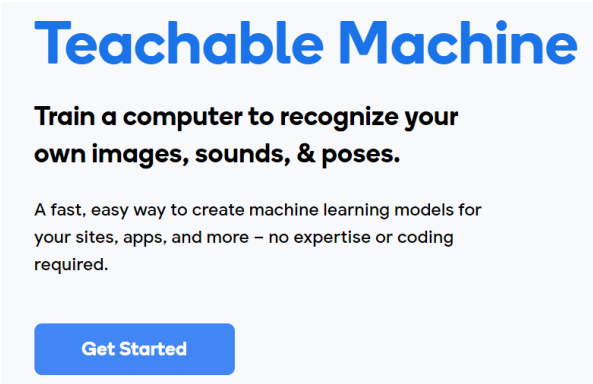
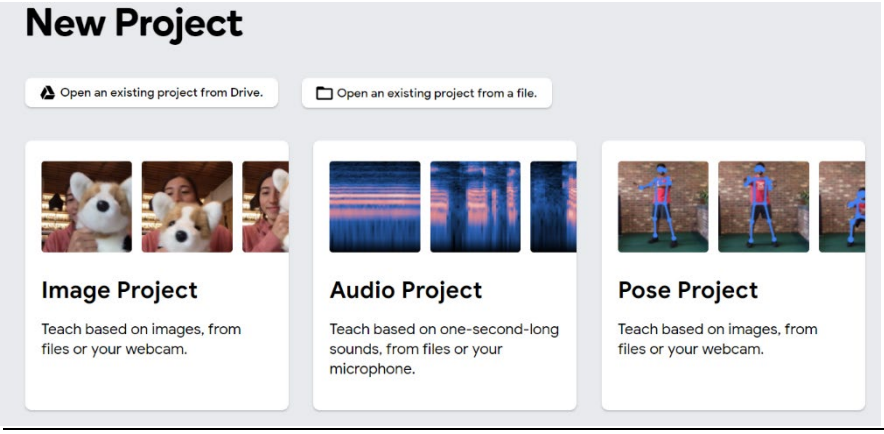
Activity – Object Recognition

In this activity, you will create a machine learning model to detect how ripe a banana is using images (You do not have to use bananas for this — you can use any fruit that changes color, or any three different objects, e.g., pick two or three items around your house/office).

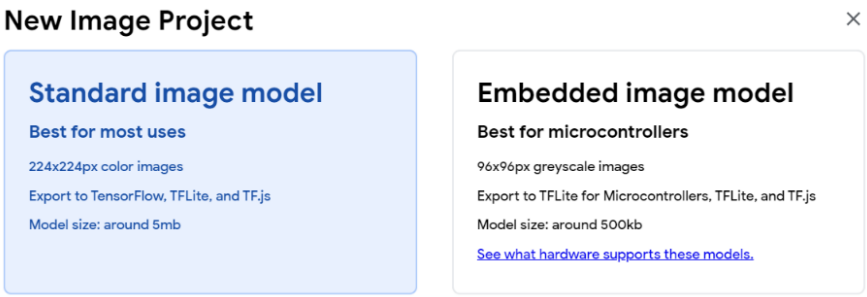
Before you start, go to the Google Teachable Machine website at http://teachablemachine.withgoogle.com/ and click on the 'Get Started' button. (See diagram).



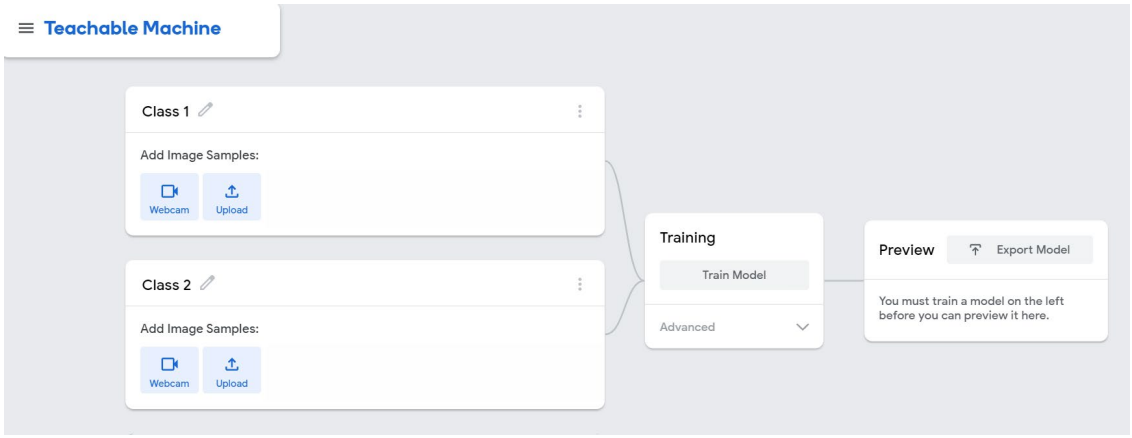
On the 'New Project' landing page, click "Ímage Project."



Select ‘Standard image model’ in the pop-up window. (See diagram).



You should see a canvas that looks like the one in the diagram below.

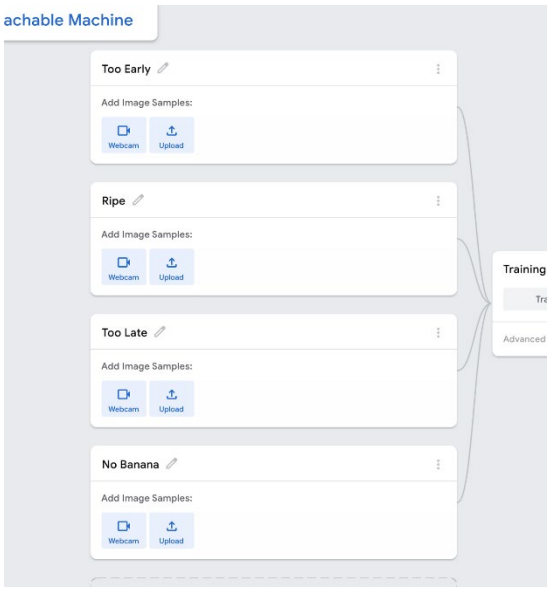


Before you start, a note about your training samples. Your samples are not sent to any servers unless you save your project to Google Drive — and even then, it is in your Google Drive, so that sample data is still yours. When you train the model, it trains in your browser tab without sending anything to any servers.

HOW TO TRAIN YOUR MODEL

To start training the machine, we first have to create different categories or classes. To create the classes, click on the ‘pencil’ icon. To add classes, click on “Add a class”.

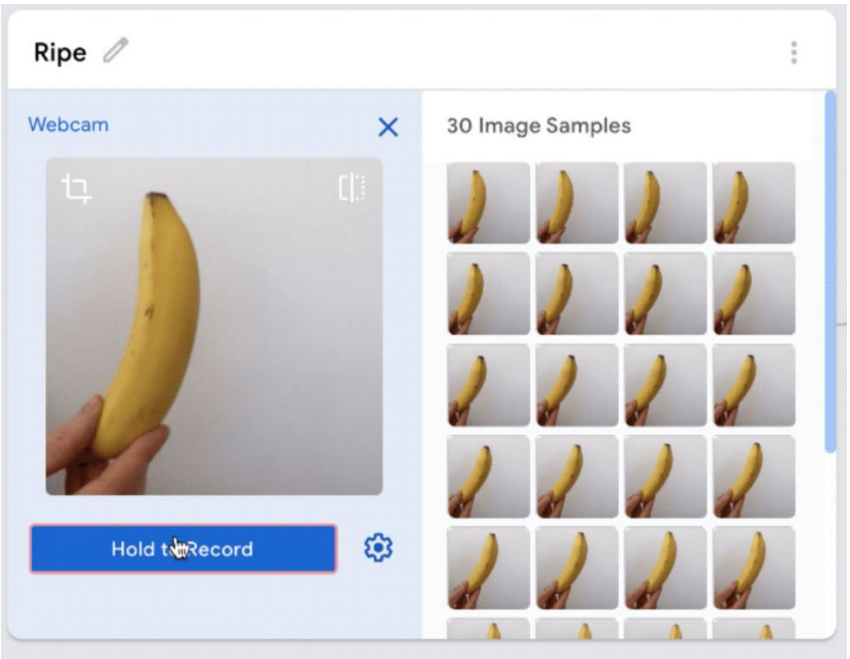
Step 1: Make four classes here — one for bananas that are too early, one for ripe bananas, and one for bananas that are too late — plus one for images where there is no banana at all. (See diagram)



Step 2: Give each class samples to learn from. Use your webcam to capture images of the banana — starting with a banana that's "Too Early." Click and hold on the button 'Hold to record' to generate sufficient samples while moving the object you hold at different angles. (See diagram)

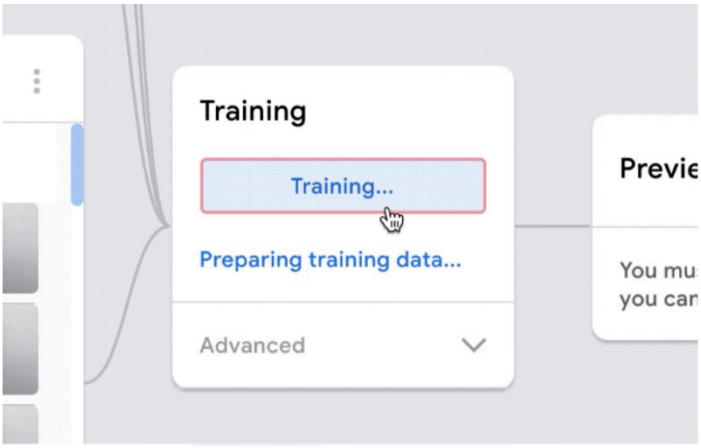
Step 3: Do the same with a ripe banana.

Step 4: And a banana that's a little past its prime.

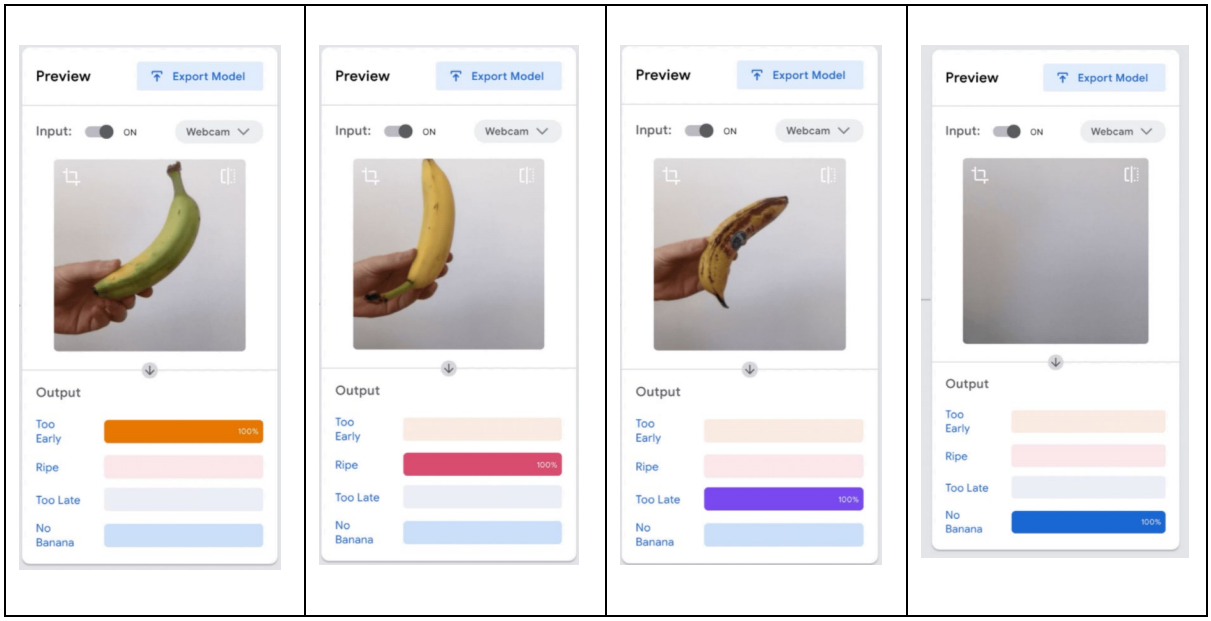


Step 5: And finally, an image with no banana at all. Note: show the webcam your hand without a banana so that it does not only see hands in the classes with bananas and make a correlation that an image has to include a hand to be classified as ripe/etc.

Step 6: After all of the classes are ready, click train. (See diagram).



Step 7: And, over on the right, preview if the model works!



Questions:

1. What do you think the model would predict if you hold up two bananas at the same time?

2. Try evaluating your bananas on a different background, like a different color wall — does it still work?

3. Hold up a photo of a banana! Or a drawing of a banana! Or a toy that looks like a banana! How does your model respond to different images?

4. What could you do to improve the accuracy of your model?

5. Why do you think the model can be trained in such a short time without a huge sample data?

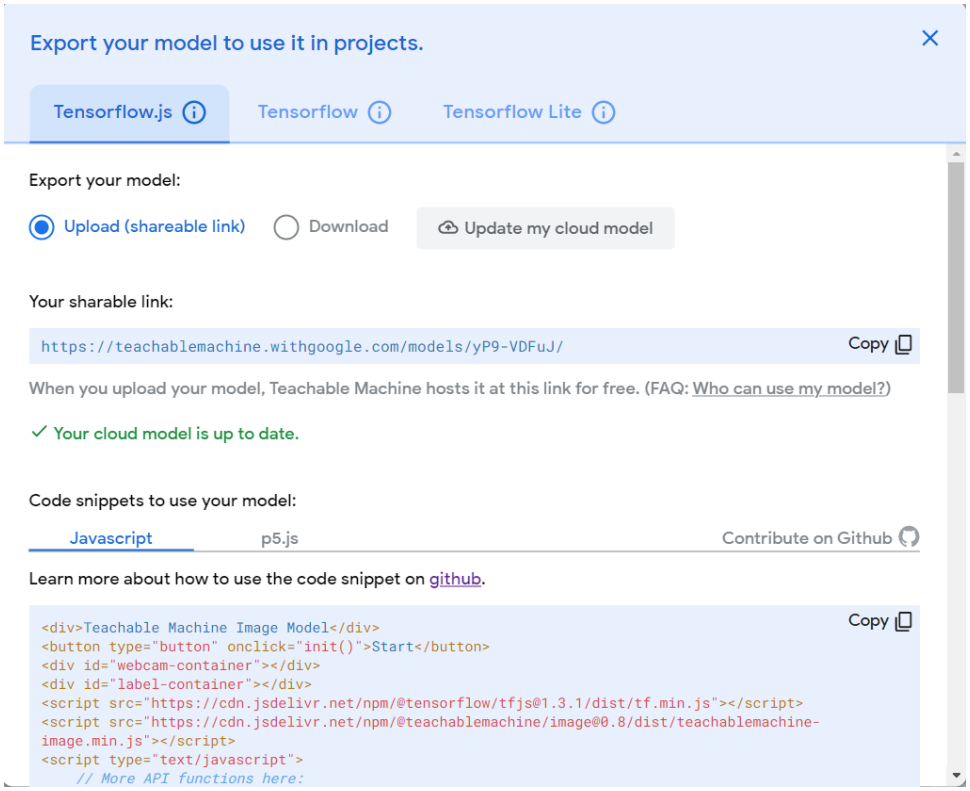
EXPORTING THE MODEL

You can export your model to make things with it if you like! For example, you can chose to upload to Google this model to tell how ripe a banana is.

To publish your model online, Teachable Machine will generate a URL where your model is hosted for free. You can share that link with anyone if you'd like them to use your model—anyone who has that link can use your model in their projects.

To export your model, at the preview window, click export model. Select 'Tensorflow.js', select 'Upload (sharable link), then click the button, upload my model. You can click 'copy link' and share the link for others to use or try it out yourself by pasting the URL to a new browser window. (Note: Your model is published to Google servers, but the examples you used to make the model are not. Just your model — the mathematical program that predicts which class you are showing it.)

The diagram below shows a model that has already been uploaded.



CHALLENGE ACTIVITY

You can use Google Teachable Machine to make a sound model to detect snaps, claps and whistles or,

You can make a pose model to detect which way you tilt your head.

Have fun!

--- End of Activity ---