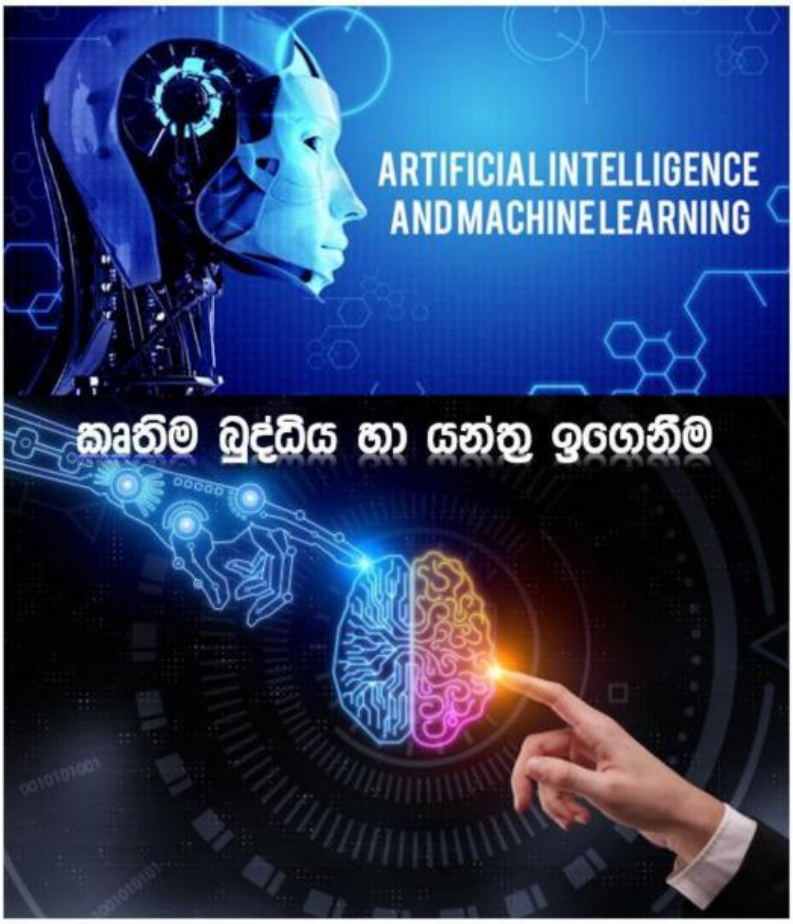
Project 180

DP EDUCATION Coding School

AI and Machine Learning

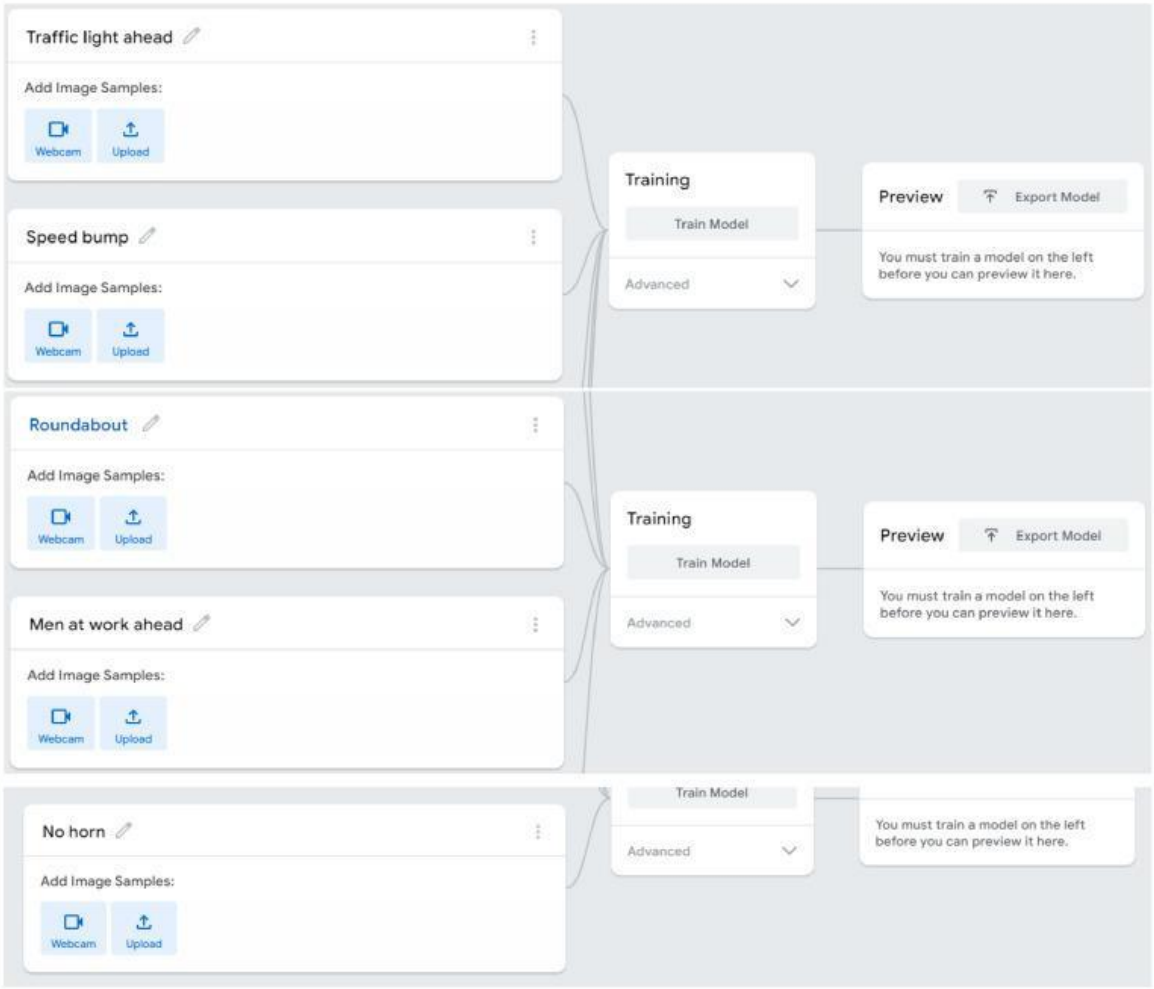


See the web page

Start here

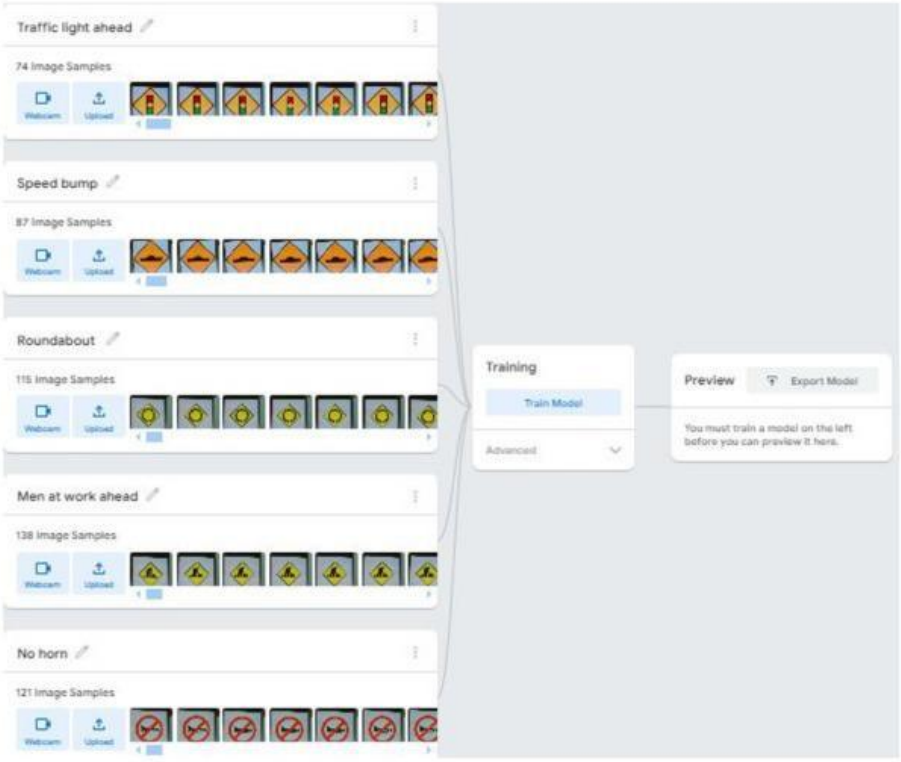
Let's see how to correctly perform image classification using Teachable Machine. Let's create a traffic sign recognition web page.

- First, https://teachablemachine.withgoogle.com go to the website and start training by getting started. Go into the Image project and start training the model.
- Add the class in the model as follows.



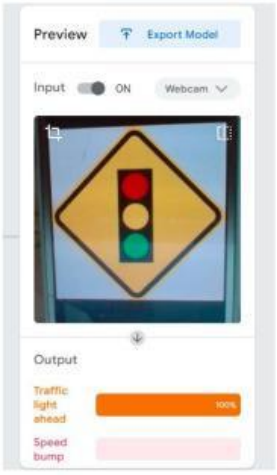
- Then provide samples for each class using the web cam.

❖ Provide Samples for all Classes prepared as above.

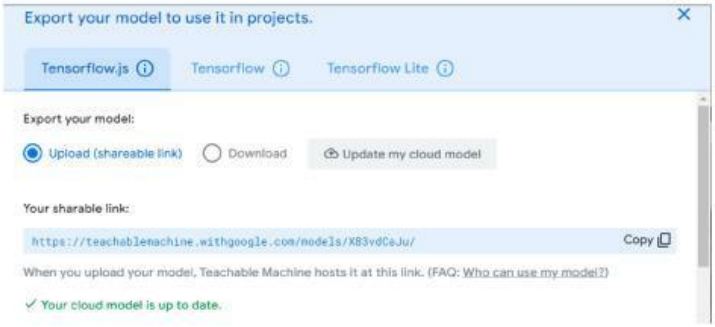


❖ Then train the model.

❖ After training the model, you can see the prediction as below from the preview.



❖ Now upload the model to export it. Then copy the sharable link.



❖ Then let's start creating the website.

❖ Libraries are added as follows in the project you are given to start with.

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>Teachable Machine Image Model</title>
    <script src="https://cdn.jsdelivr.net/npm/@tensorflow/tfjs@latest/dist/tf.min.js"></script>
    <script src="https://cdn.jsdelivr.net/npm/@teachablemachine/image@latest/dist/teachablemachine-image.min.js"></script>
    <link rel="stylesheet" href="style.css">
</head>
```

❖ Set the dev tag in the body tag as follows.

```
<body>
    <div id="webcam-container"></div>
    <div id="label-container"></div>
    <div id="result-container"></div>
  <script src="script.js"></script>
</body>
```

❖ After that import the js file.

❖ Adjust the css as follows in the Style.css file.

```
#webcam-container,
#label-container,
#result-container {
  margin-top: 20px;
}
#webcam-container {
  display: flex;
  justify-content: center;
}
#label-container div {
  font-size: 20px;
  margin: 5px;
}
#result-container {
  font-size: 24px;
  font-weight: bold;
  text-align: center;
}
```

❖ Prepare the javascript code in the Script.js file as follows.

❖ First, add a variable to store the url of the model created and trained above.

```
const URL = "https://teachablemachine.withgoogle.com/models/BbkmB9R_C/";
```

For the url here, give the sharable link you copied above.

❖ Then create some more variables as follows.

```
let model, webcam, labelContainer, resultContainer, maxPredictions;
```

❖ Create a function as init as follows.

```
async function init() {
  const modelURL = URL + "model.json";
  const metadataURL = URL + "metadata.json";

  model = await tmImage.load(modelURL, metadataURL);
  maxPredictions = model.getTotalClasses();

  const flip = true;
  webcam = new tmImage.Webcam(200, 200, flip);
  await webcam.setup();
  await webcam.play();
  window.requestAnimationFrame(loop);

  document.getElementById("webcam-container").appendChild(webcam.canvas);
  labelContainer = document.getElementById("label-container");
  resultContainer = document.getElementById("result-container");
  for (let i = 0; i < maxPredictions; i++) {
    labelContainer.appendChild(document.createElement("div"));
  }
}
```

❖ After creating it, call the function below it.

```
init();
```

❖ Then create a function as a loop as follows.

```
async function loop() {
  webcam.update();
  await predict();
  window.requestAnimationFrame(loop);
}
```

❖ Finally, create the predict function as follows.

```
async function predict() {
  const prediction = await model.predict(webcam.canvas);
  let highestProbability = 0;
  let highestClass = "";
  for (let i = 0; i < maxPredictions; i++) {
    const classPrediction =
      prediction[i].className + ": " + prediction[i].probability.toFixed(2);

    labelContainer.childNodes[i].innerHTML = classPrediction;
    if (prediction[i].probability > highestProbability) {
      highestProbability = prediction[i].probability;
      highestClass = prediction[i].className;
    }
  }

  resultContainer.innerHTML = "Detected Sign: " + highestClass;
}
```

- You can display the result as text or as an image in the result container.
- After setting it up as above, the web cam will open and prediction will start.

Traffic light ahead: 0.13
Speed bump: 0.11
Roundabout : 0.27
Men at work ahead: 0.15
No horn: 0.33

Detected Sign: No horn

- Now let's present each road sign to the web cam and check how to detect it correctly.

Traffic light ahead: 1.00
Speed bump: 0.00
Roundabout : 0.00
Men at work ahead: 0.00
No horn: 0.00

Detected Sign: Traffic light ahead

Traffic light ahead: 0.00
Speed bump: 0.00
Roundabout : 1.00
Men at work ahead: 0.00
No horn: 0.00

Detected Sign: Roundabout