

POSTURE-ANALYSIS-DOCUMENTATION

Posture rule:

For the bicep curl posture analysis, the main idea is to track how your arm moves during the exercise and detect whether the person is doing correctly or not.

To do that, we follow three key angles:

➤ ELBOW ANGLE:

- This helps us understand how much your arm is and at what angle it is bending.
- When the elbow angle becomes small (ex: below 50 or 60 degrees), we say that it is in the “Upward” position and “Downward” position. if the elbow angle increases (ex: above 150 degrees).

➤ SHOULDER- ELBOW-WRIST ALIGNMENT:

- We check whether the wrist goes too forward or backward. If the wrist moves out of line, it means the form is not strict.

➤ LOGIC BEHIND THE RULES:

As the person performs the curl, the elbow angle continuously opens and closes. By following these changes, we can understand the movement pattern.

We can identify every repetition without confusion.

By using keypoints (shoulder, elbow, wrist), we calculate the angle using basic geometry.

The smoothening step (like a moving average) prevents “jumping values”, which commonly happens in pose detection.

➤ CHALLENGES FACED:

- Multiple people in the same video

If I handle multiple people in the same video footage the algorithm gets confused about which one is exercising.

To handle this type of situation:

- We pick the person closest to the camera (largest bounding box).
- Or we pick the person at the center of the frame.
- Or we allow the user to select which person's ID to track.
- This keeps the analysis accurate even when multiple people appear in the footage.
- Movement can create small vibrations in key points so, we smooth the angle using averaging (like a 5-frame window).