative fitness tracking app that offers comprehensive features such as workout tracking, nutrition checking, BMR calculation, community support, and analytics. It effectively leverages advanced technologies to provide a robust and user-friendly platform, promoting healthier lifestyles and sustained user engagement. The app's integration of various APIs ensures accurate and reliable data, enhancing the overall user experience.

## Future Improvements

1. Personalization: Introduce more personalized fitness and nutrition plans based on user health data and goals.
2. Gamification: Incorporate gamified elements like badges and interactive challenges to boost user engagement.
3. Enhanced Community Features: Expand social interaction options, including group challenges and leaderboards.
4. Integration with Health Devices: Enable compatibility with other health apps and devices for a comprehensive health overview.
5. Advanced Analytics: Provide detailed insights and predictive analytics to help users optimize their fitness routines.
6. User Feedback Mechanism: Implement robust feedback systems for continuous improvement and user satisfaction.