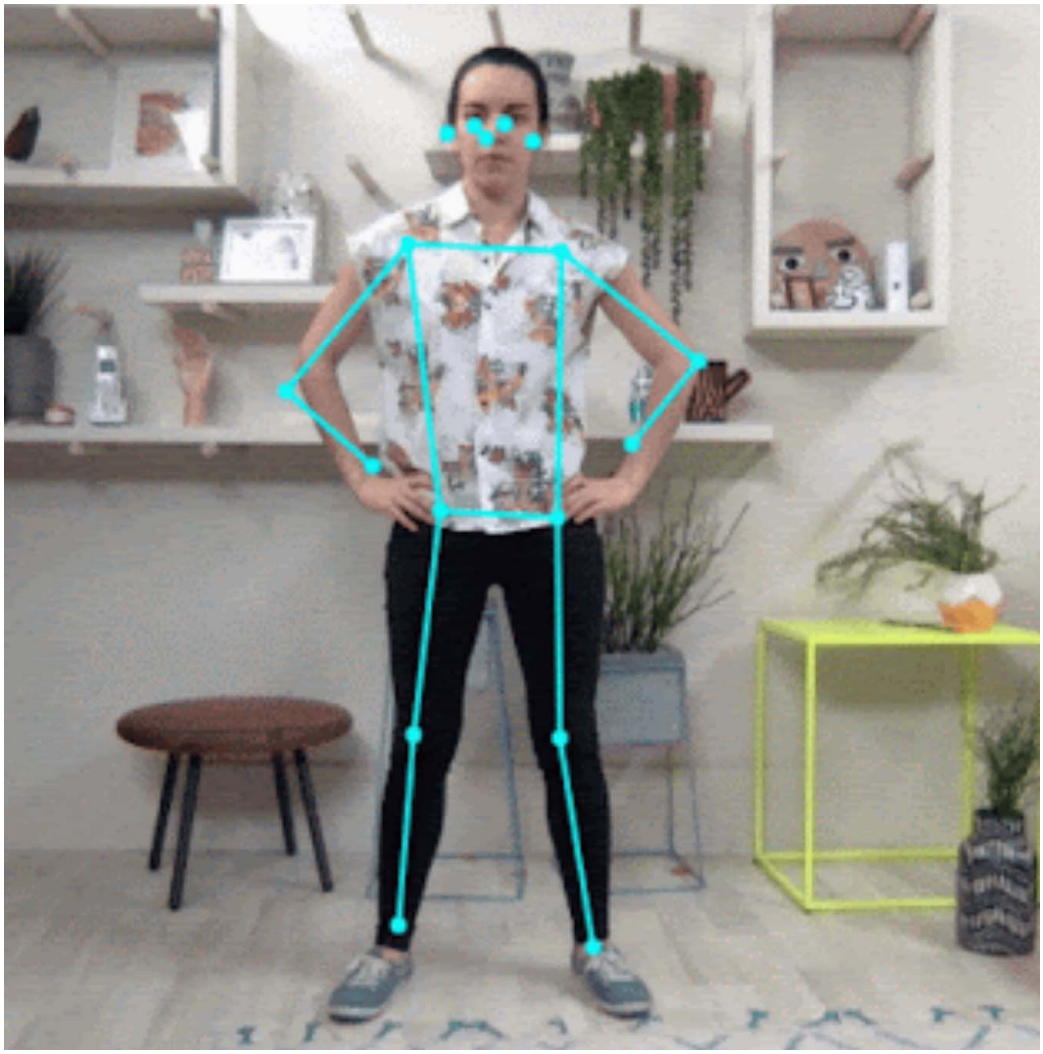
Project 2 – Assignment 2 – Week 07 – Due Week 8

project 2 / 35%

Natural Interactions



Assignment 2 - week 07

Posenet –

https://anjana2000-pradeep.medium.com/yoga-pose-estimation-using-posenet-vision-model-55a62977acef

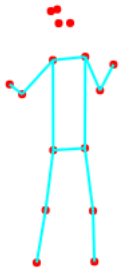
1. Posenet / ml5.js / p5.js

Posenet is a pre-trained model that will detect human body poses from images and video.

Posenet outputs 17 keypoints as the output

The keypoints correspond to joints on a human skeleton

When lines are drawn between the joints a 2D image of a "skeleton" is created



Posenet is made with TensorFlow.js. TensorFlow is a javascript library made by Google for developing Machine Learning models for web browsers. The creators of Posenet used TensorFlow to "train" it to recognize human poses.

Terminology:

A "pose" consists of Keypoints

Keypoints - there are 17 keypoints

Id	Part
0	nose
1	leftEye
2	rightEye
3	leftEar
4	rightEar
5	leftShoulder
6	rightShoulder
7	leftElbow
8	rightElbow
9	leftWrist
10	rightWrist
11	leftHip
12	rightHip
13	leftKnee
14	rightKnee
15	leftAnkle
16	rightAnkle

4. example of a Pose object


```
{
  "score": 0.32371445304906,
  "keypoints": [
    {
      "position": {
        "y": 76.291801452637,
        "x": 253.36747741699
      },
      "part": "nose",
      "score": 0.99539834260941
    },
    {
      "position": {
        "y": 71.10383605957,
        "x": 253.54365539551
      },
      "part": "leftEye",
      "score": 0.98781454563141
    },
    {
      "position": {
        "y": 71.839515686035,
        "x": 246.00454711914
      },
      "part": "rightEye",
      "score": 0.99528175592422
    },
```


Keypoint attributes

Part – the body part the keypoint represents, i.e. nose, leftshoulder etc.

Position - an x, y position for each keypoint

Pose Confidence score - a number between 0 and 1 represents how much confidence the model can predict the accuracy, Prediction is an important concept in machine learning, another similar term is estimation, ML models estimate and predict whatever they are trained to do or see.

Applications

What can you do with these data objects that are output from Posenet?

Draw, animate, write functions that are triggered when certain poses are struck, etc...

Assignment

Try several approaches to get started.

Try making a Clown Nose

- Start by experimenting with text and graphic elements that are connected to keypoint, for example try putting a red circle on your nose.
- Can you turn your nose into a drawing tool?
- Try outputting keypoint data as text.

Try using Sound

- Trigger a sound when you raise your hand (incorporate sound and images from Assignment 1)
- Make visual content appear/disappear when you move to one side of the screen or the other

Make the skeleton visible or invisible?

Consider whether you will make the skeleton visible or invisible. Do you want to have the skeleton visible on the screen? Or do you want to make the skeleton an invisible element running in the background, invisible to the user?

Set up the Environment

Consider what environment you will need to create to make Posenet work well. How far away from the camera do you need to be? Do you need to de-clutter the space in your environment to achieve better results? How many people do you want to see?

7. Go Further

Learning resources

Coding Train

https://thecodingtrain.com/learning/ml5/7.1-posenet.html

https://thecodingtrain.com/learning/ml5/index.html

Google Creative Lab

https://github.com/googlecreativelab/posenet-sketchbook

Tensorflow

https://blog.tensorflow.org/2018/05/real-time-human-pose-estimation-in.html

8. Deliverables

See - Project2-assignment-deliverable-template-2021.pdf

This covers all the file formats etc. for the deliverables.

Submit multiple iterations of this assignment, you should be able to create multiple versions by tweaking variables and parameters once you have the code working.

There is no set number of iterations required because each student will be approaching the assignment differently.