

- Code done in [main.js](#) file in previous class.

```
song = '';
scoreLeftWrist = 0;

rightWristX = 0;
rightWristY = 0;

leftWristX = 0;
leftWristY = 0;

function preload()
{
  song = loadSound("music.mp3");
}

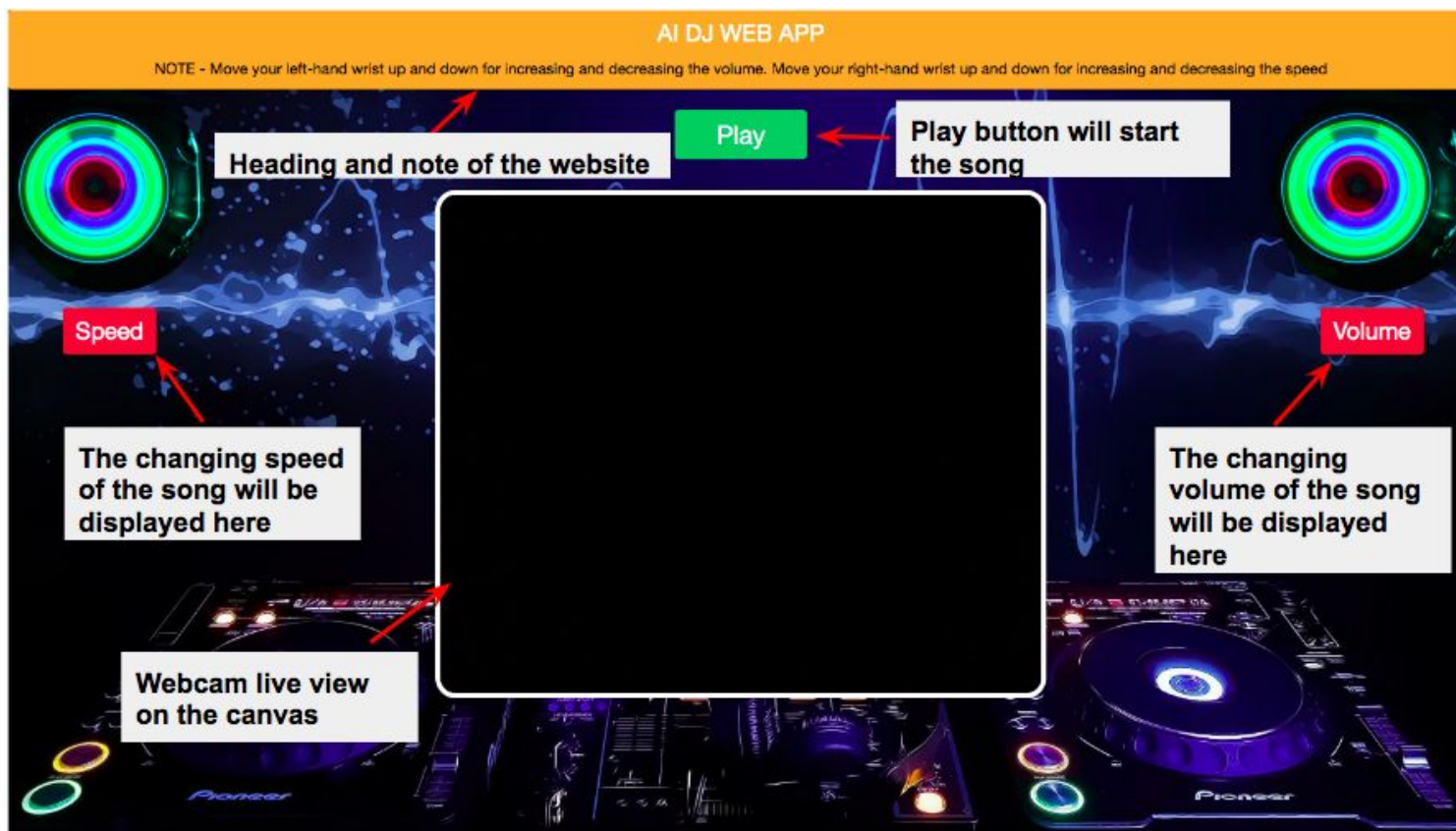
function setup() {
  canvas = createCanvas(600, 500);
  canvas.center();

  video = createCapture(VIDEO);
  video.hide();

  poseNet = ml5.poseNet(video, modelLoaded);
  poseNet.on('pose', gotPoses);
}

function modelLoaded() {
  console.log('PoseNet Is Initialized');
}
```

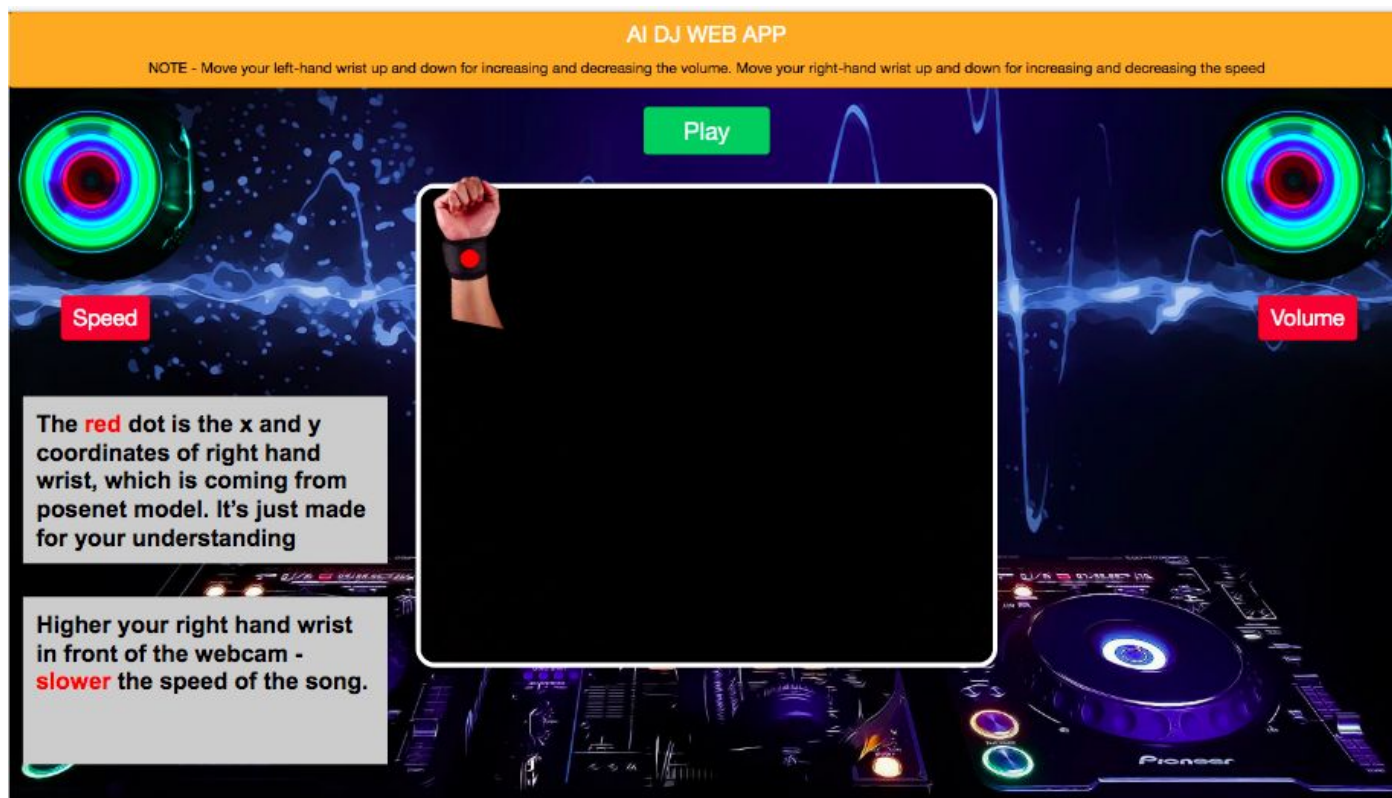
- UI overview



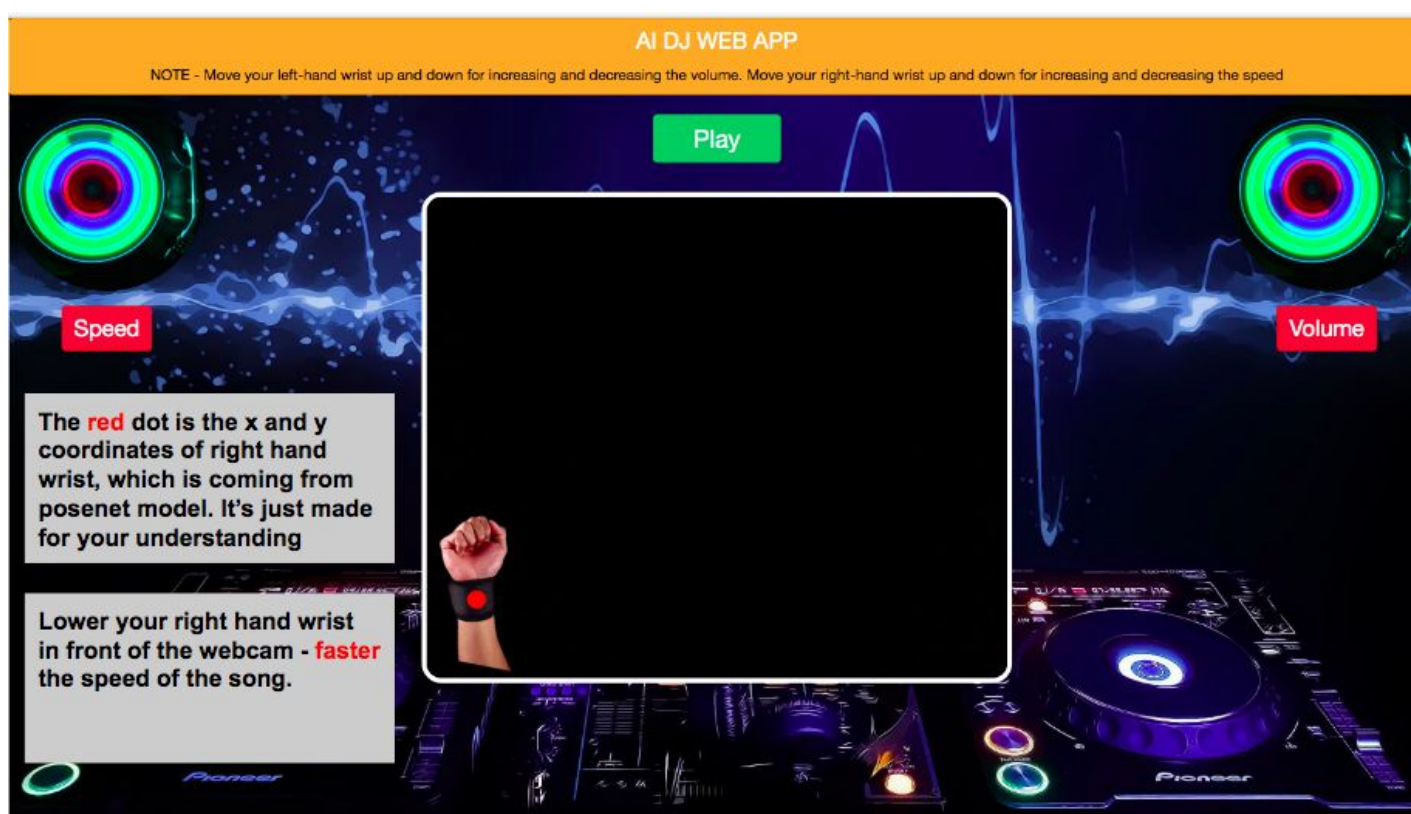
- Now press the play button
- Then it will start playing the song

→ Now move your right hand wrist up and down in front of the webcam to change the speed of the song.

Higher your right hand wrist in front of the webcam - **slower** the speed.

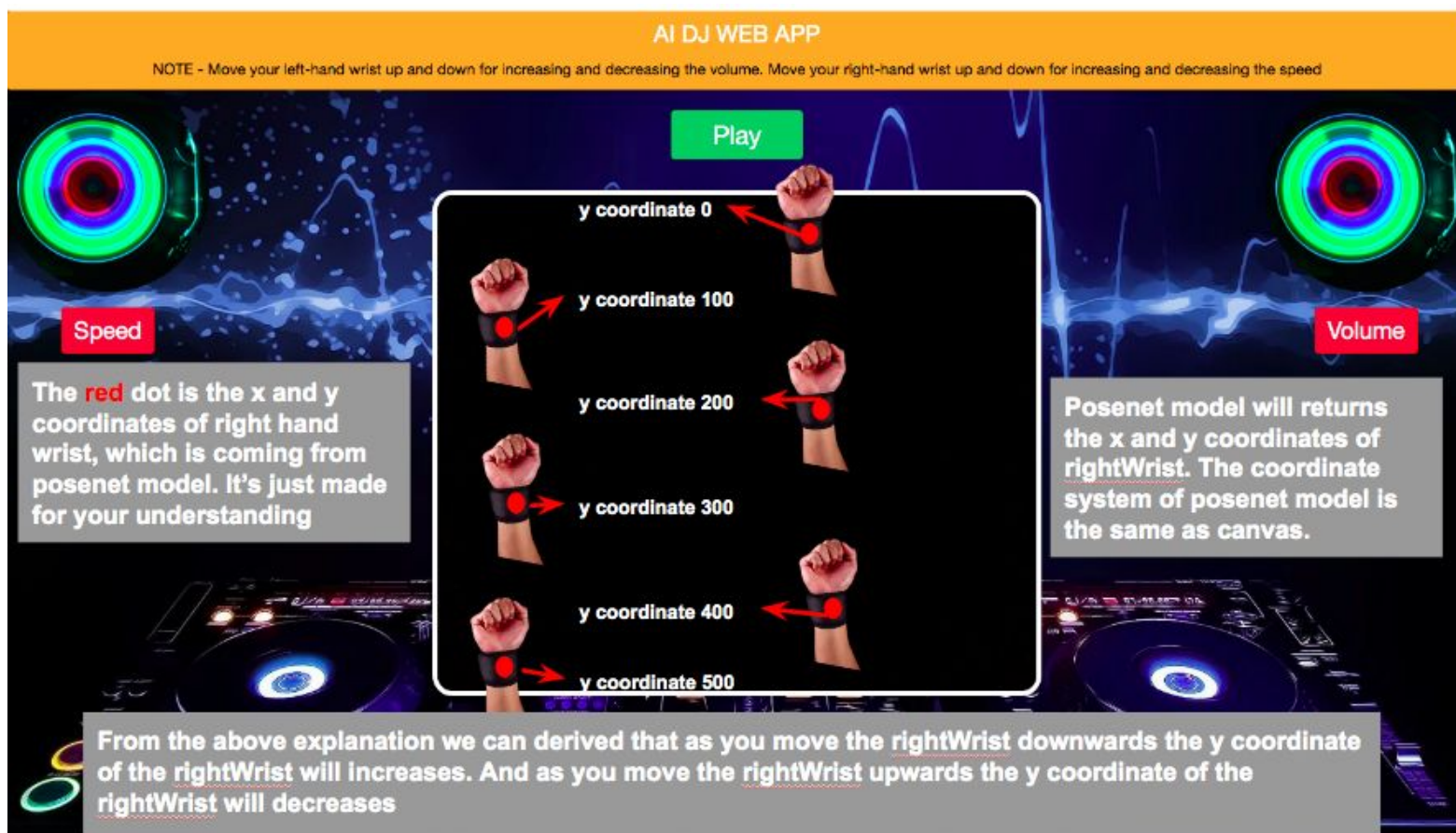
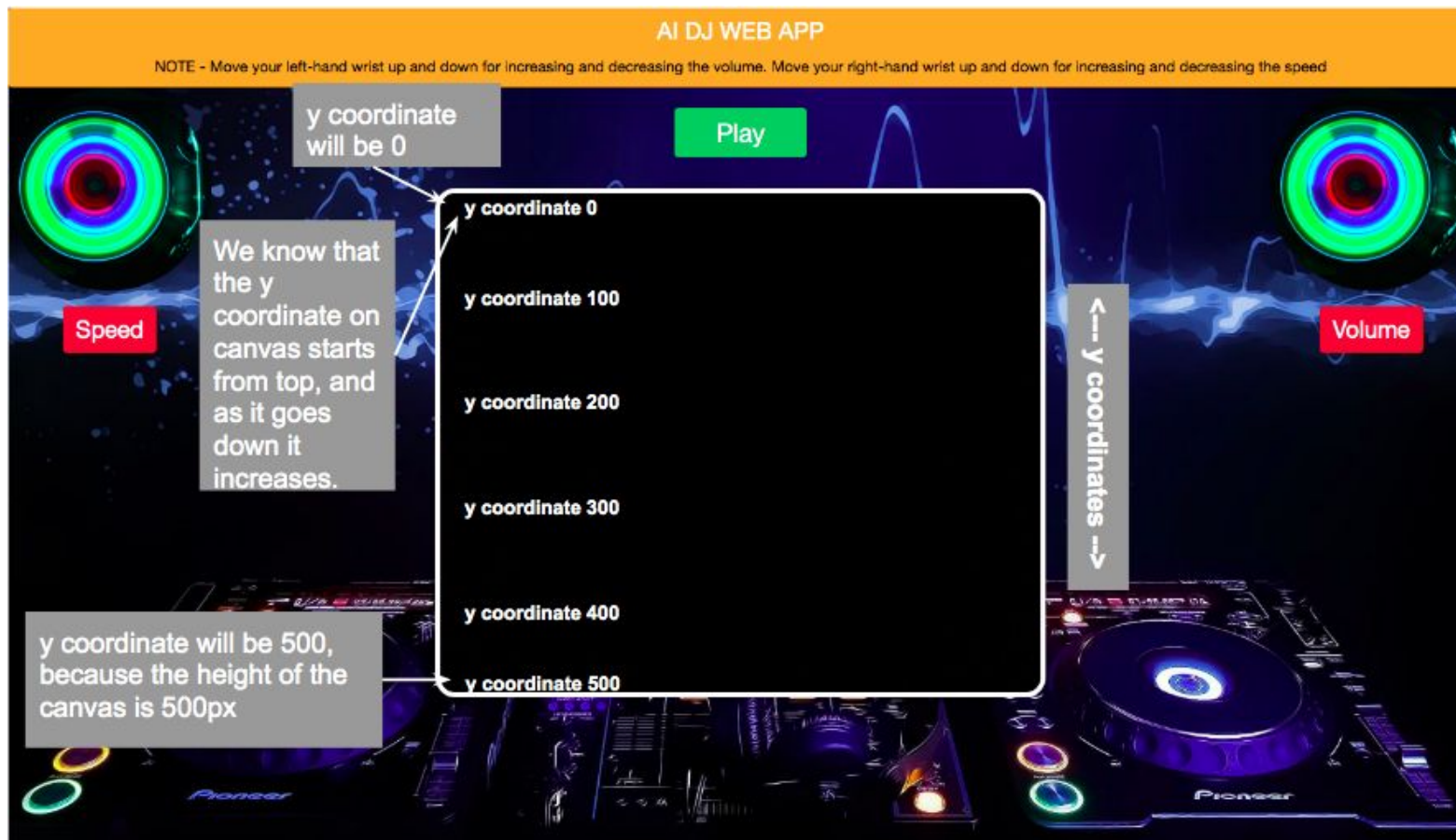


Lower your right hand wrist in front of the webcam - **faster** the speed.



As per the movement of your right hand wrist the speed of the song will change, meaning - as you move your right hand wrist from **up to down** - the speed of the song will change from **slower to faster**.

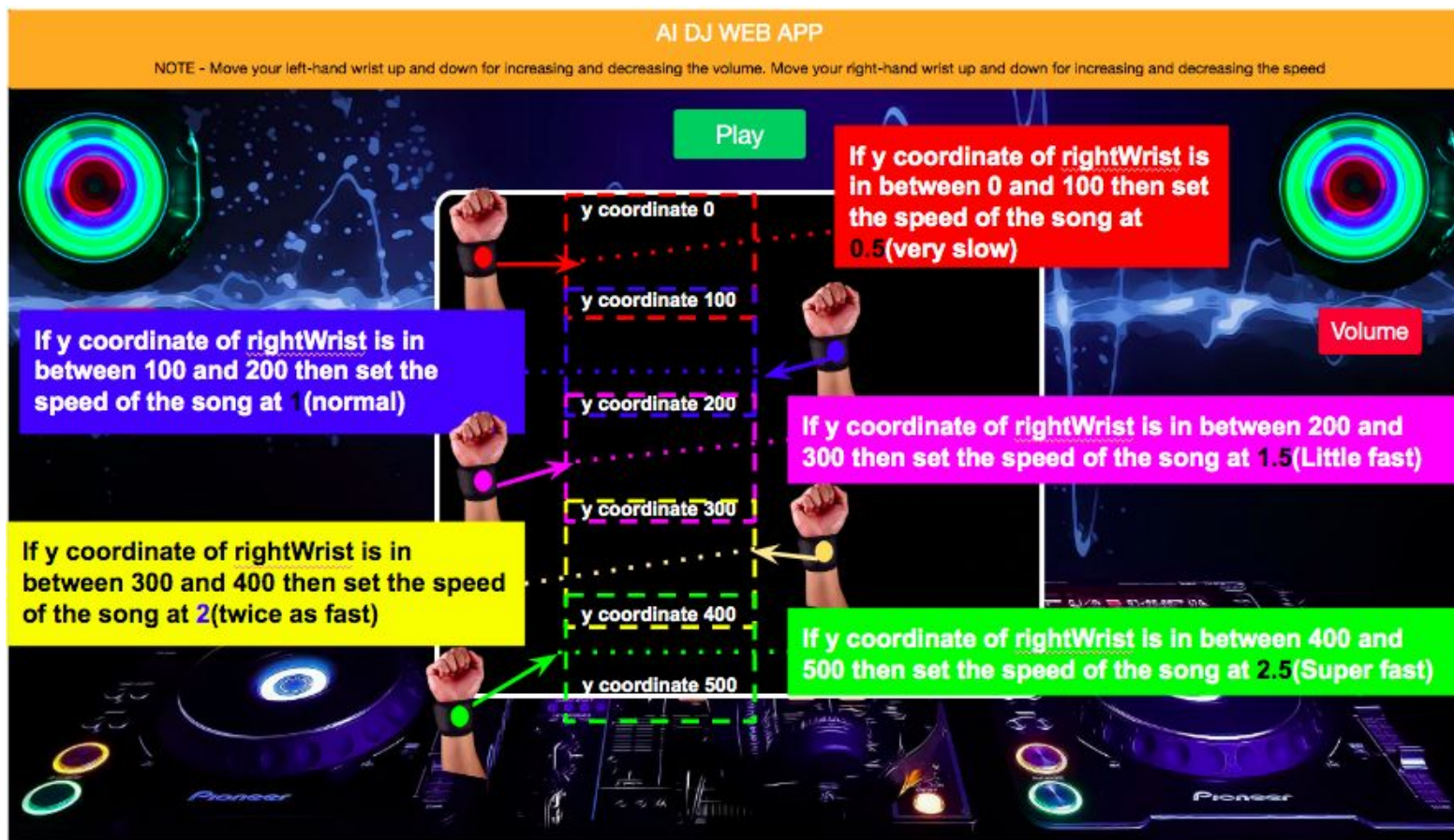
- Logic for changing the speed of the song



We will use the `rate()` function to keep changing the speed of the song, `rate()` function takes a value which is - 0.5 is half-speed, 1.0 is normal, 2.0 is twice as fast, 2.5 super fast.

And we know that the y coordinate of `rightWrist` will be between 0(starting point of the canvas) and 500(ending point of the canvas).

So we need to add a few "if - else conditions" to check the range of y coordinate of `rightWrist` and accordingly we will set the speed for the song.



- Adding code for drawing the circle

```
function draw() {
  image(video, 0, 0, 600, 500);

  fill("#FF0000");
  stroke("#FF0000");

  circle(rightWristX, rightWristY, 20);

  if(scoreLeftWrist > 0.2)
  {
    circle(leftWristX, leftWristY, 20);
    InNumberleftWristY = Number(leftWristY);
    remove_decimals = floor(InNumberleftWristY);
    volume = remove_decimals/500;
    document.getElementById("volume").innerHTML = "Volume = " + volume;
    song.setVolume(volume);
  }
}
```

- Adding “if else condition” -

→ Adding **first “if condition”** which will check if **y coordinate of rightWrist is in between 0 and 100**, and if the condition satisfies then set the speed for the song as **0.5** and also update the h3 tag and who has an id as “speed” with “**Speed = 0.5x**”. This h3 tag we had defined in class no.126 for the purpose of holding the changing speed.

```
function draw() {
  image(video, 0, 0, 600, 500);

  fill("#FF0000");
  stroke("#FF0000");

  circle(rightWristX, rightWristY, 20);

  if(rightWristY > 0 && rightWristY <= 100)
  {
    document.getElementById("speed").innerHTML = "Speed = 0.5x";
    song.rate(0.5);
  }

  if(scoreLeftWrist > 0.2)
  {
    circle(leftWristX, leftWristY, 20);
    InNumberleftWristY = Number(leftWristY);
    remove_decimals = floor(InNumberleftWristY);
    volume = remove_decimals/500;
    document.getElementById("volume").innerHTML = "Volume = " + volume;
    song.setVolume(volume);
  }
}
```

- Now add the **second “condition”** which will check if **y coordinate of rightWrist is in between 100 and 200**, and if the condition satisfies then set the speed for the song as **1** and also update the h3 tag and who has an id as **“speed”** with **“Speed = 1x”**. This h3 tag we had defined in class no.126 for the purpose of holding the changing speed.

```
function draw() {
  image(video, 0, 0, 600, 500);

  fill("#FF0000");
  stroke("#FF0000");

  circle(rightWristX, rightWristY, 20);

  if(rightWristY > 0 && rightWristY <= 100)
  {
    document.getElementById("speed").innerHTML = "Speed = 0.5x";
    song.rate(0.5);
  }

  else if(rightWristY > 100 && rightWristY <= 200)
  {
    document.getElementById("speed").innerHTML = "Speed = 1x";
    song.rate(1);
  }

  if(scoreLeftWrist > 0.2)
  {
    circle(leftWristX, leftWristY, 20);
    InNumberleftWristY = Number(leftWristY);
    remove_decimals = floor(InNumberleftWristY);
    volume = remove_decimals/500;
    document.getElementById("volume").innerHTML = "Volume = " + volume;
    song.setVolume(volume);
  }
}
```

- Same way add a **third “condition”** which will check if **y coordinate of rightWrist is in between 200 and 300**, and if the condition satisfies then set the speed for the song as **1.5** and also update the h3 tag and who has an id as **“speed”** with **“Speed = 1.5x”**. This h3 tag we had defined in class no.126 for the purpose of holding the changing speed.


```

function draw() {
  image(video, 0, 0, 600, 500);

  fill("#FF0000");
  stroke("#FF0000");

  circle(rightWristX, rightWristY, 20);

  if(rightWristY > 0 && rightWristY <= 100)
  {
    document.getElementById("speed").innerHTML = "Speed = 0.5x";
    song.rate(0.5);
  }
  else if(rightWristY > 100 && rightWristY <= 200)
  {
    document.getElementById("speed").innerHTML = "Speed = 1x";
    song.rate(1);
  }
  else if(rightWristY > 200 && rightWristY <= 300)
  {
    document.getElementById("speed").innerHTML = "Speed = 1.5x";
    song.rate(1.5);
  }

  if(scoreLeftWrist > 0.2)
  {
    circle(leftWristX, leftWristY, 20);
    InNumberleftWristY = Number(leftWristY);
    remove_decimals = floor(InNumberleftWristY);
    volume = remove_decimals/500;
    document.getElementById("volume").innerHTML = "Volume = " + volume;
    song.setVolume(volume);
  }
}

```

- Same way add a **fourth “condition”** which will check if **y coordinate of rightWrist is in between 300 and 400**, and if the condition satisfies then set the speed for the song as **2** and also update the h3 tag and who has an id as **“speed”** with **“Speed = 2x”**. This h3 tag we had defined in class no.126 for the purpose of holding the changing speed.

```

circle(rightWristX, rightWristY, 20);

if(rightWristY > 0 && rightWristY <= 100)
{
  document.getElementById("speed").innerHTML = "Speed = 0.5x";
  song.rate(0.5);
}
else if(rightWristY > 100 && rightWristY <= 200)
{
  document.getElementById("speed").innerHTML = "Speed = 1x";
  song.rate(1);
}
else if(rightWristY > 200 && rightWristY <= 300)
{
  document.getElementById("speed").innerHTML = "Speed = 1.5x";
  song.rate(1.5);
}
else if(rightWristY > 300 && rightWristY <= 400)
{
  document.getElementById("speed").innerHTML = "Speed = 2x";
  song.rate(2);
}

```

- Same way add a **fifth “condition”** which will check if **y coordinate of rightWrist is in between 400 and 500**, and if the condition satisfies then set the speed for the song as **2.5** and also update the h3 tag and who has an id as **“speed”** with **“Speed = 2.5x”**. This h3 tag we had defined in class no.126 for the purpose of holding the changing speed.

```

circle(rightWristX, rightWristY, 20);

if(rightWristY > 0 && rightWristY <= 100)
{
    document.getElementById("speed").innerHTML = "Speed = 0.5x";
    song.rate(0.5);
}
else if(rightWristY > 100 && rightWristY <= 200)
{
    document.getElementById("speed").innerHTML = "Speed = 1x";
    song.rate(1);
}
else if(rightWristY > 200 && rightWristY <= 300)
{
    document.getElementById("speed").innerHTML = "Speed = 1.5x";
    song.rate(1.5);
}
else if(rightWristY > 300 && rightWristY <= 400)
{
    document.getElementById("speed").innerHTML = "Speed = 2x";
    song.rate(2);
}
else if(rightWristY > 400 && rightWristY <= 500)
{
    document.getElementById("speed").innerHTML = "Speed = 2x";
    song.rate(2);
}

```

- Reading results to fetch the score of rightWrist

Run <https://mahdihat791.github.io/Ai-DJ/> and open console screen -

PoseNet Is Initialized	main.js:17
▶ [{-}]	main.js:24

We need to read this object and fetch the score of the rightWrist, while reading the object we will also write the code -

- First click on the arrow to expand -

PoseNet Is Initialized	main.js:17
▶ [{-}]	main.js:24

We want to read the objects of results so first we will write **results**

- Then click on the arrow next to **0** to expand -

▼ [{-}]	main.js:24
▶ 0: {pose: {_-}, skeleton: Array(0)}	
length: 1	
▶ __proto__: Array(0)	

We have clicked on 0 index which is inside the "results" object, so code will be **results[0]**

- Then click on the arrow next to **pose** to expand -

▼ [{-}]	main.js:24
▶ 0:	
▶ pose: {score: 0.25857010390866303, keypoints: Array(17)}	
▶ skeleton: []	
▶ __proto__: Object	
length: 1	
▶ __proto__: Array(0)	

Then inside 0 index we have clicked on pose object, so code will be - **results[0].pose**

- Then inside the pose object there are the two important parts **keypoints** and 17 body parts with x and y coordinates. This time we will expand **keypoints** as it has the same thing which is 17 body parts with x and y coordinates. But also it contains the score for each body part.

So click the arrow new to **keypoints** to expand


```

main.js:36
▼ [{-}] 1
  ▼ 0:
    ▼ pose:
      ▶ keypoints: (17) [{-}, {-}, {-}, {-}, {-}, {-}, {-}, {-}, {-}, {-}, {-}, {-}, {-}, {-}, {-}, {-}, {-}]
      ▶ leftAnkle: {x: 476.95984347754285, y: 557.9741131817852, confidence: 0.006817338988184929}
      ▶ leftEar: {x: 440.8266567951522, y: 279.24962594030427, confidence: 0.9845593571662903}
      ▶ leftElbow: {x: 551.0097719307763, y: 556.1943765086272, confidence: 0.005512693431228399}
      ▶ leftEye: {x: 374.511157476414, y: 252.87427221822458, confidence: 0.9968265295028687}
      ▶ leftHip: {x: 499.0492683358592, y: 555.9596999021534, confidence: 0.012135978788137436}
      ▶ leftKnee: {x: 477.69501208329524, y: 528.5981283503899, confidence: 0.004493321757763624}
      ▶ leftShoulder: {x: 533.6824056465491, y: 449.26871494940144, confidence: 0.2861071825027466}
      ▶ leftWrist: {x: 509.11176952934636, y: 544.3861177976136, confidence: 0.0015677408082410693}
      ▶ nose: {x: 328.5134251168829, y: 309.8290432638127, confidence: 0.9861957430839539}
      ▶ rightAnkle: {x: 258.2626552470246, y: 555.4868089107044, confidence: 0.007420164532959461}
      ▶ rightEar: {x: 253.53315267878898, y: 274.41933258235105, confidence: 0.7130623459815979}
      ▶ rightElbow: {x: 154.86815156992415, y: 553.3531548870004, confidence: 0.002170068444684148}
      ▶ rightEye: {x: 290.602836385805, y: 260.0981614557158, confidence: 0.9987963438034058}
      ▶ rightHip: {x: 221.92330328809354, y: 527.4246174178393, confidence: 0.017803354188799858}
      ▶ rightKnee: {x: 241.3050094217817, y: 537.2992111414264, confidence: 0.009562619030475616}
      ▶ rightShoulder: {x: 166.19060077630056, y: 424.62867067571267, confidence: 0.005944470409303904}
      ▶ rightWrist: {x: 164.9501367758589, y: 514.5395001565736, confidence: 0.0014911155449226499}
      score: 0.2964980216450332

```

If we want to get the score of the rightWrist, so **inside results -> inside 0 index -> inside pose -> inside keypoints**.

So we will write - **`results[0].pose.keypoints`**

Inside **keypoints:**

there will -

Index numbers of the body parts

Score for the body parts

Name of the body parts

Position of the body parts - this is nothing but x and y coordinates of the body parts

The diagram illustrates the structure of the `keypoints` array. It shows a list of 17 objects, each containing a score, a part name, and a position object. Annotations with arrows point to specific parts of the array:

- Index number of the body parts:** Points to the index (0-16) of each object in the array.
- Score of the body parts:** Points to the `score` property of each object.
- Name of the body parts:** Points to the `part` property of each object.
- position of the body parts which is nothing but the x and y coordinates:** Points to the `position` property of each object.

Index	Score	Part	Position
0	0.9861957430839539	nose	{x: 328.5134251168829, y: 309.8290432638127}
1	0.9968265295028687	leftEye	{x: 374.511157476414, y: 252.87427221822458}
2	0.9987963438034058	rightEye	{x: 290.602836385805, y: 260.0981614557158}
3	0.9845593571662903	leftEar	{x: 440.8266567951522, y: 279.24962594030427}
4	0.7130623459815979	rightEar	{x: 253.53315267878898, y: 274.41933258235105}
5	0.2861071825027466	leftShoulder	{x: 533.6824056465491, y: 449.26871494940144}
6	0.005944470409303904	rightShoulder	{x: 166.19060077630056, y: 424.62867067571267}
7	0.005512693431228399	leftElbow	{x: 551.0097719307763, y: 556.1943765086272}
8	0.002170068444684148	rightElbow	{x: 154.86815156992415, y: 553.3531548870004}
9	0.0015677408082410693	leftWrist	{x: 509.11176952934636, y: 544.3861177976136}
10	0.0014911155449226499	rightWrist	{x: 164.9501367758589, y: 514.5395001565736}
11	0.012135978788137436	leftHip	{x: 499.0492683358592, y: 555.9596999021534}
12	0.017803354188799858	rightHip	{x: 221.92330328809354, y: 527.4246174178393}
13	0.004493321757763624	leftKnee	{x: 477.69501208329524, y: 528.5981283503899}
14	0.009562619030475616	rightKnee	{x: 241.3050094217817, y: 537.2992111414264}
15	0.006817338988184929	leftAnkle	{x: 476.95984347754285, y: 557.9741131817852}
16	0.007420164532959461	rightAnkle	{x: 258.2626552470246, y: 555.4868089107044}

Now we want to get the score of rightWrist. The index of rightWrist is 10, so **inside results -> inside 0 index -> inside pose -> inside keypoints -> inside 10**

So the code will be - **`results[0].pose.keypoints[10]`**

Now we have the index number of rightWrist, so we can get the score inside of rightWrist, so **inside results -> inside 0 index -> inside pose -> inside keypoints -> inside 10 -> there is score**.

So the code will be - **`results[0].pose.keypoints[10].score`**

- Now add code for fetching score of rightWrist and store it inside a variable.


```
function gotPoses(results)
{
  if(results.length > 0)
  {
    console.log(results);
    scoreRightWrist = results[0].pose.keypoints[10].score;
    scoreLeftWrist = results[0].pose.keypoints[9].score;
    console.log("scoreLeftWrist = " + scoreLeftWrist);

    rightWristX = results[0].pose.rightWrist.x;
    rightWristY = results[0].pose.rightWrist.y;
    console.log("rightWristX = " + rightWristX + " rightWristY = " + rightWristY);

    leftWristX = results[0].pose.leftWrist.x;
    leftWristY = results[0].pose.leftWrist.y;
    console.log("leftWristX = " + leftWristX + " leftWristY = " + leftWristY);
  }
}
```

- Code to console this variable.

```
function gotPoses(results)
{
  if(results.length > 0)
  {
    console.log(results);
    scoreRightWrist = results[0].pose.keypoints[10].score;
    scoreLeftWrist = results[0].pose.keypoints[9].score;
    console.log("scoreRightWrist = " + scoreRightWrist + "scoreLeftWrist = " + scoreLeftWrist);

    rightWristX = results[0].pose.rightWrist.x;
    rightWristY = results[0].pose.rightWrist.y;
    console.log("rightWristX = " + rightWristX + " rightWristY = " + rightWristY);

    leftWristX = results[0].pose.leftWrist.x;
    leftWristY = results[0].pose.leftWrist.y;
    console.log("leftWristX = " + leftWristX + " leftWristY = " + leftWristY);
  }
}
```

- Add a if condition to check if scoreRightWrist is greater than 0.2 then only draw circle and change speed of the song

```
fill("#FF0000");
stroke("#FF0000");

if(scoreRightWrist > 0.2)
{
    circle(rightWristX, rightWristY, 20);

    if(rightWristY > 0 && rightWristY <= 100)
    {
        document.getElementById("speed").innerHTML = "Speed = 0.5x";
        song.rate(0.5);
    }
    else if(rightWristY > 100 && rightWristY <= 200)
    {
        document.getElementById("speed").innerHTML = "Speed = 1x";
        song.rate(1);
    }
    else if(rightWristY > 200 && rightWristY <= 300)
    {
        document.getElementById("speed").innerHTML = "Speed = 1.5x";
        song.rate(1.5);
    }
    else if(rightWristY > 300 && rightWristY <= 400)
    {
        document.getElementById("speed").innerHTML = "Speed = 2x";
        song.rate(2);
    }
    else if(rightWristY > 400 && rightWristY <= 500)
    {
        document.getElementById("speed").innerHTML = "Speed = 2.5x";
        song.rate(2.5);
    }
}
```