LAMPIRAN

1. Script app.py

```
from flask import Flask, render_template, Response, request, jsonify, send_file
from flask_socketio import SocketIO
import cv2
import json
import mediapipe as mp
import numpy as np
from scipy.spatial import procrustes
import base64
import os
app = Flask(__name__)
socketio = SocketIO(app)
mp_pose = mp.solutions.pose
mp_drawing = mp.solutions.drawing_utils
image_name = "Camel"
image = None
# Extract landmarks from JSON data
landmarks_from_json = []
the_landmarks = None
dataset = {"name": "", "ket": ""}
similarity = 0
all_data = []
def load_image_and_landmarks(image_name):
    global image, landmarks_from_json, the_landmarks, all_data
    landmarks_from_json = []  # Clear previous landmarks
```

```
    # Load JSON data
    with open('data_yoga.json') as f:
        data = json.load(f)
        all_data = data
    # Load the image and landmarks
    for the_data in data:
        if the_data['name'] == image_name:
            for lm in the_data['landmarks']:
                landmarks_from_json.append([lm['coordinates'][0], lm['coordinates'][1]])
            the_landmarks = the_data['landmarks']
            image = cv2.imread(the_data['image_name'])
            dataset["name"] = the_data['name']
            dataset["ket"] = the_data['ket']
# Define the function to calculate the color based on similarity
def calculate_color(similarity):
    if similarity < 80:
        return (0, 0, 255)  # Red
    else:
        normalized_similarity = (similarity - 55) / 45
        red = int((1 - normalized_similarity) * 255)
        green = int(normalized_similarity * 255)
        return (0, green, red)
def resample_landmarks(landmarks, target_length):
    idxs = np.linspace(0, len(landmarks) - 1, target_length).astype(int)
    return [landmarks[i] for i in idxs]
```

```
def calculate_similarity(landmarks1, landmarks2):
    if not landmarks1 or not landmarks2:
        return 0
    len1 = len(landmarks1)
    len2 = len(landmarks2)
    # Resample landmarks to ensure they have the same number of points
    if len1 != len2:
        if len1 < len2:
            landmarks2 = resample_landmarks(landmarks2, len1)
        else:
            landmarks1 = resample_landmarks(landmarks1, len2)
    # Convert to numpy arrays
    landmarks1 = np.array(landmarks1)
    landmarks2 = np.array(landmarks2)
    # Normalize landmarks by removing the mean
    norm_landmarks1 = landmarks1 - np.mean(landmarks1, axis=0)
    norm_landmarks2 = landmarks2 - np.mean(landmarks2, axis=0)
    # Perform Procrustes analysis to align the shapes
    _, mtx1, mtx2 = procrustes(norm_landmarks1, norm_landmarks2)
    # Calculate the Euclidean distances between corresponding landmarks
    dists = np.linalg.norm(mtx1 - mtx2, axis=1)
    # Calculate the similarity as the inverse of the average distance
    avg_dist = np.mean(dists)
    similarity = max(0, 1 - avg_dist)
    # Scale the similarity to a percentage
```

```
    similarity_percentage = similarity * 100
    return similarity_percentage
def draw_landmarks(image, landmarks):
    global similarity
    annotated_image = image.copy()
    for landmark in landmarks:
        landmark_x = int(landmark['coordinates'][0] * annotated_image.shape[1])
        landmark_y = int(landmark['coordinates'][1] * annotated_image.shape[0])
        cv2.circle(annotated_image, (landmark_x, landmark_y), 5, (0, 255, 0), -1)
    connections = mp_pose.POSE_CONNECTIONS
    for connection in connections:
        start_idx = connection[0]
        end_idx = connection[1]
        if 0 <= start_idx < len(landmarks) and 0 <= end_idx < len(landmarks):
            start_landmark = landmarks[start_idx]['coordinates']
            end_landmark = landmarks[end_idx]['coordinates']
            start_x = int(start_landmark[0] * annotated_image.shape[1])
            start_y = int(start_landmark[1] * annotated_image.shape[0])
            end_x = int(end_landmark[0] * annotated_image.shape[1])
            end_y = int(end_landmark[1] * annotated_image.shape[0])
            cv2.line(annotated_image, (start_x, start_y), (end_x, end_y), (0, 255, 0), 2)
    return annotated_image
def generate_frames():
    global similarity
    cap = cv2.VideoCapture(1)
```

```
    with mp_pose.Pose(min_detection_confidence=0.5, min_tracking_confidence=0.5) as
pose:
        while cap.isOpened():
            ret, frame = cap.read()
            if not ret:
                break
            image_rgb = cv2.cvtColor(frame, cv2.COLOR_BGR2RGB)
            image_rgb.flags.writeable = False
            results = pose.process(image_rgb)
            image_rgb.flags.writeable = True
            image_bgr = cv2.cvtColor(image_rgb, cv2.COLOR_RGB2BGR)
            the_color = calculate_color(similarity)
            if results.pose_landmarks:
                mp_drawing.draw_landmarks(
                    image_bgr,
                    results.pose_landmarks,
                    mp_pose.POSE_CONNECTIONS,
                    mp_drawing.DrawingSpec(color=(0, 255, 0), thickness=4, circle_radius=2),
                    mp_drawing.DrawingSpec(color=(the_color), thickness=4, circle_radius=2),
                )
                landmarks_from_webcam = []
                for lm in results.pose_landmarks.landmark:
                    landmarks_from_webcam.append([lm.x, lm.y])
                                    similarity = calculate_similarity(landmarks_from_json,
landmarks_from_webcam)
```

```
                    cv2.putText(image_bgr, f'Similarity: {similarity:.2f}%', (10, 30),
cv2.FONT_HERSHEY_SIMPLEX, 1, (0, 255, 0), 2)
            ret, buffer = cv2.imencode('.jpg', image_bgr)
            frame = buffer.tobytes()
            yield (b'--frame\r\n'
                   b'Content-Type: image/jpeg\r\n\r\n' + frame + b'\r\n')
    cap.release()
@app.route('/')
def index():
    image_name = request.args.get('image_name', 'Camel')
    previous = None
    next = None
    load_image_and_landmarks(image_name)
    current_index = 0
    for index, data in enumerate(all_data):
        if data['name'] == image_name:
            current_index = index
            break
    if current_index == 0:
        previous = all_data[-1]['name']
    else:
        previous = all_data[current_index - 1]['name']

    if current_index == len(all_data) - 1:
        next = all_data[0]['name']
```

```
    else:
        next = all_data[current_index + 1]['name']
    annotated_image = draw_landmarks(image, the_landmarks)
    _, buffer = cv2.imencode('.jpg', annotated_image)
    img_str = base64.b64encode(buffer).decode('utf-8')
    return render_template('index2.html', img_str=img_str, previous=previous, next=next)
@app.route('/video_feed')
def video_feed():
        return Response(generate_frames(), mimetype='multipart/x-mixed-replace;
boundary=frame')
@app.route('/getdata', methods=['GET'])
def getdata():
    return jsonify(all_data)
@app.route('/similarity', methods=['GET'])
def get_similarity():
    global similarity
    return {'similarity': similarity, 'data': dataset}
@app.route('/pose_dataset')
def pose_dataset():
    load_image_and_landmarks("Camel")
    return render_template('pose_dataset.html', data=all_data)
@app.route('/show_image')
def show_image():
    image_path = request.args.get('image_path')
    if image_path and os.path.exists(image_path):
```

```
        return send_file(image_path, mimetype='image/jpeg')
    else:
        return "Image not found", 404
if __name__ == '__main__':
    socketio.run(app, debug=True)
```

2. Script Index

```
<!DOCTYPE html>
<html lang="en">
<!-- Mirrored from demo.ninjateam.org/html/my-admin/light/page-starter.html by HTTrack Website Copier/3.x [XR&CO'2014], Wed, 03 Jan 2018 03:48:56 GMT -->
<head>
    <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
    <meta http-equiv="X-UA-Compatible" content="IE=edge">
        <meta name="viewport" content="width=device-width, initial-scale=1, user-scalable=no">
    <meta name="description" content="">
    <meta name="author" content="">
    <title>Yoga Pose Recognition</title>
    <!-- Main Styles -->
    <link rel="stylesheet" href="static/styles/style.min.css">
    <!-- Material Design Icon -->
    <link rel="stylesheet" href="static/fonts/material-design/css/materialdesignicons.css">

    <!-- mCustomScrollbar -->
```

```
                                    <link rel="stylesheet"
href="static/plugin/mCustomScrollbar/jquery.mCustomScrollbar.min.css">
    <!-- Waves Effect -->
    <link rel="stylesheet" href="static/plugin/waves/waves.min.css">
    <!-- Sweet Alert -->
    <link rel="stylesheet" href="static/plugin/sweet-alert/sweetalert.css">
    <style>
        table {
            border: 1px;
            font-family: arial, sans-serif;
            border-collapse: collapse;
            width: 86%;
            margin: auto;
        }
        td,
        th {
            border: 1px solid black !important;
            padding: 5px;
        }
        tr:nth-child(even) {
            background-color: #dddddd;
        }
    </style>
</head>
<body>
```

```
<div class="main-menu">
    <header class="header">
            <a href="" class="logo"><i class="ico mdi mdi-account-box"></i>Body Tracking</a>
                    <button type="button" class="button-close fa fa-times js__menu_close"></button>
        <div class="user">
            <!-- <a href="#" class="avatar"><img src="static/images/avatar-sm-5.jpg" alt=""><span
                class="status online"></span></a> -->
            <h5 class="name"><a href="">Pengguna</a></h5>
            <h5 class="position">User</h5>
            <!-- /.name -->
            <!-- /.control-wrap -->
        </div>
        <!-- /.user -->
    </header>
    <!-- /.header -->
    <div class="content">
        <div class="navigation">
            <h5 class="title">Navigation</h5>
            <!-- /.title -->
            <ul class="menu js__accordion">
                <li class="current">
```

```
                    <a class="waves-effect ac" href="{{ url_for('index') }}"><i class="menu-
icon mdi mdi-account-box"></i><span>Deteksi Pose</span></a>
                </li>
                <li>
                        <a class="waves-effect ac" href="{{ url_for('pose_dataset') }}"><i
class="menu-icon mdi mdi-account-card-details"></i><span>Pose Dataset</span></a>
                </li>
              </ul>
            </div>
            <!-- /.navigation -->
        </div>
        <!-- /.content -->
    </div>
    <!-- /.main-menu -->
    <div class="fixed-navbar">
        <div class="pull-left">
            <button type="button" class="menu-mobile-button glyphicon glyphicon-menu-
hamburger js__menu_mobile"></button>
                    <h1 class="page-title"><span id="today_date"></span> | <span
id="clock"></span></h1>
            <!-- /.page-title -->
        </div>
        <!-- /.pull-left -->
        <div class="pull-right">
        </div>
```

```
        <!-- /.pull-right -->
    </div>
    <!-- /.fixed-navbar -->
    <!-- /#message-popup -->
    <div id="wrapper">
        <div class="main-content">
            <div class="row small-spacing">
                <div class="col-xs-6 col-md-6">
                    <div class="box-content card">
                        <!-- span italic -->
                                <h4 class="box-title">Pose <span id="pose" style="font-style:
italic;"></span></h4>
                        <div class="card-content">
                            <img src="{{ img_str }}" style="width:100%;
height:400px;">
                        </div>
                    </div>
                </div>
                <div class="col-xs-6 col-md-6">
                    <div class="box-content card">
                        <h4 class="box-title">Pose Tubuh <span id="similarity"></span></h4>
                        <div class="card-content">
                                <img src="{{ url_for('video_feed') }}" style="width:100%;
height:400px;">
                        </div>
```

```
            </div>
          </div>
        </div>
        <div class="row small-spacing">
          <div class="col-xs-2 col-md-2 text-center">
            <!-- url with parameters image_name-->
                    <a href="{{ url_for('index', image_name=previous) }}"><button
type="button" class="btn btn-primary btn-xs" id="previous">Sebelumnya</button></a>
          </div>
          <div class="col-xs-8 col-md-8">
            <div class="box-content card">
              <h4 class="box-title">Keterangan</h4>
              <!-- <br> -->
              <div class="card-content">
                <p id="keterangan" style="font-size: 15px;"></p>
              </div>
            </div>
          </div>
          <div class="col-xs-2 col-md-2 text-center">
            <!-- create a next button  and put it on center-->
              <a href="{{ url_for('index', image_name=next) }}"><button type="button"
id="button_next" class="btn btn-primary btn-xs" id="next">Selanjutnya</button></a>
          </div>
        </div>
        <footer class="footer">
```

```
            <ul class="list-inline">
                <li>2024 © Muhammad Irsan.</li>
                <!-- <li><a href="#">Website</a></li>
                <li><a href="#">Facebook</a></li> -->
                <!-- <li><a href="#">Help</a></li> -->
            </ul>
        </footer>
    </div>
    <!-- /.main-content -->
</div><!--/#wrapper -->
 <!-- HTML5 shim and Respond.js for IE8 support of HTML5 elements and media queries -->
<!--[if lt IE 9]>
    <script src="static/script/html5shiv.min.js"></script>
    <script src="static/script/respond.min.js"></script>
<![endif]-->
<!--
================================================ -->
<!-- Placed at the end of the document so the pages load faster -->
<script src="static/scripts/jquery.min.js"></script>
<script src="static/scripts/modernizr.min.js"></script>
<script src="static/plugin/bootstrap/js/bootstrap.min.js"></script>
                                                                    <script src="static/plugin/mCustomScrollbar/jquery.mCustomScrollbar.concat.min.js"></script>
<script src="static/plugin/nprogress/nprogress.js"></script>
```

```
<script src="static/plugin/sweet-alert/sweetalert.min.js"></script>
<script src="static/plugin/waves/waves.min.js"></script>
<script src="static/scripts/main.min.js"></script>
<script>
    var clockElement = document.getElementById('clock');
    var date = new Date();
    function clock() {
        clockElement.textContent = new Date().toString().slice(15, 24);
    }
    function today_date() {
        $('#today_date').html(date.toDateString());
    }
    today_date();
    setInterval(clock, 1000);
    var counter = 0;
    // // check data every 2 seconds
    setInterval(function () {
        $.ajax({
            url: 'http://127.0.0.1:5000/similarity',
            type: 'GET',
            success: function (data) {
                console.log(data);
                var similarity = data.similarity;
                if (similarity <85) {
                    counter = 0
```

```
            }else{
                counter = counter + 1
            }
            if(counter == 5){
                // click the button_next id
                $('#button_next').trigger('click');
            }
            // only 2 behind .
            similarity = similarity.toFixed(2);
            $('#similarity').html(similarity+ ' % tingkat kesamaan');
            console.log(data.data.name);
            $("#pose").html(data.data.name);
            $('#keterangan').html(data.data.ket);
            // if(data['ket'] == null){
            //  $('#keterangan').html('Tidak ada pose yang terdeteksi');
            // }else{
            //  $('#keterangan').html(data['ket']);
            // }
        }
    });
}, 2000);
// set interval 70 second and change pose
// setInterval(function () {
//     window.location.href="{{ url_for('index', image_name=next) }}";
// }, 70000);
```

```
    </script>
</body>
<!-- Mirrored from demo.ninjateam.org/html/my-admin/light/page-starter.html by HTTrack Website Copier/3.x [XR&CO'2014], Wed, 03 Jan 2018 03:48:56 GMT -->
</html>
```

3. Script Pose Dataset

```
<!DOCTYPE html>
<html lang="en">
<!-- Mirrored from demo.ninjateam.org/html/my-admin/light/page-starter.html by HTTrack Website Copier/3.x [XR&CO'2014], Wed, 03 Jan 2018 03:48:56 GMT -->
<head>
    <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
    <meta http-equiv="X-UA-Compatible" content="IE=edge">
        <meta name="viewport" content="width=device-width, initial-scale=1, user-scalable=no">
    <meta name="description" content="">
    <meta name="author" content="">
    <title>Yoga Pose Recognition</title>
    <!-- Main Styles -->
    <link rel="stylesheet" href="static/styles/style.min.css">
    <!-- Material Design Icon -->
    <link rel="stylesheet" href="static/fonts/material-design/css/materialdesignicons.css">
    <!-- mCustomScrollbar -->
                                                <link                                rel="stylesheet"
href="static/plugin/mCustomScrollbar/jquery.mCustomScrollbar.min.css">
```

```
    <!-- Waves Effect -->
    <link rel="stylesheet" href="static/plugin/waves/waves.min.css">
    <!-- Sweet Alert -->
    <link rel="stylesheet" href="static/plugin/sweet-alert/sweetalert.css">
    <style>
        table {
            border: 1px;
            font-family: arial, sans-serif;
            border-collapse: collapse;
            width: 86%;
            margin: auto;
        }
        td,
        th {
            border: 1px solid black !important;
            padding: 5px;
        }
        tr:nth-child(even) {
            background-color: #dddddd;
        }
    </style>
</head>
<body>
    <div class="main-menu">
        <header class="header">
```

```
                <a href="" class="logo"><i class="ico mdi mdi-account-box"></i>Body
Tracking</a>
                            <button type="button" class="button-close fa fa-times
js__menu_close"></button>
            <div class="user">
                    <!-- <a href="#" class="avatar"><img src="static/images/avatar-sm-5.jpg"
alt=""><span
                        class="status online"></span></a> -->
                <h5 class="name"><a href="">Pengguna</a></h5>
                <h5 class="position">User</h5>
                <!-- /.name -->
                <!-- /.control-wrap -->
            </div>
            <!-- /.user -->
        </header>
        <!-- /.header -->
        <div class="content">
            <div class="navigation">
                <h5 class="title">Navigation</h5>
                <!-- /.title -->
                <ul class="menu js__accordion">
                    <li>
                        <a class="waves-effect ac" href="{{ url_for('index') }}"><i
                                class="menu-icon mdi mdi-account-box"></i><span>Deteksi
Pose</span></a>
```

```
                </li>
                <li class="current">
                    <a class="waves-effect ac" href="{{ url_for('pose_dataset') }}"><i
                            class="menu-icon mdi mdi-account-card-details"></i><span>Pose
Dataset</span></a>
                </li>
            </ul>
        </div>
        <!-- /.navigation -->
    </div>
    <!-- /.content -->
</div>
<!-- /.main-menu -->
<div class="fixed-navbar">
    <div class="pull-left">
        <button type="button"
                    class="menu-mobile-button glyphicon glyphicon-menu-hamburger
js__menu_mobile"></button>
                <h1 class="page-title"><span id="today_date"></span> | <span
id="clock"></span></h1>
        <!-- /.page-title -->
    </div>
    <!-- /.pull-left -->
    <div class="pull-right">
    </div>
```

```
        <!-- /.pull-right -->
    </div>
    <!-- /.fixed-navbar -->
    <!-- /#message-popup -->
    <div id="wrapper">
        <div class="main-content">
            <div class="row small-spacing">
                <div class="col-xs-2 col-md-2"></div>
                <div class="col-xs-8 col-md-8">
                    <div class="box-content card">
                        <h4 class="box-title">Pose Dataset</h4>
                        <div class="card-content">
                                    <table class="table table-striped table-bordered display"
style="width:100%">
                                <thead>
                                    <tr>
                                        <th>No</th>
                                        <th>Pose</th>
                                        <th>Action</th>
                                    </tr>
                                </thead>
                                <tbody>
                                    {% for pose in data %}
                                    <tr>
                                        <td>{{ loop.index }}</td>
```

```
                        <td>{{ pose['name'] }}</td>
                        <td>
                                <button type="button" class="btn btn-info btn-xs"
onclick="show_pose(`{{ pose['name'] }}`,`{{ pose['image_name'] }}`,`{{ pose['ket']
}}`)">Tampilkan</button>
                        </td>
                      </tr>
                      {% endfor %}
                    </tbody>
                  </table>
                </div>
              </div>
            </div>
            <div class="col-xs-2 col-md-2"></div>
          </div>
          <footer class="footer">
            <ul class="list-inline">
              <li>2024 © Muhammad Irsan.</li>
              <!-- <li><a href="#">Website</a></li>
              <li><a href="#">Facebook</a></li> -->
              <!-- <li><a href="#">Help</a></li> -->
            </ul>
          </footer>
        </div>
        <!-- /.main-content -->
```

```
</div><!--/#wrapper -->
 <!-- HTML5 shim and Respond.js for IE8 support of HTML5 elements and media queries -->
<!--[if lt IE 9]>
    <script src="static/script/html5shiv.min.js"></script>
    <script src="static/script/respond.min.js"></script>
<![endif]-->
<!--
================================================== -->
<!-- Placed at the end of the document so the pages load faster -->
 <div class="modal fade" id="boostrapModal-1" tabindex="-1" role="dialog" aria-labelledby="myModalLabel">
    <div class="modal-dialog" role="document">
      <div class="modal-content">
        <div class="modal-header">
                    <button type="button" class="close" data-dismiss="modal" aria-label="Close"><span
                aria-hidden="true">&times;</span></button>
                 <h4 class="modal-title" id="myModalLabel">Pose <span id="name" style="font-style: italic;"></span></h4>
        </div>
        <div class="modal-body">
          <div class="form-group text-center">
            <img src="" id="image" class="img-responsive">
          </div>
```

```
                <div class="form-group">
                    <p id="ket"></p>
                </div>
            </div>
            <div class="modal-footer">
                <button type="button" class="btn btn-default btn-sm waves-effect waves-
light"
                data-dismiss="modal">Close</button>
            </div>
        </div>
    </div>
</div>
<script src="static/scripts/jquery.min.js"></script>
<script src="static/scripts/modernizr.min.js"></script>
<script src="static/plugin/bootstrap/js/bootstrap.min.js"></script>
                                                                    <script
src="static/plugin/mCustomScrollbar/jquery.mCustomScrollbar.concat.min.js"></script>
<script src="static/plugin/nprogress/nprogress.js"></script>
<script src="static/plugin/sweet-alert/sweetalert.min.js"></script>
<script src="static/plugin/waves/waves.min.js"></script>
<script src="static/scripts/main.min.js"></script>
<script>
    var clockElement = document.getElementById('clock');
    var date = new Date();
    function clock() {
```

```
            clockElement.textContent = new Date().toString().slice(15, 24);
        }
        function today_date() {
            $('#today_date').html(date.toDateString());
        }
        today_date();
        setInterval(clock, 1000);
        function show_pose(name, image, ket) {
            console.log(name)
            console.log(image)
            console.log(ket)
            $('#image').attr('src', "http://127.0.0.1:5000/show_image?image_path=" + image);
            $('#name').html(name);
            $('#ket').html(ket);
            $('#boostrapModal-1').modal('show')
        }
    </script>
</body>
<!-- Mirrored from demo.ninjateam.org/html/my-admin/light/page-starter.html by HTTrack Website Copier/3.x [XR&CO'2014], Wed, 03 Jan 2018 03:48:56 GMT -->
</html>
```

4. Script Simpan

```
import cv2
import mediapipe as mp
import json
```

```
# Initialize MediaPipe pose module
mp_pose = mp.solutions.pose
pose = mp_pose.Pose(min_detection_confidence=0.5, min_tracking_confidence=0.5)
mp_drawing = mp.solutions.drawing_utils

# Load and process the image
image_path = 'gerakan/Childs.jpg'
image = cv2.imread(image_path)
image_rgb = cv2.cvtColor(image, cv2.COLOR_BGR2RGB)
image_results = pose.process(image_rgb)

# Extract landmarks from the image
def extract_landmarks(results):
    if not results.pose_landmarks:
        return None
    landmarks = []
    for lm in results.pose_landmarks.landmark:
        landmarks.append((lm.x, lm.y, lm.z))
    return landmarks

image_landmarks = extract_landmarks(image_results)

# Define mapping between landmark indices and body parts
landmark_labels = {
```

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'
}

# Map landmark indices to descriptive labels
descriptive_landmarks = [{'body': landmark_labels.get(idx, 'unknown'), 'coordinates':
coord} for idx, coord in enumerate(image_landmarks)]

# Prepare landmark coordinates data
landmark_data = {
    'image_name': image_path,
    'landmarks': descriptive_landmarks
}

# Save landmark coordinates to a variable and print as JSON
landmark_coordinates = json.dumps(landmark_data, indent=4)
print(landmark_coordinates)

# Release resources
```

```
pose.close()
```

5. Script Tampilkan

```
import cv2
import json
import mediapipe as mp
import numpy as np
from scipy.spatial import distance

# Load JSON data
with open('data_yoga.json') as f:
    data = json.load(f)

image_name = "Camel"
image = None

# Extract landmarks from JSON data
landmarks_from_json = []
the_landmarks = None



# Load the image
for the_data in data:
    if the_data['name'] == image_name:
        for lm in the_data['landmarks']:
```

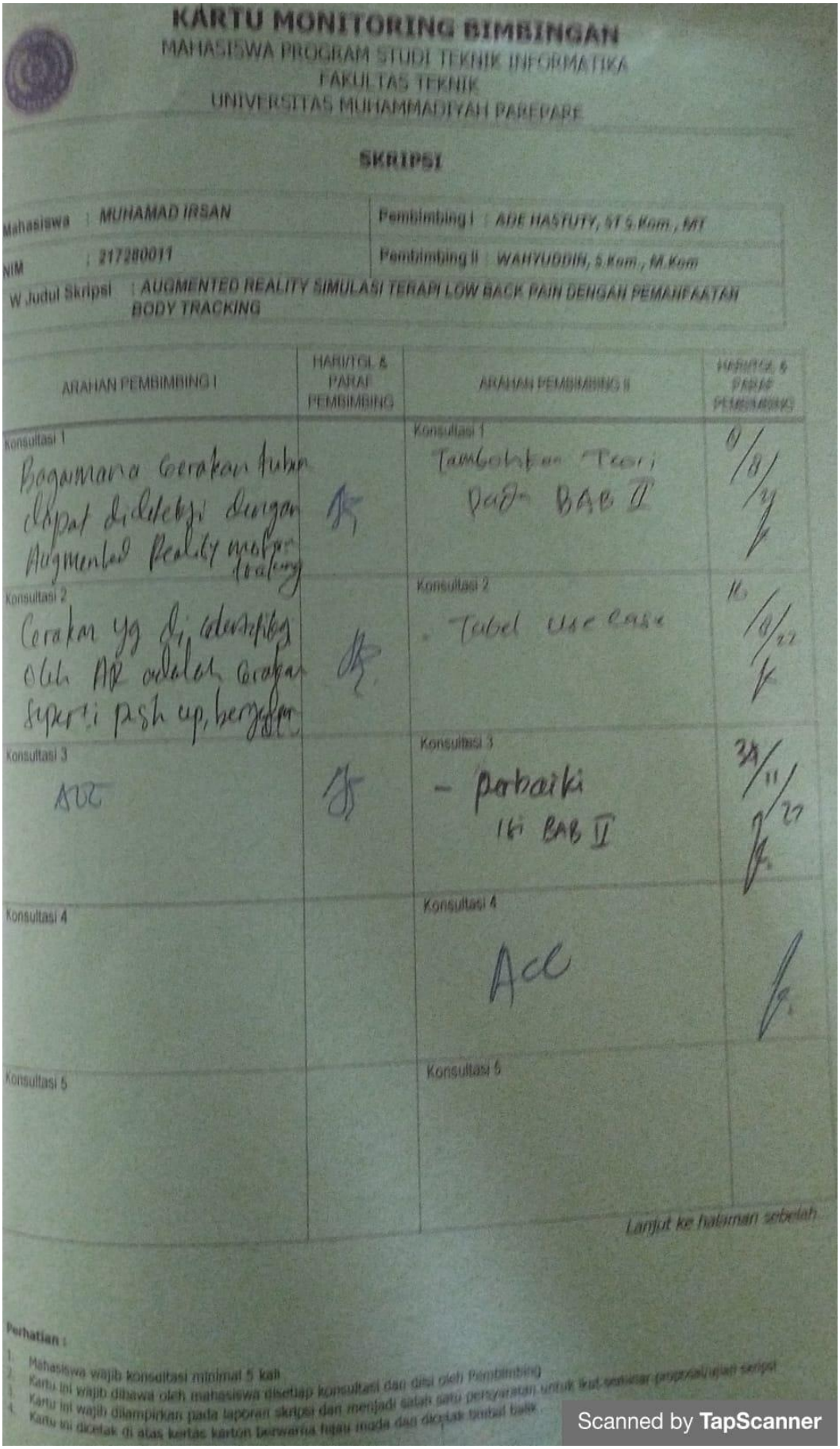
```
            landmarks_from_json.append([lm['coordinates'][0], lm['coordinates'][1]])
        the_landmarks = the_data['landmarks']
        image = cv2.imread(the_data['image_name'])

# Initialize MediaPipe pose module
mp_pose = mp.solutions.pose
mp_drawing = mp.solutions.drawing_utils

# Function to calculate similarity between two sets of landmarks
def calculate_similarity(landmarks1, landmarks2):
    if not landmarks1 or not landmarks2:
        return 0
    # Normalize landmarks
    norm_landmarks1 = np.array(landmarks1) - np.mean(landmarks1, axis=0)
    norm_landmarks2 = np.array(landmarks2) - np.mean(landmarks2, axis=0)
    # Calculate the distance between corresponding landmarks
    dists = [distance.euclidean(lm1, lm2) for lm1, lm2 in zip(norm_landmarks1,
norm_landmarks2)]
    # Calculate similarity as the inverse of the average distance
    similarity = 1 / (1 + np.mean(dists))
    return similarity * 100

# Draw landmarks and connections on the image
def draw_landmarks(image, landmarks):
    annotated_image = image.copy()
```

```
    for landmark in landmarks:
        # Extract landmark coordinates
        landmark_x = int(landmark['coordinates'][0] * annotated_image.shape[1])
        landmark_y = int(landmark['coordinates'][1] * annotated_image.shape[0])
        # Draw a circle at the landmark position
        cv2.circle(annotated_image, (landmark_x, landmark_y), 5, (0, 255, 0), -1)
        # Add text with the body part label
        cv2.putText(annotated_image, landmark['body'], (landmark_x, landmark_y),
cv2.FONT_HERSHEY_SIMPLEX, 0.5,
                    (255, 255, 255), 1)

    # Draw connections between landmarks
    connections = mp_pose.POSE_CONNECTIONS
    for connection in connections:
        start_idx = connection[0]
        end_idx = connection[1]
        if 0 <= start_idx < len(landmarks) and 0 <= end_idx < len(landmarks):
            start_landmark = landmarks[start_idx]['coordinates']
            end_landmark = landmarks[end_idx]['coordinates']
            start_x = int(start_landmark[0] * annotated_image.shape[1])
            start_y = int(start_landmark[1] * annotated_image.shape[0])
            end_x = int(end_landmark[0] * annotated_image.shape[1])
            end_y = int(end_landmark[1] * annotated_image.shape[0])
            cv2.line(annotated_image, (start_x, start_y), (end_x, end_y), (0, 255, 0), 2)
```

```
    return annotated_image



# Annotate and display the image
annotated_image = draw_landmarks(image, the_landmarks)
cv2.imshow('Image with Landmarks and Connections', annotated_image)

# Open webcam
cap = cv2.VideoCapture(0)

with mp_pose.Pose(min_detection_confidence=0.5, min_tracking_confidence=0.5)
as pose:
    while cap.isOpened():
        ret, frame = cap.read()
        if not ret:
            break

        # Convert the BGR image to RGB
        image_rgb = cv2.cvtColor(frame, cv2.COLOR_BGR2RGB)
        image_rgb.flags.writeable = False

        # Process the image and detect the pose
        results = pose.process(image_rgb)
```

```
        # Convert the RGB image back to BGR
        image_rgb.flags.writeable = True
        image_bgr = cv2.cvtColor(image_rgb, cv2.COLOR_RGB2BGR)

        # Draw the pose annotation on the image
        if results.pose_landmarks:
            mp_drawing.draw_landmarks(
                image_bgr,
                results.pose_landmarks,
                mp_pose.POSE_CONNECTIONS,
                mp_drawing.DrawingSpec(color=(0, 255, 0), thickness=2,
circle_radius=2),
                mp_drawing.DrawingSpec(color=(0, 0, 255), thickness=2,
circle_radius=2),
            )
            # Extract landmarks
            landmarks_from_webcam = []
            for lm in results.pose_landmarks.landmark:
                landmarks_from_webcam.append([lm.x, lm.y])

            # Calculate similarity
            similarity = calculate_similarity(landmarks_from_json,
landmarks_from_webcam)
```

```
            cv2.putText(image_bgr, f'Similarity: {similarity:.2f}%', (10, 30), cv2.FONT_HERSHEY_SIMPLEX, 1, (0, 255, 0), 2)

        # Display the image
        cv2.imshow('Webcam Pose', image_bgr)

        if cv2.waitKey(10) & 0xFF == ord('q'):
            break
# Release resources
cap.release()
cv2.destroyAllWindows()
cv2.waitKey(1)
```



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UNIVERSITAS MUHAMMADIYAH PAREPARE

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Judul Skripsi : AUGMENTED REALITY SIMULASI TERAPI LOW BACK PAIN DENGAN PEMANFAATAN BODY TRACKING	

ARAHAN PEMBIMBING I	HARI/TGL & PARAF PEMBIMBING	ARAHAN PEMBIMBING II	HARI/TGL & PARAF PEMBIMBING
Konsultasi 1 Bagaimana Gerakan tubuh dapat dideteksi dengan Augmented Reality motion tracking		Konsultasi 1 Tambahkan Teori pada BAB II	9/8/22
Konsultasi 2 Gerakan yg di identifikasi oleh AR adalah Gerakan seperti push up, berjalan		Konsultasi 2 - Tabel use case	16/8/22
Konsultasi 3 ACC		Konsultasi 3 - perbaiki lagi BAB II	23/11/22
Konsultasi 4		Konsultasi 4 Acc	
Konsultasi 5		Konsultasi 5	

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Konsultasi 2 Rumusan masalah terjawab di kesimpulan		Konsultasi 2 Kata Asing Diminimalisir ganti kata pengantar	
Konsultasi 3 Uji White Box dan Black box		Konsultasi 3 ACC	
Konsultasi 4 Saran berisi kekurangan dari aplikasi yg dibuat		Konsultasi 4	
Konsultasi 5 Seminar Hasil 18/07/2024		Konsultasi 5	

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