HydroPower Documentation

Overview

HydroPower is an AI-powered web and mobile app designed to analyze, enhance, and optimize swimming performance. It integrates real-time data from wearables (heart rate monitors, smart goggles) and machine learning models to offer structured workouts, dryland training, pace analysis, injury prevention, and nutritional advice.

Key Features

- Swim Workout Generator: Custom plans based on stroke, intensity & training goals.
- Dryland Training: Strength, core & mobility workouts tailored for swimmers.
- Pace & Workout Analysis: Evaluates lap times, heart rates & interval rest.
- Injury Prevention: AI-based recovery tips & prevention techniques.
- Nutrition Guidance: Structured diets (Veg, Vegan, Non-Veg) for optimal performance.
- Swimming Records & Knowledge: National & international stats for swimmers, coaches & parents.

Tech Stack

Backend & Cloud:

- Python (FastAPI/Flask) - For API development
- AWS Lambda / Google Cloud Functions - Low-cost, serverless architecture
- Firebase / Supabase - Real-time database
- AWS IoT Core / MQTT - Wearable data streaming
- TensorFlow Lite / ONNX - Lightweight ML model inference

Frontend & Mobile:

- React.js (Web) - Hosted on Vercel/GitHub Pages
- React Native (Mobile) - Cross-platform (iOS & Android)
- Streamlit (for interactive UI in some ML features)

Getting Started

1. Clone the Repository:

```
git clone https://github.com/your-username/HydroPower.git
cd HydroPower
```

2. Backend Setup:

pip install -r requirements.txt

uvicorn main:app --reload

3. Frontend Setup:

npm install

npm start

Contributing

1. Fork the repo & create a new branch.
2. Make your changes & commit with a meaningful message.
3. Push to your branch and submit a PR.