Development and Deployment Guide

Overview

This guide provides developers with all the necessary steps to set up, develop, and deploy the Weight Loss Coaching System. It includes API configurations, deployment strategies, testing methods, and troubleshooting tips.

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1. System Requirements

To develop and deploy the Weight Loss Coaching System, ensure the following:

- Node.js (v16 or higher).
- NPM (v8 or higher).
- An OpenAI API key with access permissions.
- Access to a hosting platform (e.g., Replit, AWS, or Render).

2. Environment Setup

1. Clone the Repository:

```
git clone <repository-url>
cd <repository-folder>
```

2. Install Dependencies:

```
npm install
```

3. Set Up Environment Variables:

- Create a .env file in the root directory:

```
touch .env
```

- Add the following variables:

```
OPENAI_API_KEY=<your-api-key>
PORT=3000
```

3. API Configuration

The API powers all backend functionality, including:

- Generating weight loss plans.
- Managing user progress and inputs.
- Connecting to the OpenAI engine for personalized recommendations.

Endpoints

Endpoint	Method	Description
/api/generate-plan	POST	Generates a personalized weight loss plan.
/api/upload-photo	POST	Allows users to upload progress photos.
/api/get-progress	GET	Retrieves user progress and analytics.
/api/admin-dashboard	GET	Admin-specific metrics and insights.

Input Validation

- Use middleware (e.g., express-validator) to validate all incoming requests.
- Example for /api/generate-plan:

```
app.post('/api/generate-plan', validateRequest, async (req, res) => {
   const userData = req.body;
   // Process data and return plan.
});
```

4. Running Locally

1. Start the Development Server:

```
npm run dev
```

2. Access the API:

- Visit http://localhost:3000 to test endpoints.

3. Use Postman or Curl:

- Test API functionality using tools like Postman.

5. Deployment to Replit

1. Set Up Replit Project:

- Create a new Replit project using the Node.js template.
- Upload all project files to Replit.

2. Configure Environment Variables:

- In Replit, go to Secrets and add:

```
OPENAI_API_KEY=<your-api-key>
```

3. Run the Server:

- Click Run to start the server.
- Note the provided public URL for accessing the API.

4. Enable Always-On (if available):

- For persistent hosting, ensure Always-On is enabled in your Replit plan.

6. Alternative Hosting Options

AWS/EC2:

1. Set up an EC2 instance and install Node.js.

2. Deploy the codebase to the server.

3. Use PM2 to ensure the server remains live:

```
pm2 start index.js
```

4. Map the API to a domain using AWS Route 53.

Render:

1. Push your repository to GitHub.
2. Create a new service in Render linked to your GitHub repo.
3. Specify the start command (npm start) and environment variables.

Vercel (for serverless):

1. Deploy API routes as serverless functions.
2. Define routes in the api/ folder for auto-deployment.

7. Testing and Quality Assurance

Unit Testing:

- Use jest for testing API endpoints and core logic:

```
npm install --save-dev jest
npm run test
```

Manual Testing:

- Use Postman to send requests and validate responses for all endpoints.

Automated Testing:

- Set up integration tests with a CI/CD pipeline (e.g., GitHub Actions).

8. Troubleshooting

Problem	Cause	Solution
404 Not Found	Incorrect endpoint URL.	Verify the URL and endpoint path.
500 Internal Error	Missing or invalid API key.	Ensure OPENAI_API_KEY is configured.
Deployment failure	Incorrect hosting platform configuration.	Recheck hosting steps or try another.

This Development and Deployment Guide ensures you can set up, run, and maintain the Weight Loss Coaching System effectively.