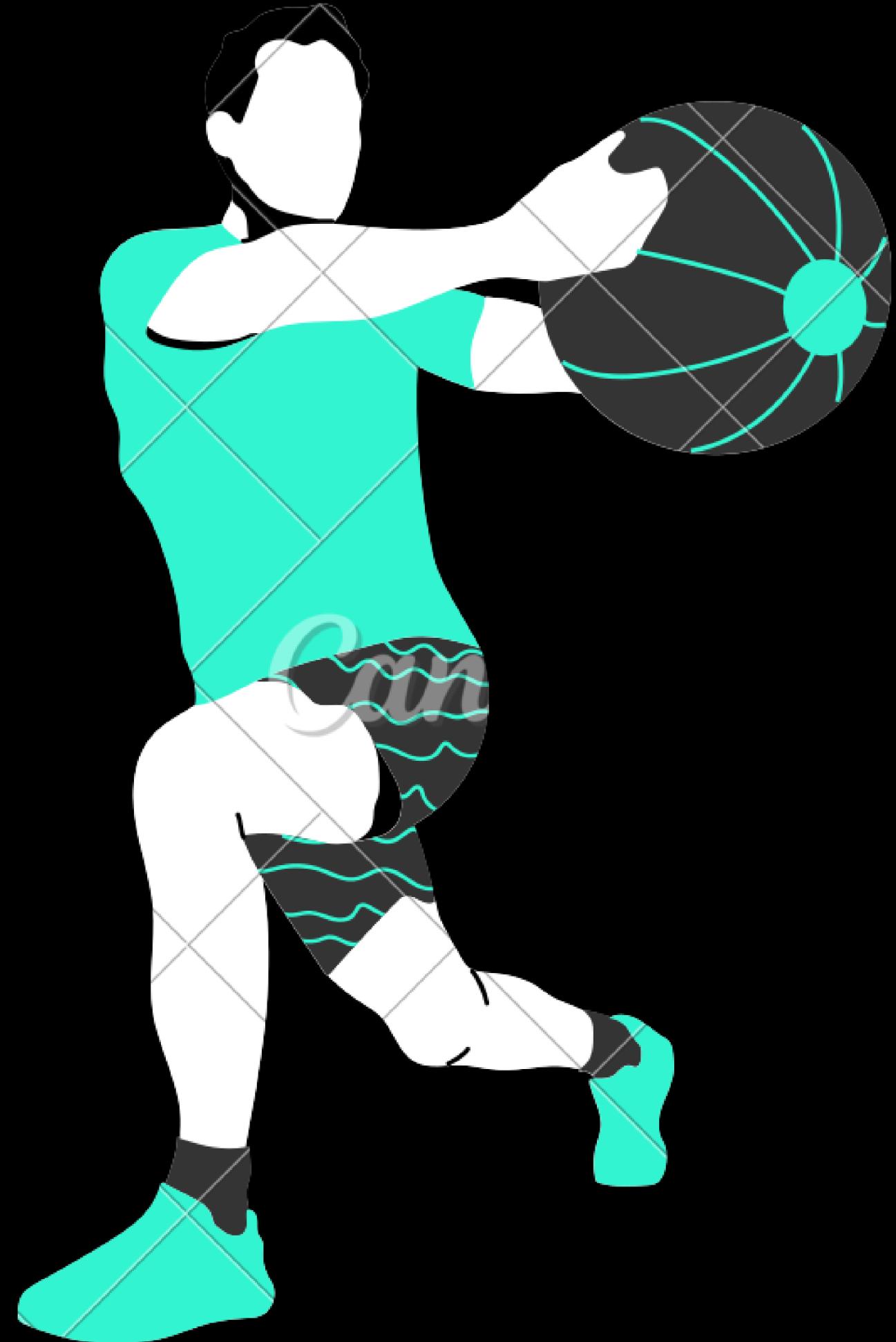


Personal Trainer

SOUMYA RANJAN NAYAK
23070243063

COURSE COORDINATOR:
DR. YOGESH RAJPUT



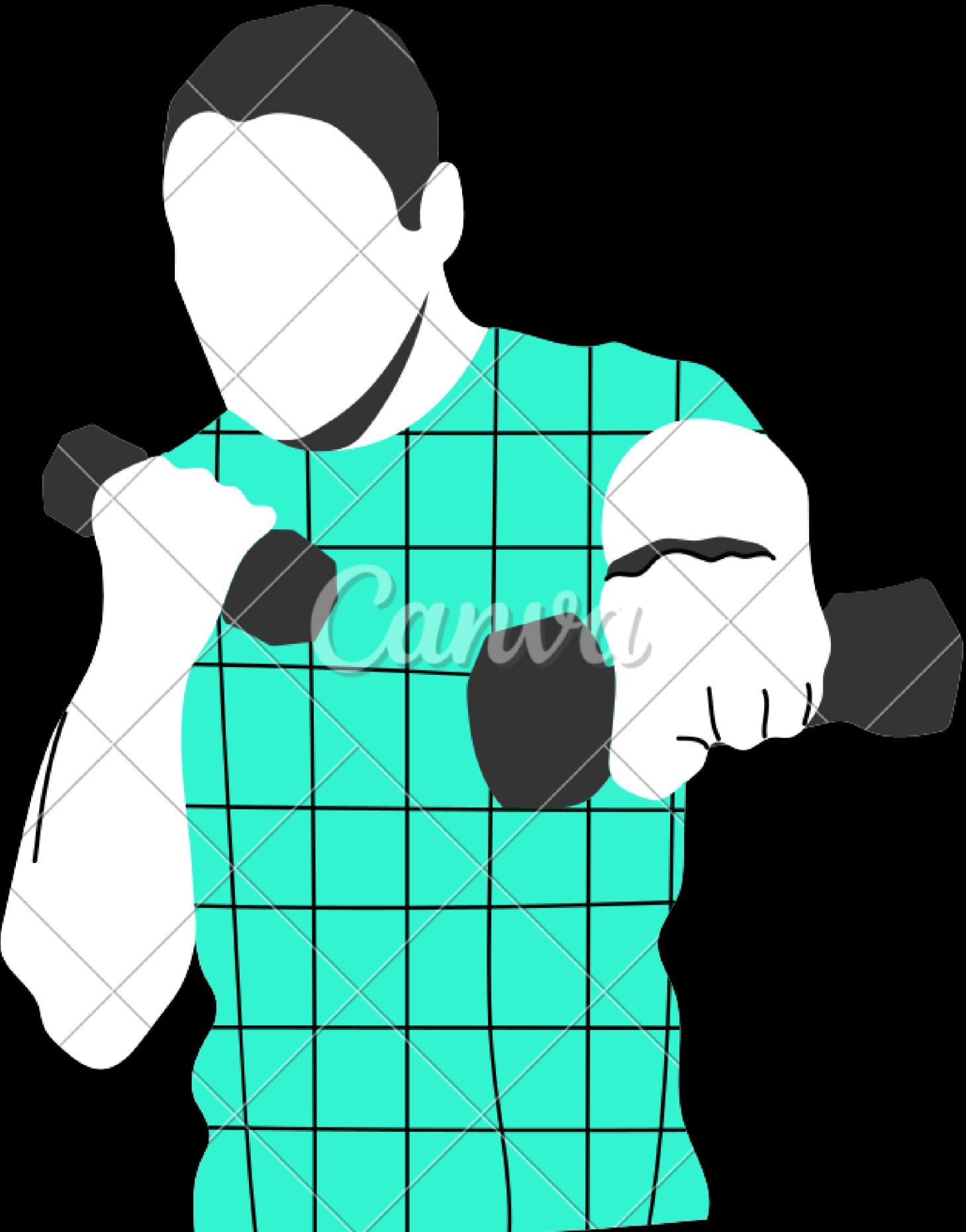
INTRODUCTION



The Real-time AI trainer project utilizes pose estimation techniques to track and count curls and pushups in real time using a standard webcam. By analyzing key points on the user's body, such as joints and limbs, the system accurately identifies exercises like curls and pushups. This project addresses the need for accurate workout activity monitoring in today's health and fitness-conscious era.

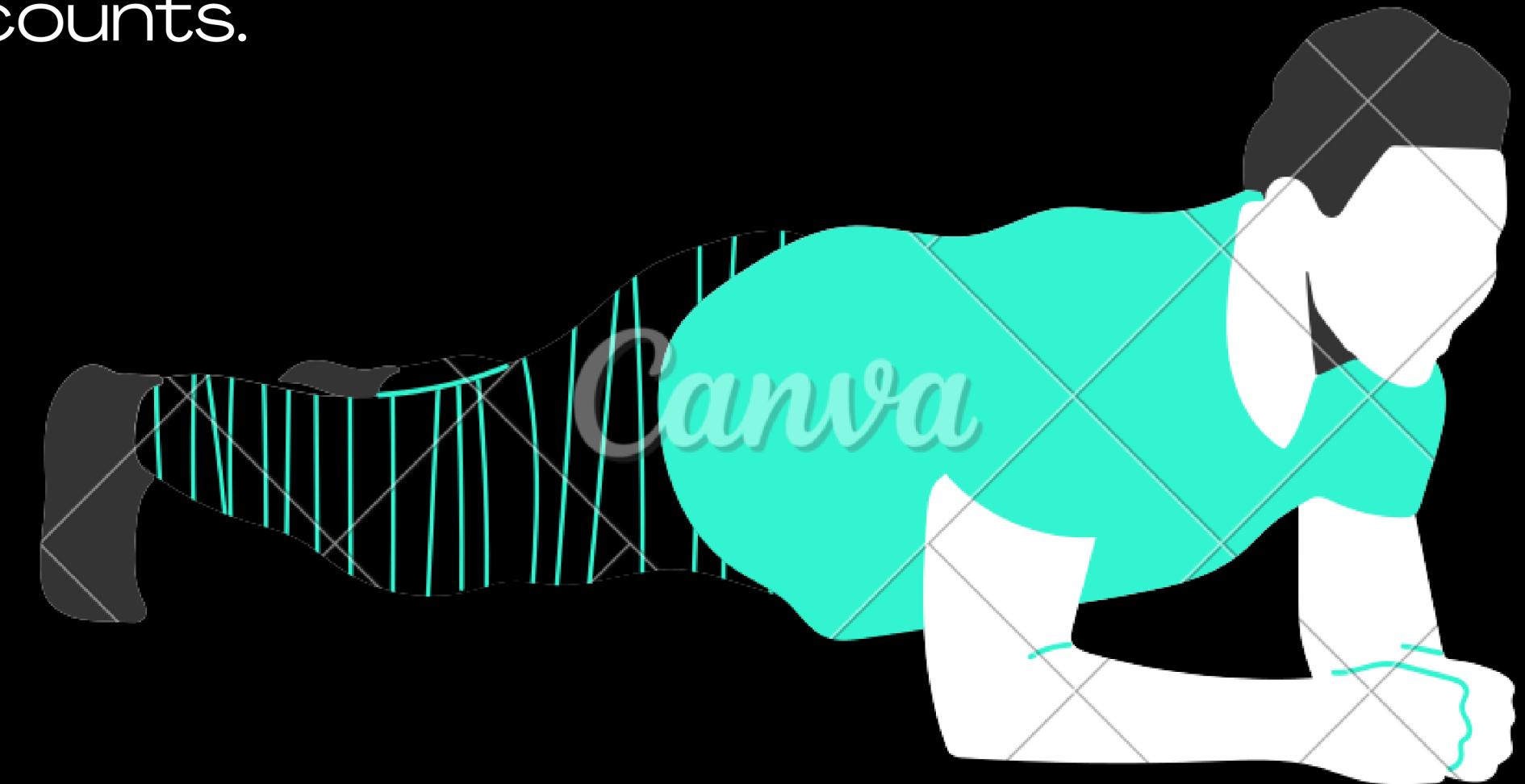
OBJECTIVE

- Develop a real-time pose estimation system using a webcam.
- Identify and track key body movements during workout sessions.
- Implement algorithms to accurately detect and count curls and pushups.
- Provide immediate visual feedback on the number of completed curls and pushups.
- Enable users to monitor their workout progress effectively and stay motivated.
- Offer a cost-effective solution for fitness tracking without specialized equipment.



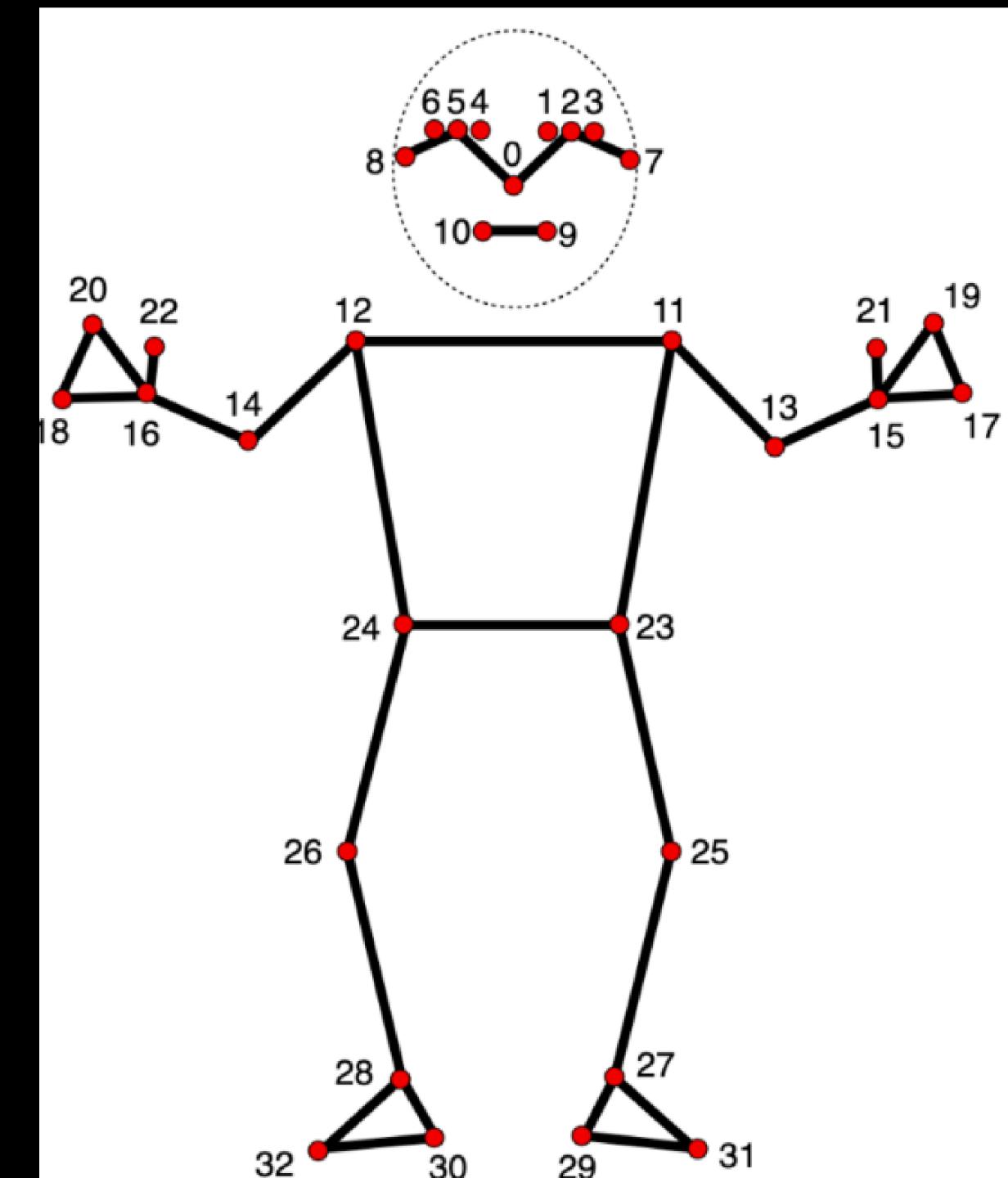
1. Pose Estimation: Use a model to detect body landmarks.
2. Landmark Tracking: Track hand and elbow movements.
3. Angle Calculation: Determine curl and pushup completion.
4. Thresholding: Set criteria for motion detection.
5. Counting: Increment count upon completing motions.
6. Visual Feedback: Display real-time counts.

METHODOLGY



MEDIPIPE

The MediaPipe Pose Landmarker task lets you detect landmarks of human bodies in an image or video. You can use this task to identify key body locations, analyze posture, and categorize movements. This task uses machine learning (ML) models that work with single images or video. The task outputs body pose landmarks in image coordinates and in 3-dimensional world coordinates..



1. Convolutional Neural Networks (CNNs)
2. Recurrent Neural Networks (RNNs)
3. Graph Neural Networks (GNNs)
4. KeyPoint Detection Models
5. Machine Learning Models for Feature Extraction

KEY ATTRACTORS

0 - nose
1 - left eye (inner)
2 - left eye
3 - left eye (outer)
4 - right eye (inner)
5 - right eye
6 - right eye (outer)
7 - left ear
8 - right ear
9 - mouth (left)
10 - mouth (right)
11 - left shoulder
12 - right shoulder
13 - left elbow
14 - right elbow
15 - left wrist
16 - right wrist
17 - left pinky
18 - right pinky
19 - left index
20 - right index

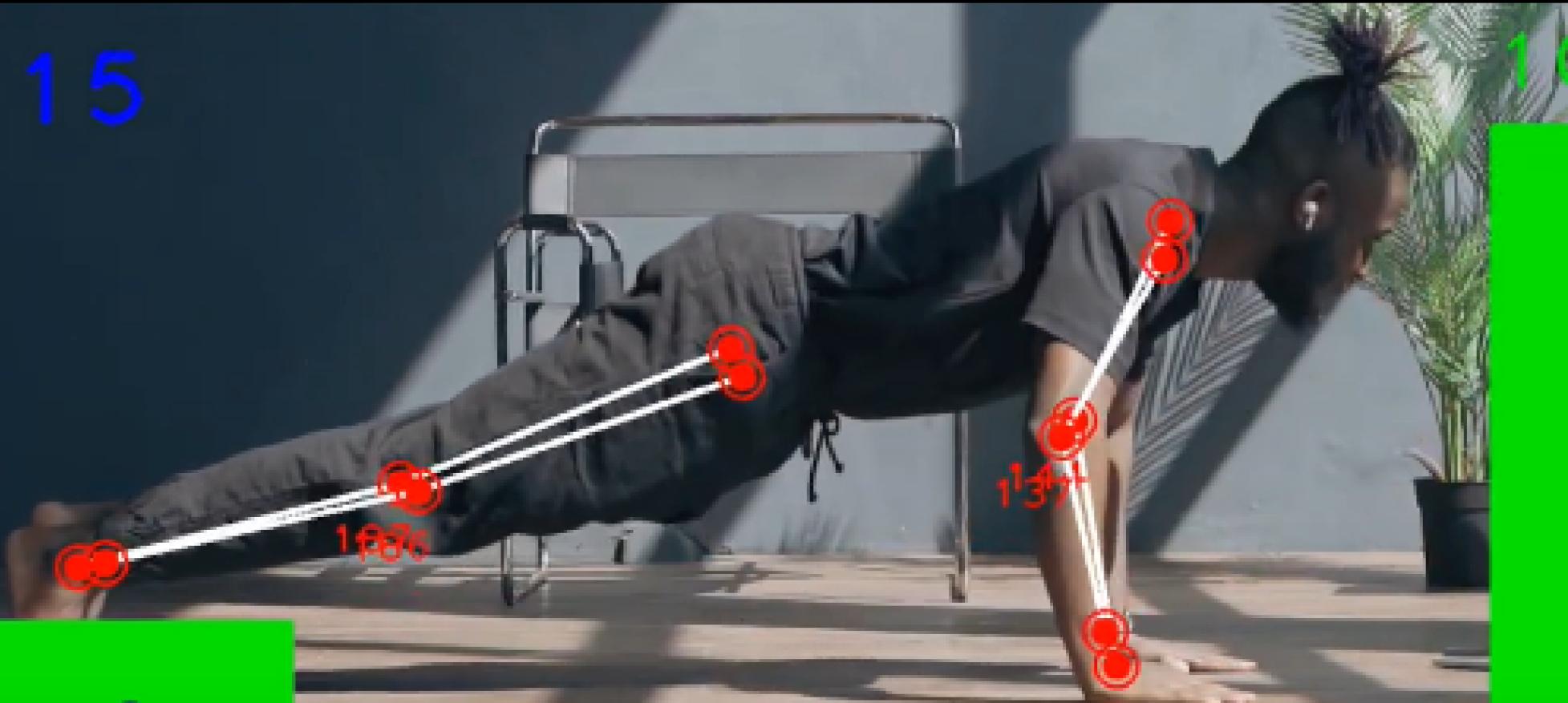
21 - left thumb
22 - right thumb
23 - left hip
24 - right hip
25 - left knee
26 - right knee
27 - left ankle
28 - right ankle
29 - left heel
30 - right heel
31 - left foot index
32 - right foot index



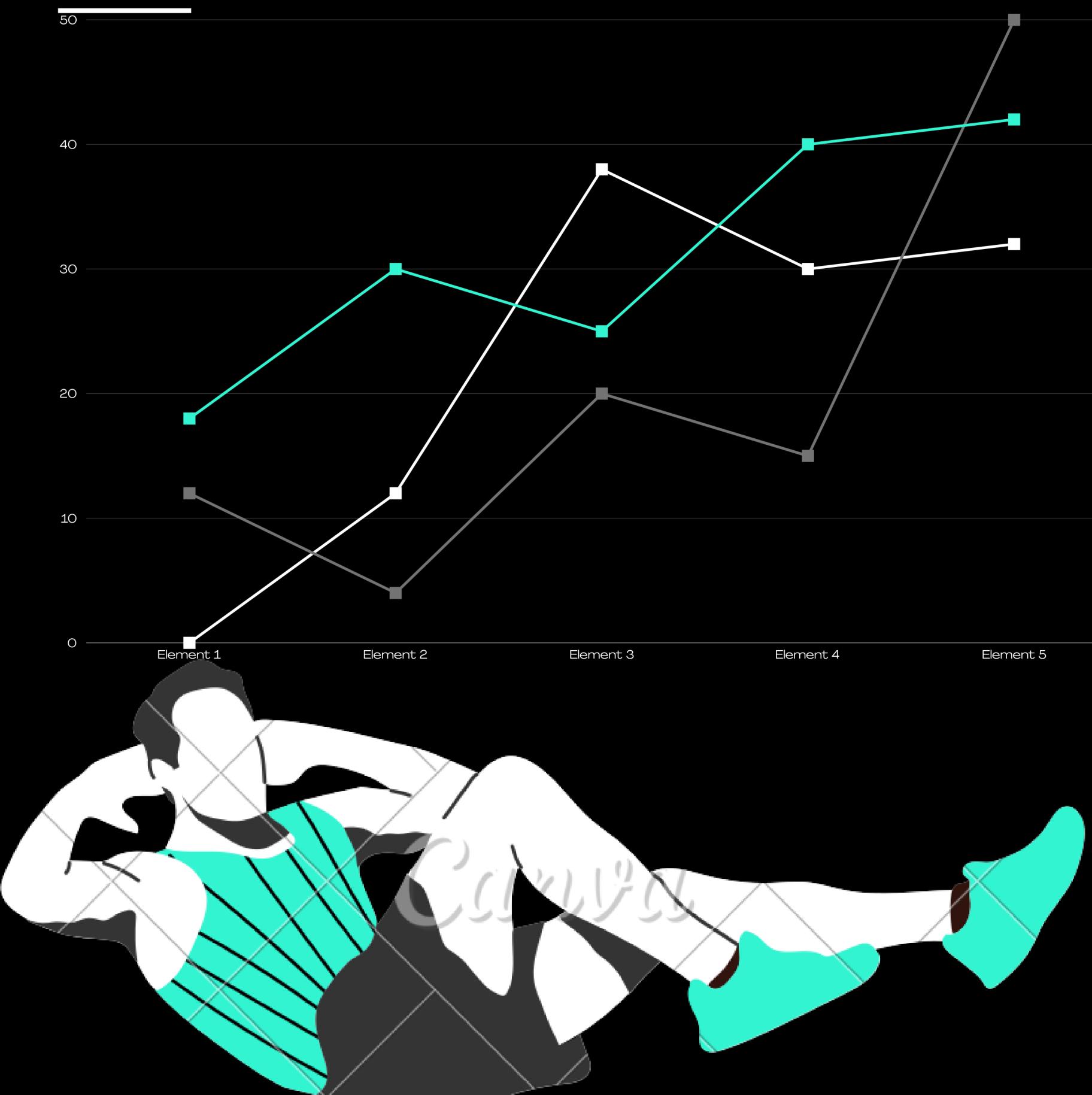
THE RESULTS

15

4+



Future work includes:



1. Database Integration: Implement a database to store user training data for analysis and progress tracking.
2. Machine Learning Integration: Utilize machine learning algorithms to analyze user data and provide personalized health and fitness recommendations, such as workout plans and dietary suggestions.
3. AI Instruction and Prescription: Integrate artificial intelligence to offer real-time guidance and personalized exercise prescriptions during workout sessions, enhancing the user experience and optimizing training effectiveness.

Conclusion

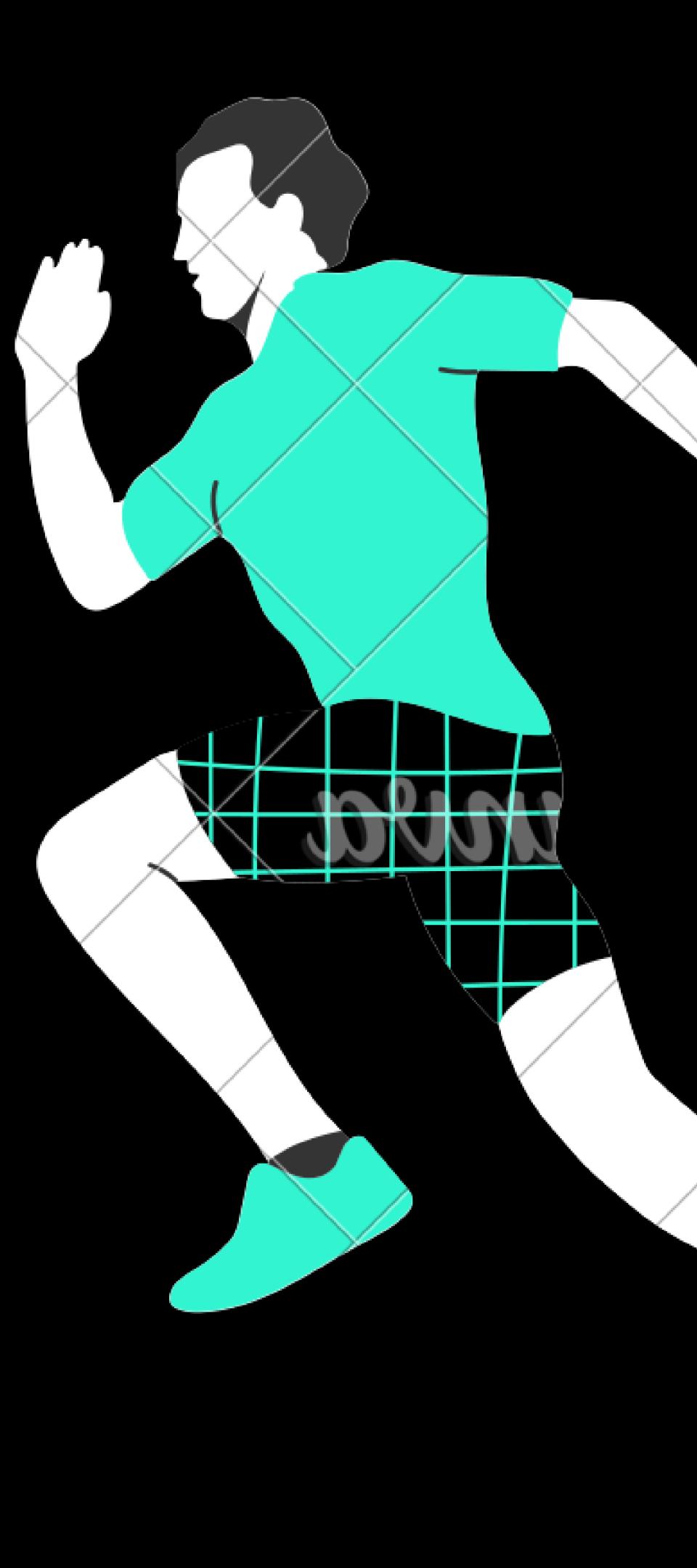
In conclusion, the Trainer Counter project demonstrates the practical application of computer vision and pose estimation techniques in monitoring and tracking workout activities. By accurately detecting and counting curls and pushups in real-time using a standard webcam, this project provides users with valuable insights into their exercise performance. With further enhancements and integration of machine learning and artificial intelligence, this system has the potential to revolutionize the way individuals monitor their fitness progress and receive personalized health recommendations.



REFERENCES



Mediapipe:
https://developers.google.com/mediapipe/solutions/vision/pose_landmarker



Thanks

SRN