The Pose Analysis Tool is a comprehensive computer vision application designed for fitness form analysis and posture assessment. Developed for Smartan FitTech, this tool leverages advanced machine learning algorithms to provide real-time feedback on exercise performance, helping users improve their workout form and prevent injuries.

Feature of the tool includes:

- **Real-time Exercise Analysis**: Monitor and analyze exercise form during live workouts
- **Form Feedback**: Provide actionable feedback to improve exercise technique
- **Video Clip Assessment:** Detailed analysis of pre-recorded workout videos
- **User-Friendly Interface**: Intuitive GUI for easy operation by fitness enthusiasts and professionals

Technologies used:

- **Programming Language**: Python 3.7+
- **Computer Vision**: OpenCV 4.x
- **Machine Learning**: MediaPipe (Google)
- **GUI Framework**: Tkinter with PIL/Pillow
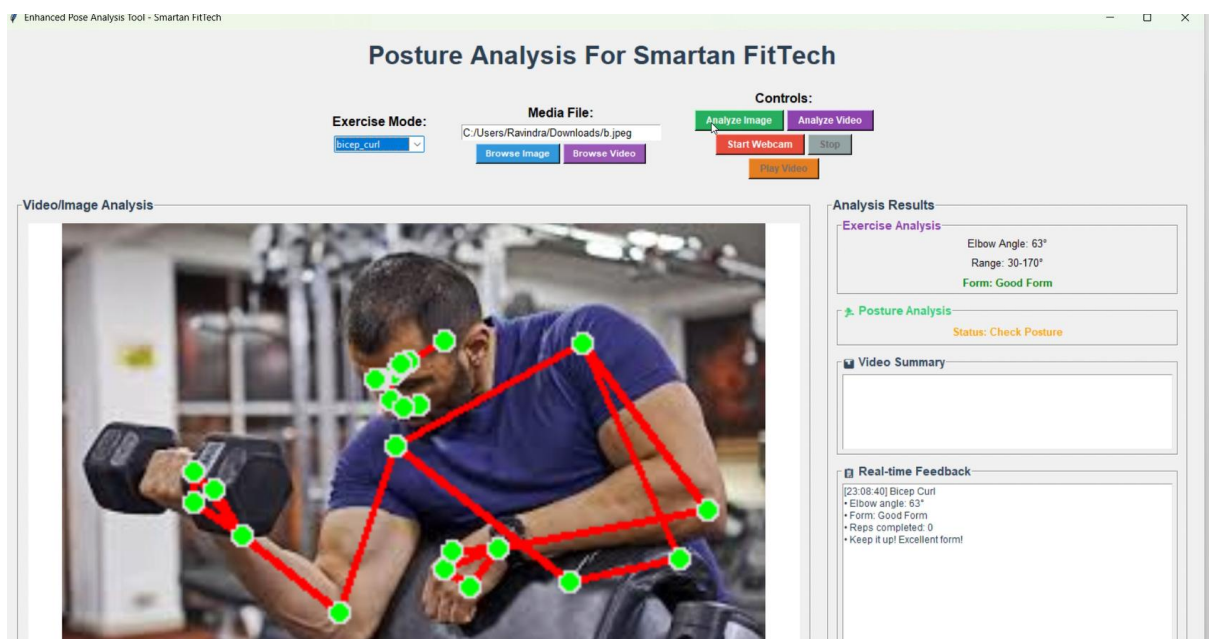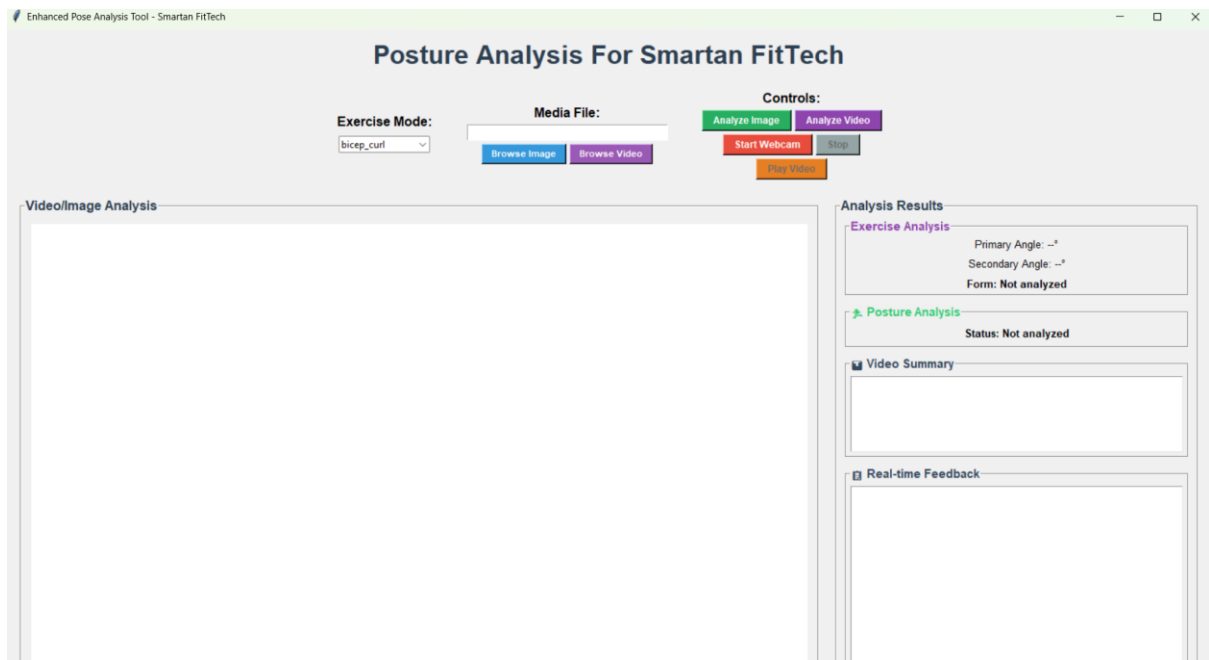- **Data Processing**: NumPy

Dependencies:

- Opencv-python: computer vision
- Mediapipe:pose detection
- Numpy: mathematical operations
- Pillow:image processing and display
- Tkinter: GUI

The exercise rules are as follows:

1. **Bicep Curls**
   - Elbow angle measurement (30°-170° optimal range)
   - Form quality assessment
2. **Push-ups**
   - Elbow angle analysis (70°-180° range)
   - Body alignment measurement
   - Core stability assessment
3. **Squats**
   - Knee angle tracking (70°-180° range)
   - Hip angle analysis
   - Depth measurement and posture evaluation
4. **General Pose Analysis**
   - Full body posture assessment
   - Symmetry analysis
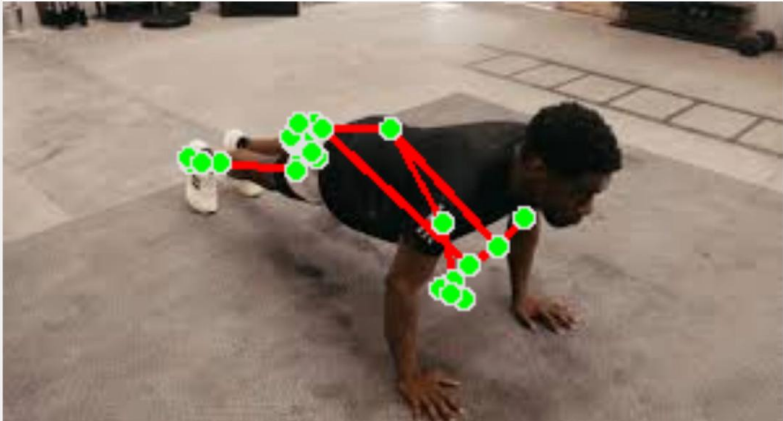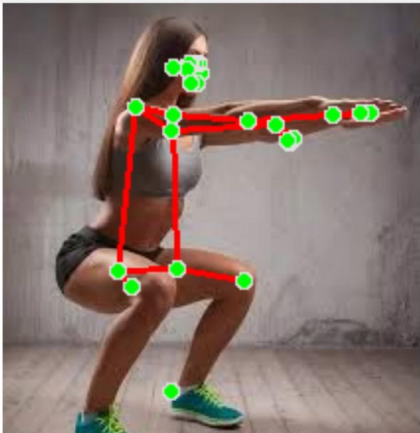   - Balance evaluation

Below are the results:

Posture Analysis For Smartan FitTech

Exercise Mode:
bicep_curl

Media File:

Browse Image   Browse Video

Controls:
Analyze Image   Analyze Video
Start Webcam   Stop
Play Video

Video/Image Analysis

Analysis Results

Exercise Analysis
Primary Angle: --°
Secondary Angle: --°
Form: Not analyzed

Posture Analysis
Status: Not analyzed

Video Summary

Real-time Feedback

Posture Analysis For Smartan FitTech

Exercise Mode:
bicep_curl

Media File:
C:/Users/Ravindra/Downloads/b.jpeg

Browse Image   Browse Video

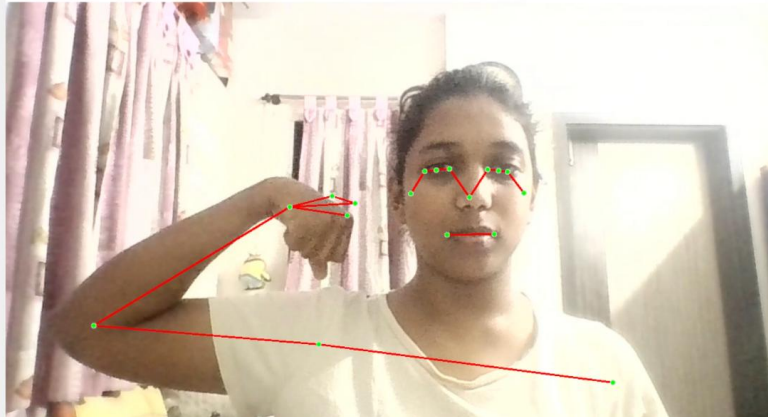Controls:
Analyze Image   Analyze Video
Start Webcam   Stop
Play Video

Video/Image Analysis

Analysis Results

Exercise Analysis
Elbow Angle: 63°
Range: 30-170°
Form: Good Form

Posture Analysis
Status: Check Posture

Video Summary

Real-time Feedback
[23:08:40] Bicep Curl
• Elbow angle: 63°
• Form: Good Form
• Reps completed: 0
• Keep it up! Excellent form!

Posture Analysis For Smartan FitTech

Exercise Mode:
pushup

Media File:
C:/Users/Ravindra/Downloads/push.jpeg

Browse Image   Browse Video

Controls:
Analyze Image   Analyze Video
Start Webcam   Stop
Play Video

Video/Image Analysis

Analysis Results

Exercise Analysis
Elbow Angle: 159
Body Angle: 83
Form: Check Form

Posture Analysis
Status: Good Posture

Video Summary

Real-time Feedback
[23:08:40] Bicep Curl
• Elbow angle: 63°
• Form: Good Form
• Reps completed: 0
• Keep it up! Excellent form!

[23:09:00] Push-up
• Elbow angle: 159
• Body alignment: 83
• Form: Check Form
• Reps completed: 0
• Keep your body straight

Posture Analysis For Smartan FitTech

Exercise Mode:
squat

Media File:
C:/Users/Ravindra/Downloads/squat1.jpeg

Browse Image   Browse Video

Controls:
Analyze Image   Analyze Video
Start Webcam   Stop
Play Video

Video/Image Analysis

Analysis Results

Exercise Analysis
Knee Angle: 70°
Hip Angle: 101°
Form: Good Form

Posture Analysis
Status: Good Posture

Video Summary

Real-time Feedback
[23:09:17] Squat
• Knee angle: 46
• Hip angle: 83
• Form: Check Form
• Reps completed: 0
• Great depth! Keep it up
• Keep chest up and back straight

[23:09:19] Squat
• Knee angle: 70
• Hip angle: 101
• Form: Good Form
• Reps completed: 0