FITNESS WEBSITE WITH CHATBOT

A PROJECT REPORT

Submitted by

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RAJALAKSHMI ENGINEERING COLLEGE, CHENNAI BONAFIDE CERTIFICATE

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ABSTRACT

This project introduces a comprehensive fitness analyzer with an intelligent chatbot interface, designed to empower users in achieving their health and wellness goals. The website integrates personalized diet plans, tailored workout routines, and precise Body Mass Index (BMI) calculations to provide a holistic approach to fitness. The chatbot serves as an interactive guide, assisting users in navigating the platform and offering real-time advice and support. By incorporating principles of balanced nutrition and user-specific goals such as weight loss, muscle gain, or maintenance, the system ensures that dietary recommendations are both effective and sustainable. The system includes a robust BMI calculator that provides users with insights into their current health status based on height and weight metrics. This feature helps users understand their body composition and set realistic goals. It simplifies the process of entering data, retrieving information, and receiving recommendations. By leveraging natural language processing, the chatbot can engage in meaningful conversations, answer queries, and provide encouragement, making the user experience more engaging and supportive.

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INTRODUCTION

In today's fast-paced world, maintaining a healthy lifestyle has become increasingly challenging. However, with the advancement of technology, innovative solutions are emerging to simplify the process of staying fit and monitoring our well-being. One such groundbreaking innovation is the Fitness Analyzer, a cutting-edge tool powered by chatbot technology. Imagine having a personal health assistant at your fingertips, ready to provide personalized guidance, track your progress, and offer valuable insights into your fitness journey. The Fitness Analyzer does just that and more. By leveraging the capabilities of chatbots, this revolutionary system offers users a seamless and interactive way to manage their health and wellness.

At its core, the Fitness Analyzer utilizes artificial intelligence to understand user inputs, analyze data, and generate actionable recommendations. Whether you're looking to lose weight, build muscle, improve endurance, or simply maintain a healthy lifestyle, this intelligent chatbot is designed to cater to your specific needs and goals. With its user-friendly interface and 24/7 availability, the Fitness Analyzer empowers individuals to take control of their health anytime, anywhere. Whether you're at home, at work, or on the go, you can rely on this intelligent chatbot to support you in achieving your fitness goals and maintaining a balanced lifestyle.

The Fitness Analyzer signifies a groundbreaking advancement in health tracking and personalized coaching, fundamentally transforming our approach to fitness and well-being. By leveraging cutting-edge chatbot technology, this innovative tool goes beyond traditional methods, providing real-time, personalized insights and guidance. Its integration of artificial intelligence with a human-centric design ensures that users receive tailored advice that adapts to their unique needs and preferences. This sophisticated system not only monitors physical activity and health metrics but also offers motivational support and lifestyle recommendations, making it an indispensable companion for anyone dedicated to improving their overall health. The Fitness Analyzer's ability to deliver customized, data-driven coaching empowers users to make informed decisions and maintain a sustainable, healthier lifestyle. Ultimately, it stands as a testament to the potential of AI in enhancing personal well-being, offering a revolutionary solution for those striving to live a happier, healthier life.

1.1 PROBLEM STATEMENT

Many individuals struggle to achieve their fitness goals due to a lack of personalized guidance in diet and exercise. Generic fitness plans fail to account for individual differences in dietary preferences, fitness levels, and health objectives, leading to poor adherence and suboptimal results. Additionally, users often find it challenging to track their progress effectively and stay motivated. There is a need for a comprehensive solution that provides personalized diet plans, tailored workout routines, and accurate BMI calculations, all facilitated by an interactive chatbot that offers real-time support and motivation, enhancing user engagement and success in achieving fitness goals.

1.2 SCOPE OF THE WORK

The project encompasses the development of a web-based fitness analyzer integrating personalized diet plans, customized workout routines, and BMI calculations. A key component is the implementation of an intelligent chatbot to guide users through the platform, facilitate data input, and provide real-time support. The scope includes designing user-friendly interfaces, developing algorithms for personalized recommendations, and ensuring accurate tracking of users' progress. The solution aims to cater to diverse user needs, enhancing engagement and adherence to fitness plans through personalized, adaptive, and interactive features, ultimately aiding users in achieving their health and fitness goals effectively.

1.4 AIM AND OBJECTIVES OF THE PROJECT

The aim of the Fitness Analyzer using chatbot technology is to provide users with an accessible and personalized platform for health and fitness monitoring. By leveraging chatbot capabilities, this innovative tool aims to offer tailored guidance, track progress, and provide actionable insights to help individuals achieve their wellness goals. The Fitness Analyzer aims to simplify the process of tracking health metrics and promoting healthy lifestyle habits. Ultimately, it seeks to empower users to take control of their well-being and foster long-term adherence to fitness routines and healthy behaviours. The Fitness Analyzer using chatbot technology aims to revolutionize the way individuals approach health and fitness by providing a comprehensive platform for personalized health monitoring, goal setting, and support. The primary objective of this innovative tool is to empower users to take control of their well-being through a seamless and intelligent interface.

1.5 RESOURCES

To create the frontend of the fitness website, essential resources include HTML, CSS, and JavaScript for building a responsive and user-friendly interface. HTML will structure the content, CSS will handle the styling and layout, and JavaScript will provide interactivity and dynamic features. For the chatbot, JavaScript functions will be used to manage user interactions and responses, ensuring a seamless conversational experience. Additionally, an API for BMI calculation will be integrated to allow users to input their height and weight and receive instant BMI results. This combination of technologies will create a robust, engaging, and functional fitness platform.

1.6 MOTIVATION

The Fitness Analyzer using chatbot technology holds immense potential to revolutionize how individuals approach health and fitness. Firstly, it offers unparalleled convenience by providing users with a personalized health assistant accessible at their fingertips. In today's fast-paced world, where time is often a limiting factor, having a virtual coach available 24/7 can significantly enhance adherence to fitness goals. Moreover, the interactive nature of the chatbot fosters engagement and accountability, as users receive real-time feedback, encouragement, and support tailored to their unique needs and preferences.

By harnessing the power of artificial intelligence and machine learning, the Fitness Analyzer can continuously adapt and improve, offering increasingly accurate and relevant recommendations over time. This dynamic feedback loop not only empowers users to make informed decisions about their health but also fosters a sense of autonomy and ownership over their well-being. Furthermore, the integration of wearable devices and fitness apps provides users with a holistic view of their health metrics, enabling them to track progress, identify trends, and make data-driven adjustments to their fitness routines. Ultimately, the Fitness Analyzer using chatbot technology has the potential to democratize access to personalized health and fitness guidance, empowering individuals of all backgrounds to lead healthier, happier lives.

CHAPTER 2 LITRETURE SURVEY

(Hui Xu and Qicheng Liu) In view of the low classification accuracy of the minority class in imbalanced data, an algorithm called DPF-EL (density peaks and fitness combined with ensemble learning) based on density peaks clustering and fitness is proposed. Firstly, this method uses the density peaks clustering algorithm to divide the majority class into different sub-clusters, the local density calculated in the clustering process is used to assign weights to each sub-cluster, and the number of under-sampling is determined by the weights. Secondly, the concept of fitness is introduced into the sub-clusters, the selection probability of the samples is calculated according to the size of their fitness, and the majority class is under-sampled based on the selection probability.

(Foster-Schubert, Burke) Research often emphasizes the importance of personalized approaches in diet and exercise. Studies like those by Foster-Schubert and Burke discuss how tailored nutrition plans and exercise routines based on individual characteristics and goals can improve adherence and outcomes.

(Laranjo and Shickel)AI-driven chatbots leverage machine learning algorithms to analyze user data, preferences, and goals. This enables them to provide tailored recommendations for diet plans, workout routines, and health behaviors. By considering individual characteristics such as age, weight, fitness level, and dietary preferences, chatbots can suggest personalized strategies that are more likely to resonate with users and lead to better adherence.

(Xu and Liu) Algorithms like DPF-EL (Density Peaks and Fitness combined with Ensemble Learning), are pivotal in addressing the challenges posed by imbalanced data in health-related scenarios. DPF-EL utilizes density-based clustering algorithms, such as Density Peaks clustering, to partition the majority class into meaningful sub-clusters. Density Peaks clustering identifies clusters based on local density peaks, which helps in identifying both dense and sparse regions within the data. This approach is beneficial in health-related datasets where the distribution of data points can vary significantly across different classes.

(Alkhaldi)Interactive features, such as chatbots, personalized recommendations, and real-time feedback, play a crucial role in engaging users. It discuss how interactive elements keep users actively involved in their health management by providing dynamic interactions and immediate responses to queries. This real-time interaction fosters a sense of connection and accountability, motivating users to stay committed to their health goals over time.

(Topol and Choi) AI and machine learning algorithms have the capability to continuously learn from user data. This includes health metrics such as medical history, genetic information, lifestyle factors, and real-time health monitoring data from wearables or apps. By analyzing this data, these algorithms can adapt recommendations over time based on evolving user needs and health conditions. For example, algorithms can adjust diet plans or exercise routines based on changes in a user's health status or progress towards their goals.

(Danial Abdul Kareem Muhammed, Soran Saeed, Tarik Ahmed Rashid) This work presents an improved version of the fitness-dependent optimizer (FDO) algorithm called IFDO. IFDO enhances FDO's ability to tackle complex optimization problems by considering alignment, cohesion, and pace of position updates. It introduces randomization for weight factor determination and demonstrates its convergence to optimal solutions. Testing against standard benchmark functions and competition datasets shows IFDO's effectiveness compared to FDO and other algorithms like PSO, DA, and GA. Real-world applications further validate IFDO's practicality and improved performance.

(Nuno M. Rodrigues Sara Silva , Leonardo Vanneschi)This paper explores the application of fitness landscapes to neuro evolution, aiming to understand the learning and generalization capabilities of machine learning algorithms. It fills a gap in research by examining how fitness landscapes can offer insights into the performance of machine learning algorithms on unseen data and their applicability to neuro evolution landscapes. Using a grammar-based approach to generate convolutional neural networks, the study analyzes the dynamics of three mutations employed in their evolution. Various measures, including autocorrelation, entropic ruggedness, fitness clouds, density clouds, and overfitting, are utilized to characterize fitness landscapes. The findings indicate that these measures effectively estimate both learning and generalization abilities of the studied neuro evolution configurations.

(Kavakiotis)This provides a comprehensive overview of machine learning applications in healthcare, covering diverse domains and discussing key aspects such as challenges, opportunities, and future directions. It underscore the transformative impact of machine learning across various healthcare domains, from diagnostic imaging to personalized medicine. By addressing challenges and leveraging opportunities, machine learning holds immense potential to improve patient outcomes, enhance healthcare delivery efficiency, and pave the way for more personalized and effective healthcare interventions.

(Jiang) delve into the transformative role of artificial intelligence (AI) and digital health technologies in revolutionizing healthcare. They emphasize AI applications across telemedicine, wearable devices, health monitoring, and personalized health management. These technologies enable remote consultations, continuous monitoring of vital signs, early detection of health issues, and personalized treatment recommendations based on individual health data. This integration enhances healthcare accessibility by overcoming geographical barriers, improves efficiency through automated processes, and empowers patients with proactive health management tools, ultimately reshaping the landscape of healthcare delivery towards more accessible, efficient, and patient-centric care models.

(Ariel Keller Rorabaugh, Silvina Cai'no-Lores , Travis Johnston , and Michela Taufer)This paper introduces PENGUIN, a decoupled fitness prediction engine designed to enhance efficiency and scalability in neural architecture search (NAS) for neural networks (NNs). PENGUIN employs parametric modeling to predict NN fitness, allowing NAS to terminate training early and evaluate more NNs with fixed computational resources. By decoupling fitness prediction from the search process and integrating flexible parametric modeling, PENGUIN significantly reduces training costs and increases throughput. Experimental results on various benchmark datasets and state-of-the-art NAS implementations demonstrate that PENGUIN can enhance throughput by 1.6 to 7.1 times and reduce training time by a factor of 2.5 to 5.3, offering promising improvements in NAS efficiency and scalability.

(Rahul Dubey, Simon Hickinbotham , Mark Price , Andy Tyrell)This paper introduces the Fitness Landscape Exploration based Genetic Algorithm (FLEX-GA) as an approach to enhance the efficiency of genetic algorithms (GAs) in evolving optimal or sub-optimal solutions for computationally challenging problems. By exploring local fitness landscapes, FLEX-GA aims to accelerate the search process and improve solution quality. Experiments on both single and multi-objective benchmark problems, with and without constraints, demonstrate the effectiveness of FLEX-GA compared to canonical GAs and other optimization algorithms. Results indicate significant speed improvements (up to 50%) and enhanced solution quality across various problem domains, affirming the viability of fitness landscape approximation-based approaches for real-world optimization challenges.

SYSTEM DESIGN

3.1 GENERAL

In this section, we would like to show how the general outline of how all the components end up working when organized and arranged together. It is further represented in the form of a flow chart below.

3.2 SYSTEM ARCHITECTURE DIAGRAM

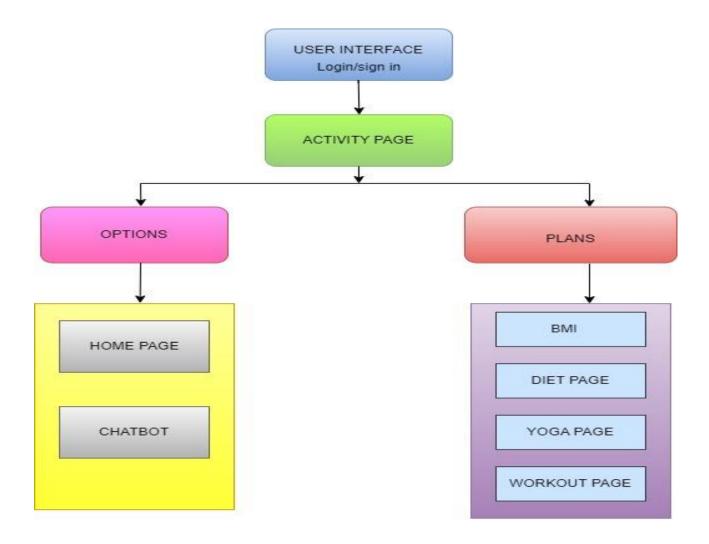


Fig 3.1: System Architecture

3.3 DEVELOPMENTAL ENVIRONMENT

3.3.1 HARDWARE REQUIREMENTS

The hardware requirements may serve as the basis for a contract for the system's implementation. It should therefore be a complete and consistent specification of the entire system. It is generally used by software engineers as the starting point for the system design.

Table 3.1 Hardware Requirements

COMPONENTS	SPECIFICATION
PROCESSOR	Intel Core i5
RAM	8 GB RAM
GPU	NVIDIA GeForce GTX 1650
MONITOR	15" COLOR
HARD DISK	512 GB
PROCESSOR SPEED	MINIMUM 1.1 GHz

3.3.2 SOFTWARE REQUIREMENTS

The software requirements document is the specifications of the system. It should include both a definition and a specification of requirements. It is aset of what the system should rather be doing than focus on how it should be done. The software requirements provide a basis for creating the software requirements specification. It is useful in estimating the cost, planning team activities, performing tasks, tracking the team, and tracking the team's progressthroughout the development activity.

HTML, CSS, JAVASCRIPT and chrome would all be required.

PROJECT DESCRIPTION

4.1 METHODOLODGY

The methodology for developing the fitness website, utilizing HTML, CSS, and JavaScript, is a structured process aimed at creating a responsive, interactive, and user-friendly platform. The project starts with comprehensive planning and requirement analysis, where the goals of providing diet plans, workout schedules, BMI calculations, and a chatbot are clearly outlined. Detailed requirements are gathered from stakeholders to understand user preferences and technical needs. A feasibility study is conducted to assess the project's viability in terms of technology, operations, and cost.In the design phase, the system architecture is carefully planned, defining the interaction between the frontend and backend, the database schema, and the integration of necessary APIs. UI/UX designers create wireframes, mockups, and prototypes to ensure a visually appealing and intuitive user interface. The database design is finalized to ensure secure and efficient data storage. The development phase is divided into frontend and backend tasks. The frontend development involves using HTML to structure the website's content, CSS to style and layout the pages, and JavaScript to add interactivity and dynamic features. This combination ensures a responsive and engaging user experience. Backend development includes creating server-side logic, developing APIs, and integrating the database to handle data processing and storage. JavaScript functions are also used to develop the chatbot, which manages user interactions and provides personalized responses. An API for BMI calculation is integrated to allow users to input their height and weight and receive instant BMI results.

4.2 MODULE DESCRIPTION

- 1. **Requirement Analysis**: Understand the objectives and requirements of the chatbot project. Determine the scope, functionalities, and target audience. Define the types of interactions the chatbot will support and the information it needs to provide.
- 2. **Design Phase:** Define the overall architecture, including frontend-backend interaction, database schema, and API integrations. Create wireframes, mockups, and prototypes to visualize the user interface and ensure a seamless user experience. Plan the database structure for storing user data securely and efficiently.
- 3. **Development Phase:** We use HTML, CSS and JavaScript. Using HTML, we structure the content and layout of the website. Style the website to ensure a visually appealing and responsive design with CSS. With JavaScript ,implement interactivity, animations, and dynamic content updates.
- 4. **Chatbot Development:** Create functions to handle user interactions and responses. We implement AI algorithms for personalized recommendations and integrate an API to calculate and return BMI based on user inputs.
- 5. **Testing and Evaluation**: Conduct thorough testing of the chatbot system to ensure its functionality, usability, and reliability. Test for various scenarios, including normal interactions, edge cases, and error handling. Gather feedback from users and stakeholders to identify areas for improvement.
- 6. **Deployment and Maintenance:** Deploy the chatbot system to a production environment where it can be accessed by users. Monitor the system's performance, scalability, and security. Continuously update and improve the chatbot based on user feedback and changing requirements.

RESULTS AND DISCUSSIONS

5.1 OUTPUT

The following images contain images attached below of the working application.

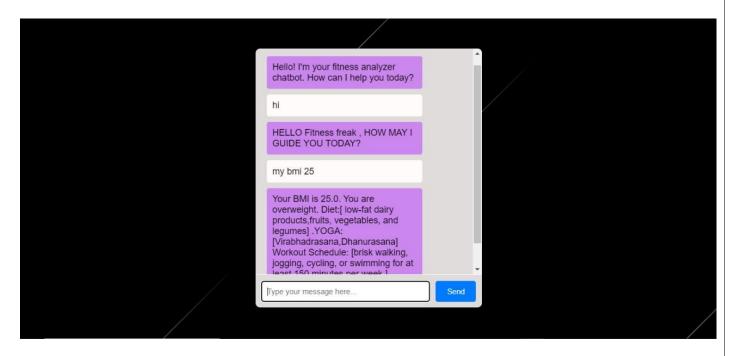


Fig 5.1: Chatbot

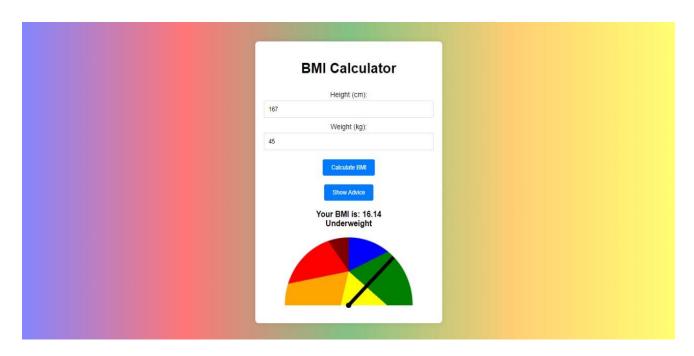


Fig 5.2: BMI Calculator



Fig 5.2 Activity Page

5.2 RESULT

The result of developing the fitness website, utilizing HTML, CSS, and JavaScript, is a robust and user-centric platform that effectively meets its intended goals and enhances user engagement in health and fitness management. The website provides comprehensive features including personalized diet plans, workout schedules, BMI calculations, and interactive chatbot functionality. On the backend, robust server-side logic and API integrations facilitated efficient data processing and management. The integration of a BMI calculation API allowed users to input their metrics and receive accurate BMI results instantly, enhancing the website's utility for health monitoring and goal setting. The chatbot, developed using JavaScript functions, provided personalized recommendations and support, further enhancing user engagement and satisfaction. The chatbot's implementation not only improves user engagement but also contributes to the website's overall utility. Users can receive instant feedback on their fitness progress, dietary choices, and exercise routines, fostering motivation and accountability. Its ability to learn from user interactions allows it to continuously improve responses and adapt to user preferences over time.

CONCLUSION AND FUTURE ENHANCEMENT

6.1 CONCLUSION

In conclusion, the development of the fitness website represents a culmination of efforts aimed at creating a comprehensive and user-centric platform for health and fitness management. Utilizing HTML, CSS, and JavaScript, the project successfully delivered a responsive and visually appealing frontend interface that ensures accessibility and engagement across various devices. This interface not only facilitates easy navigation but also enhances user experience through intuitive design elements and interactive features.

The backend infrastructure, supported by robust server-side logic and API integrations, enables efficient data processing and management. Integration of a BMI calculation API and the implementation of a sophisticated chatbot further enhance the website's functionality. The BMI calculator provides users with immediate, accurate assessments of their body mass index, empowering them to track their progress and make informed decisions regarding their health goals. Meanwhile, the chatbot, developed with JavaScript functions and AI capabilities, serves as a virtual assistant, offering personalized guidance on diet plans, workout routines, and general health inquiries. Its natural language processing capabilities allow for seamless interactions, providing users with real-time support and feedback tailored to their individual needs..

FUTURE ENHANCEMENT

Looking forward, several key enhancements can further elevate the fitness website's capabilities and user experience. One significant area for improvement involves enhancing AI integration within the chatbot. By leveraging machine learning algorithms, the chatbot can evolve to offer more personalized and adaptive recommendations based on user interactions and data. This could include analyzing user behavior patterns, preferences, and health metrics to provide tailored diet plans, workout routines, and motivational support in real-time. Integrating natural language understanding (NLU) advancements would enable the chatbot to better interpret complex user queries and respond with greater accuracy and relevance.

Additionally, expanding the website's integration with wearable health devices presents a promising opportunity. By syncing with devices like fitness trackers and smart scales, the website can gather real-time health data such as activity levels, heart rate, and sleep patterns. This data integration would allow for more precise tracking of user progress and personalized adjustments to diet and exercise recommendations. Users could benefit from seamless updates to their profiles and automated adjustments to their fitness plans based on their current health metrics.

Improving accessibility features is another crucial enhancement. Enhancements could include implementing voice-enabled commands for navigation and interaction, ensuring that the website is accessible to users with disabilities. Furthermore, enhancing multilingual support would broaden the website's reach and accommodate users from diverse linguistic backgro

APPENDIX

SOURCE CODE:

1. CHATBOT:

```
<html>
<body>
<div class="chat-container">
  <div class="chat-box" id="chat-box">
    <div class="message bot-message">Hello! I'm your fitness analyzer chatbot.
   How can I help you today?</div>
  </div>
  <div class="input-container">
    <input type="text" id="user-input" placeholder="Type your message here..."</pre>
   onkeypress="if(event.keyCode==13) sendMessage()">
    <button onclick="sendMessage()">Send</button>
  </div>
</div>
<script>
  function sendMessage() {
    const userInput = document.getElementById('user-input').value;
    if (userInput.trim() === ") return;
```

```
addMessage(userInput, 'user-message');
  // Simulate bot response (In a real-world scenario, you would send this to a
 backend server)
  setTimeout(() => {
    const botResponse = getBotResponse(userInput);
    addMessage(botResponse, 'bot-message');
  }, 1000);
  document.getElementById('user-input').value = ";
  document.getElementById('chat-box').scrollTop =
 document.getElementById('chat-box').scrollHeight;
function addMessage(text, className) {
  const chatBox = document.getElementById('chat-box');
  const messageDiv = document.createElement('div');
  messageDiv.classList.add('message', className);
  messageDiv.textContent = text;
  chatBox.appendChild(messageDiv);
function getBotResponse(userInput) {
  // Bot response logic
```

```
userInput = userInput.toLowerCase();
if (userInput.includes('bmi')) {
  return calculateBMI(userInput);
} else if (userInput.includes('exercise')) {
```

return 'Exercise benefits include improved cardiovascular health, increased muscle strength, enhanced flexibility, better mood, and weight management. It also reduces the risk of chronic diseases. For optimal health, adults should aim for at least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity exercise per week, plus muscle-strengthening activities twice weekly.';

```
} else if (userInput.includes('diet')) {
```

return 'A balanced diet provides essential nutrients, supports energy levels, and promotes overall health. Benefits include weight management, improved mood, better digestion, and reduced risk of chronic diseases. The duration of maintaining a healthy diet is lifelong to sustain these benefits and ensure long-term health and well-being.';

```
} else if (userInput.includes('protein')) {
```

return 'Protein is essential for building and repairing tissues, and its important for muscle growth. Good sources of protein include meat, fish, eggs, dairy products, legumes, and nuts.';

```
} else if (userInput.includes('carbs') || userInput.includes('carbohydrates')) {
```

return 'Carbohydrates are the body\'s main source of energy. Choose complex carbs like whole grains, fruits, and vegetables over refined carbs like white bread and sugary snacks.';

```
} else if (userInput.includes('fat')) {
```

return 'Healthy fats, such as those found in avocados, nuts, seeds, and olive oil, are important for brain function and hormone production. However, limit intake of saturated and trans fats found in processed foods.';

```
} else if (userInput.includes('hi') || userInput.includes('hello')) {
```

```
return 'HELLO Fitness freak, HOW MAY I GUIDE YOU TODAY?';
  }else {
    return 'Sorry, I can only help with exercise, diet, calorie, protein, carb, and fat
 related questions.';
  }
function calculateBMI(input) {
  const\ weightMatch = input.match(/(\d+\.?\d^*)\s^*/);
  const bmi=parseInt(weightMatch);
    return getBMIResult(bmi);
}
function getBMIResult(bmi) {
  if (bmi < 18.5) {
    return Your BMI is ${bmi.toFixed(1)} You are Underweight.Diet:[turkey,
 fish, eggs, brown rice, olive oil, and fatty fish]. YOGA: [Surya Namaskar,
 Bhujangasana] Workout Schedule: [Strength Training, Cardiovascular Exercise];
  } else if (bmi >= 18.5 && bmi < 24.9) {
    return Your BMI is ${bmi.toFixed(1)} You are Normal.Diet:[tofu, legumes,
 and dairy products,oats, avocados] Yoga:[Surya
 Namaskar, Bhujangasana, Vrikshasana Workout Schedule: [brisk walking,
 jogging, cycling, or swimming];
  } else if (bmi >= 25 && bmi < 29.9) {
```

```
return Your BMI is ${bmi.toFixed(1)}. You are overweight. Diet:[ low-fat dairy products,fruits, vegetables, and legumes]
.YOGA:[Virabhadrasana,Dhanurasana] Workout Schedule: [brisk walking, jogging, cycling, or swimming for at least 150 minutes per week.];
} else {

return Your BMI is ${bmi.toFixed(1)}. You are in the obese range.Diet:[ low-fat dairy products,fruits, vegetables, and legumes]
.YOGA:[Virabhadrasana,Dhanurasana] Workout Schedule: [brisk walking, jogging, cycling, or swimming for at least 150 minutes per week.].;
}

//script>

//body>

//html>
```

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