Highly Commended

Programming, Apps & Robotics

Year 3-4

Louis Kent

Pembroke School - Middle School

Oliphant Science Awards 2021
Project report: AI Image Classifier – by Louis Kent
The aim of the entry, and its scientific purpose and potential applications:

The aim of this entry is to show how artificial intelligence (AI) can be used to; (1) classify and identify images and (2) help the vision impaired.

Artificial intelligence (AI) is like a brain that learns from information and can then be used to classify input that it has not seen yet. An example is a neural network.

An image classifier is a type of AI that gets input from pixels and produces a result in the form of data which which classifies what the user is seeing.

The use I thought about when making this project is to help blind people be able to know what image is being seen by the user (for example if a group of people are watching a slide-show or learning about places in the world, this software could identify for the vision impaired what is being seen in then provide an audio output to help them in following the show or lesson).

The image classifier uses a pre-trained model which has thousands of images the model is trained on.
I then use this learning information to guess what the output should be.
After, I use the output as words and use text to speech to output it through audio.

I implemented this by finding a programming library online and using code from it to make speech. (See link in bibliography below.)

An Image Classifier is probably a first AI project for kids to do but this particular way of doing it is probably the easiest way as I used a library called p5.js (from p5js.org) which had lots of pre-made functions for me to use.

The type of robot or computer required to run the:

Any web browser (eg. Chrome)that supports HTML5 and Javascript
A device that has a keyboard attached (eg. computer/laptop).
The project is programmed in Javascript, HTML5 because anyone who wishes to use it can (if they have a   web browser).

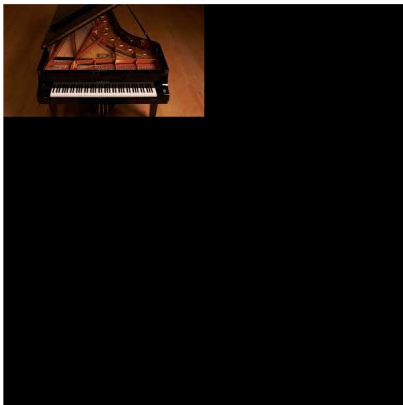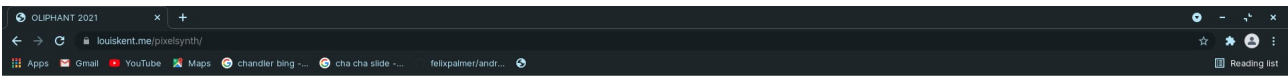All of the code is stored in file sketch.js.

Clear Instructions on Loading or Using the Entry:

Instructions:

1. Turn on the computer/laptop/ipad/phone/iphone.

2. Open a web browser and in the address box type :
"https://louiskent.me/pixelsynth/" (no quotes) and press enter.
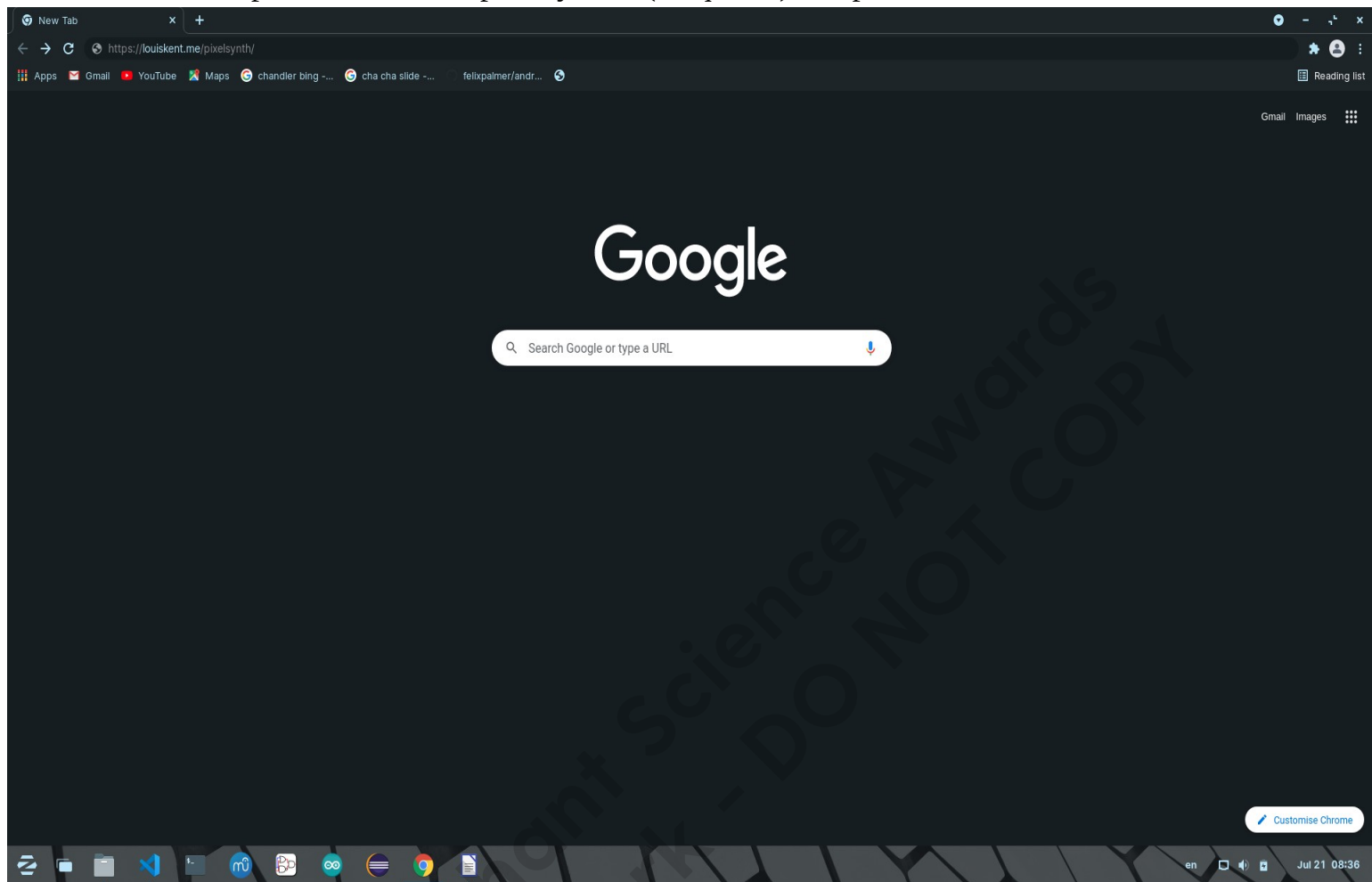
3. Press "c" key to change image and click to hear speech.

4. Enjoy!

5. Go here: "https://louiskent.me/Oliphant2021/sketch.js" (no quotes) to view the code. (show below)

6. Bibliography - AI information can be seen here (Wikipedia):
https://louiskent.me/Oliphant2021/dependencies.txt
programming library: https://p5js.org
AI Wiki: https://en.wikipedia.org/wiki/Artificial_intelligence
ml5 library (helps with Machine Learning): ml5js.org

Appendix – Code:

sketch.js:

```javascript
//variables
//random selection of images
let selections = ["bird.jpeg", "bird2.jpg",
"bird5.jpeg", "piano1.jpeg", "piano4.jpeg"];
let img;
let classifier;
let label = "waiting...";
let speech;
```

```javascript
let startNew;
let div;

// load model and image!
function preload() {
// Use a random image
img = loadImage("./images/" +
random(selections));
classifier = ml5.imageClassifier("MobileNet");
}

// Setup and run setupcode
function setup() {
createCanvas(600, 600);
div = createDiv();
setupCode();
}

// setup code to use later
function setupCode() {
div.elt.innerText = "";
div.elt.innerHTML = "";
classifyImage();

//speech
speech = new p5.Speech(voiceReady); //callback
speech.started(startSpeaking);
function startSpeaking() {
background(0,255,0);
}
```

```javascript
function voiceReady() {
console.log(speech.voices);
}


speech.setVoice("SpeechSynthesisVoice"); // set
voice
}


// classify!
function classifyImage() {
classifier.classify(img, gotResults);
}


function draw() {
background(0);

// Draw the image
image(img, 0, 0);
if (startNew) {
// load a new image
preload();
setupCode();
startNew = false;
}
}


// Run again when c key pressed
function keyPressed() {
if (key == "c") {
```

```javascript
  startNew = true;
  }
}


// When mouse pressed, speak
function mousePressed() {
speech.speak(label);
}


// Get the classification!
function gotResults(error, results) {
// Something went wrong!
if (error) {
console.error(error);
return;
}
// Store the label
label = results[0].label;
div.elt.innerText = label;
div.elt.innerHTML = label;
console.log(results[0].label);
}
```