AI Yoga & Fitness Trainer App With Pose Detection

P. Navaneetha Krishnan[1], Mrs. V. Mageswari[2]

[1, 2] Dept of Computer Applications

[2]Assistant Professor, Dept of Computer Applications

[1, 2] Christ College of Engineering & Technology, Puducherry – 605 010, India.

Abstract- *We didn't just build an app. We built a coach. A smart one. It lives right in your phone and knows what you're doing. No wearables. No bands. Just your camera and a bit of AI magic. Built with Flutter and Google ML Kit's Pose Detection, this app sees your movements. Count push-ups, squats, jumping jacks, and more in real-time. It also checks your posturewhether you're nailing that yoga pose or not. You move, it responds. Simple.*

But wait, there's more. This app isn't just about exercises. It calculates your BMI. Helps track your nutrition. And turns workouts into game-like levels. It's part trainer, part game, and all smart. You get instant feedback. Progress tracking. Motivation. It's like a gym, a trainer, and a buddyall in one. Fitness has changed. And this app is proof.

Keywords-

- Tracks your posture in real-time.
- Six smart exercises: Push-ups to Bird Dog.
- Made with Flutter + ML Kit.
- Works on Android and iOS.
- BMI, food chart, and profile included.
- Firebase handles login and data.
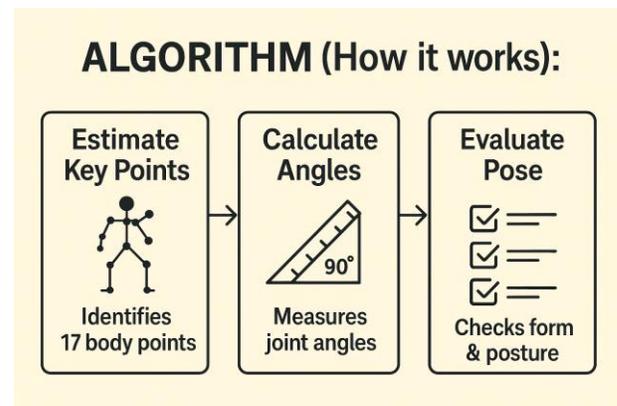- Game levels to keep you going

I. INTRODUCTION

Fitness matters more than ever. But not everyone can afford a gym, let alone a personal trainer. Life's busy. Time's tight. So we thoughtwhat if your phone became your coach? Not just an app. A real-time, smart trainer that knows when you're pushing hard or slacking off. That's how this project began. We wanted to build something that watches, listens, and helps you move better. That's what this app does.

Using Flutter for the frontend and Google's ML Kit for pose detection, we made a tool that doesn't just log workoutsit *sees* them. It tracks squats. Push-ups. Jumping jacks. Even yoga poses. And yeah, it checks your form live. If you're doing wrong, it knows. If you're doing great, it says so. It feels more like a friend than a machine. We didn't stop at movements. We added BMI calculation, nutrition tracking, and game-like levels to keep things fun.

This isn't your usual fitness app. It's light, smart, and personal. No wearables. No cables. Just your camera and clean code. Fitness made simple, but smarter.

II. ALGORITHM

It's not just an app. It's motion science packed into your pocket. Behind the scenes? Angles, vectors, and landmarks. Every elbow bend. Every knee dip. Every hip twist. It calculates all of it. Like a smart coach with a math degree. We use Google's ML Kit to detect body joints in real time. Then we start crunching fast.

ALGORITHM (How it works):

Estimate Key Points	Calculate Angles	Evaluate Pose
Identifies 17 body points	Measures joint angles	Checks form & posture

Angles matter. Big time. Let's say you're doing a squat. The app watches your knees, your hips, and your ankles. If that knee doesn't bend deep enough? Not counted. Same with push-ups. You drop too shallow? It won't budge the counter. It's picky like a coach, and honestly, that's a good thing.

Movements aren't just recognized, they're understood. The system checks the phases of motion. Going down is one. Coming up is another. Both must be clean. Controlled. Real. Half-reps, lazy jumps, or fake poses? Denied. The logic behind each rep is designed to spot only real effort. Because your progress deserves accuracy.

And the best part? It's personal. Built to adapt. Everyone's body is different. Your range of motion, limb length, and even how fast you move. It learns. Adjusts. Grows with you. Smarter detection. Less guessing. More results. It

gives targeted feedback—like "straighten your back," or "deepen your stance,"so you're not left wondering what went wrong.

Each pose, each exercise has its own rules. The algorithm switches modes for push-ups, squats, yoga poses, high knees, and more. You move. It analyzes. You pause—it knows. You mess up? It tells you. Did you nail it? It celebrates (well, silently… for now). That's the power of combining motion science with machine learning. All happening on your phone. In real time. With zero extra gear.

III. ADVANTAGES: [2],[5],[3]

- No Gadgets: Just your phone. That's all.
- All Phones: Android and iOS, thanks to Flutter.
- Fixes Your Form: In the moment. Not after.
- Total Health Buddy: BMI. Meals. Exercises.
- Fun Too: Level up as you move.
- Safe Data: Firebase keeps things secure.

IV. FUTURE SCOPE

We're not done. Not even close. What do you see now? Just the warm-up. The real workout? Oh, it's coming. Because fitnessit's not one-size-fits-all. And this app? It's learning. Evolving. About to get smarter. Louder. More human.

Picture this—your app talks. Like, talks. A voice in your pocket. "Let's go!" When you slow down. "One more!" when you wanna quit. You won't need to glance at the screen mid-squat. It'll be like a coach. But cooler. More chill.

More exercises? Oh yeah. Right now, we track the basics: push-ups, squats, jumping jacks. But soon, full yoga flows. Sun salutations. Warrior poses. Even crow pose—real-time feedback, all guided, all smart. Not just motion, but precision.

Next up, routines that aren't boring. No more one-size-fits-all junk. We're talking AI-built workouts. Based on *you*. Your energy. Your stats. Your patterns. It watches. Learns. Adapts. Each day, something better.

And wearables? That's in the queue. Smartwatches. Heart rate. Step sync. It'll all link up. Real-time metrics, right in the app. Less guesswork. More insights.

One more thingfun. We're bringing the squad. Invite your friends. Compete. Smash goals together. Track streaks. Climb leaderboards. Fitness isn't lonely anymore.

So what's coming next?

- Real-time voice coach. Hands-free motivation.
- Full-body yoga sequences with feedback.
- AI-generated routines made just for you.
- Smartwatch integration—heart rate, steps, and more.
- Social layer: friend challenges, leaderboards, progress sharing.

V. CONCLUSION: [2],[3]

This app isn't just a bunch of code stitched together; it's more like a coach that fits in your pocket. It watches you move, counts your reps, and quietly pushes you to do better. Built with Flutter for a smooth UI, powered by Google's ML Kit for real-time pose detection, and backed by Firebase for storing every bit of your journey, the tech is solid. But the real soul of this app? Helping people get stronger, healthier, and more confident in their bodies. It doesn't yell. It guides. It doesn't judge. It learns. Whether you're doing a perfect push-up or just figuring out your form, it's there, responding live, no extra gear needed. Fitness shouldn't feel like a chore or a luxury. And now, with just your phone, it doesn't have to. This app makes moving smarter, eating better, and staying consistent feel possible for everyone.

REFERENCES

[1] Google ML Kit Documentation. https://developers.google.com/ml-kit
[2] Flutter Official Docs. https://flutter.dev
[3] Firebase Documentation. https://firebase.google.com/docs
[4] OpenCV Pose Estimation Theory. https://docs.opencv.org
[5] WHO BMI [Guidelines. https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight