
Using Data to Train our Robot

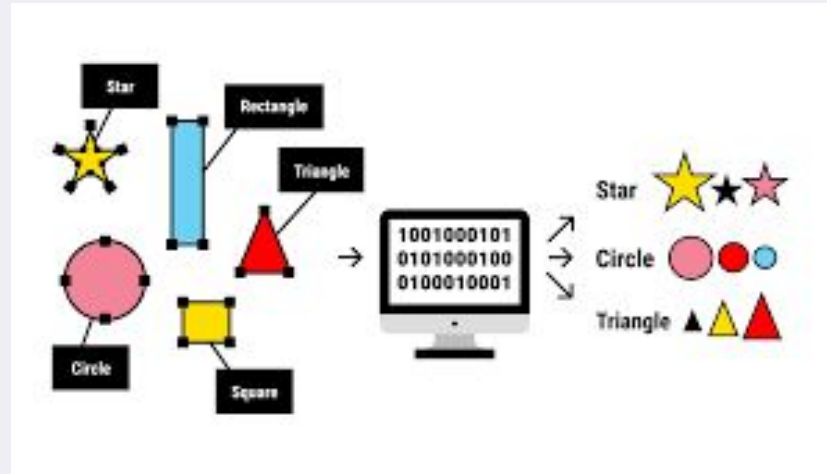
Image Classification

How does data impact AI?

Data drives AI.

The more labeled data pairs that our Artificial Intelligence is trained on, the more accurate the model will be.

Today we will look at how we use data to learn, and how we might use data to train our machines.



Remember this?



Let's use our input/output agent to try image classification.



What is this?



What is this?



How did you know that??



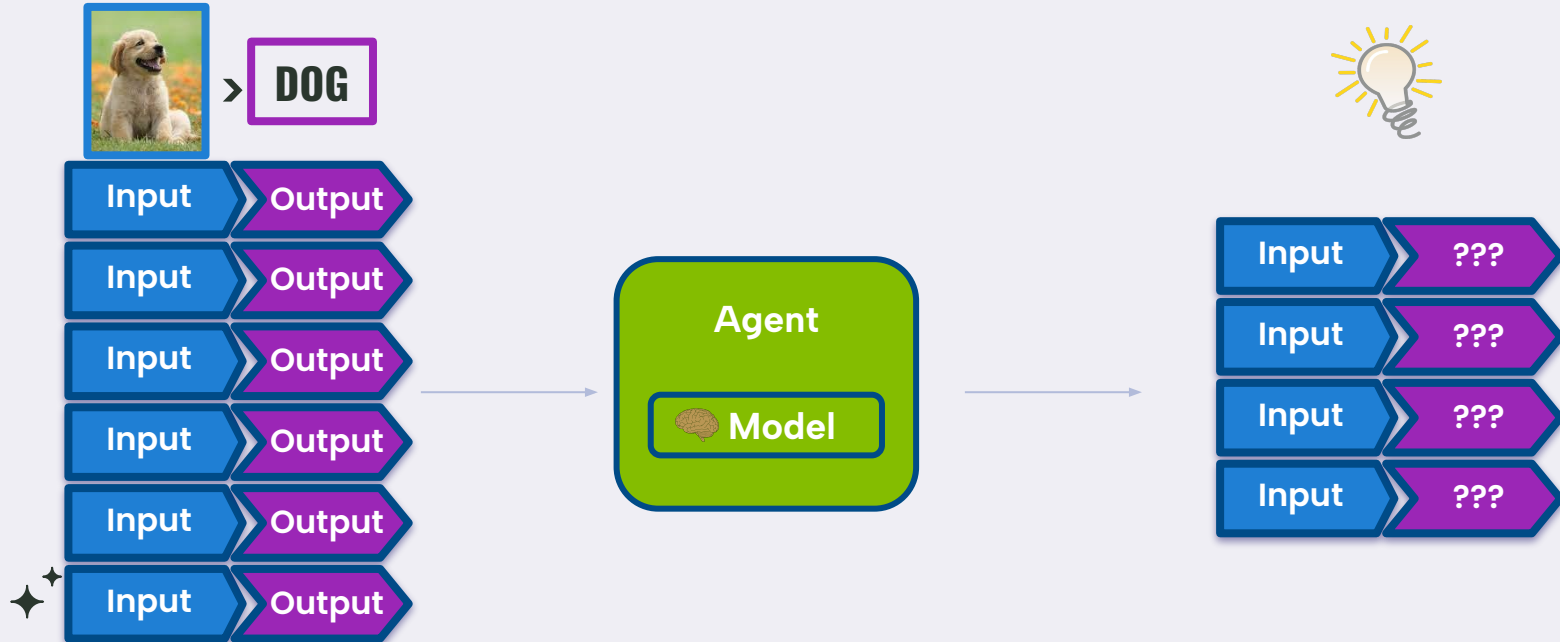


You have seen so many images of dogs and cats!





How did you become trained?



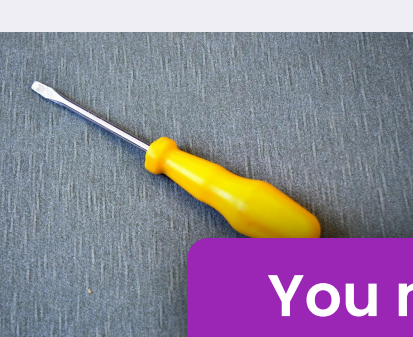
Do you know what this is?



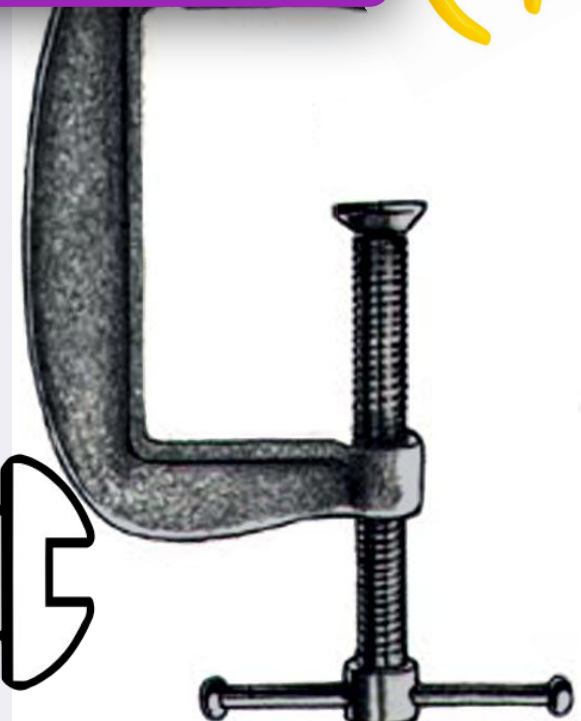
or this?

✦ ✦





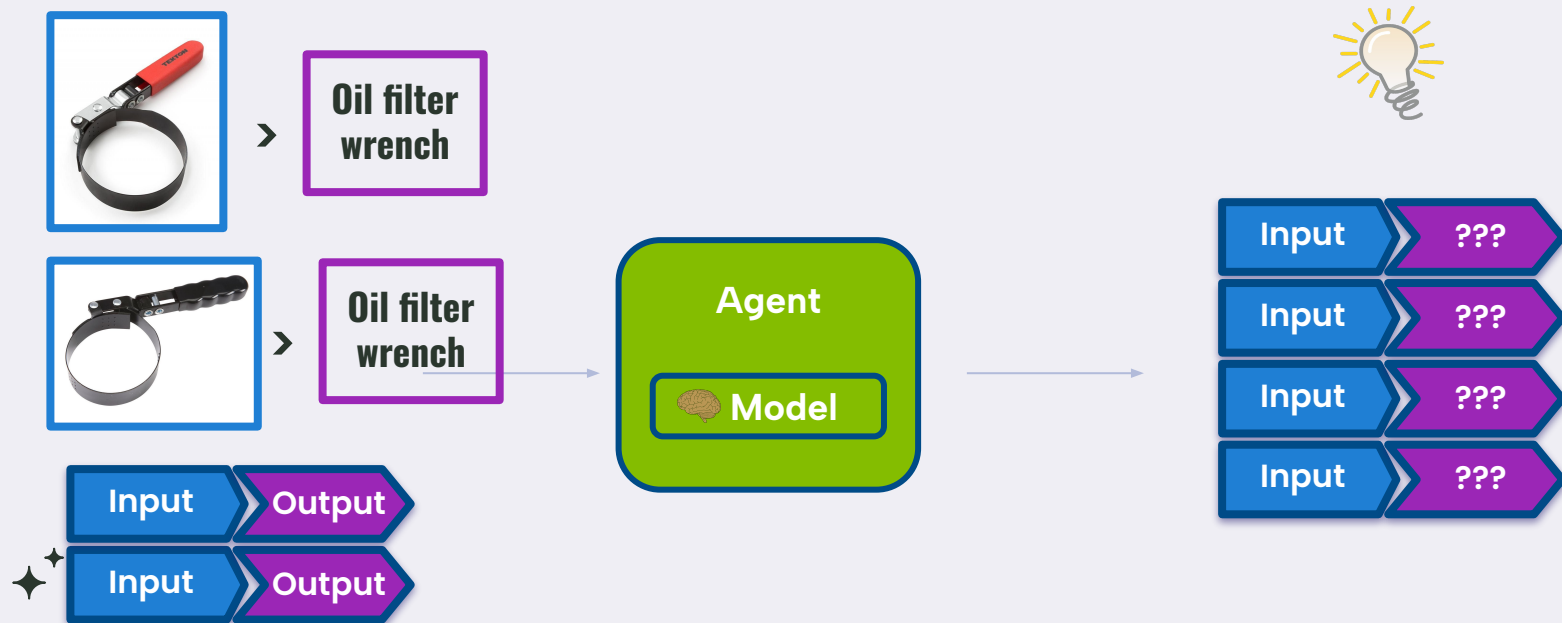
You may not have the “data” on different tools



Uh-oh no training



Providing the output answer with the input can help humans learn!



Now you might know the answer to
what is this.



Machine need data to learn too!

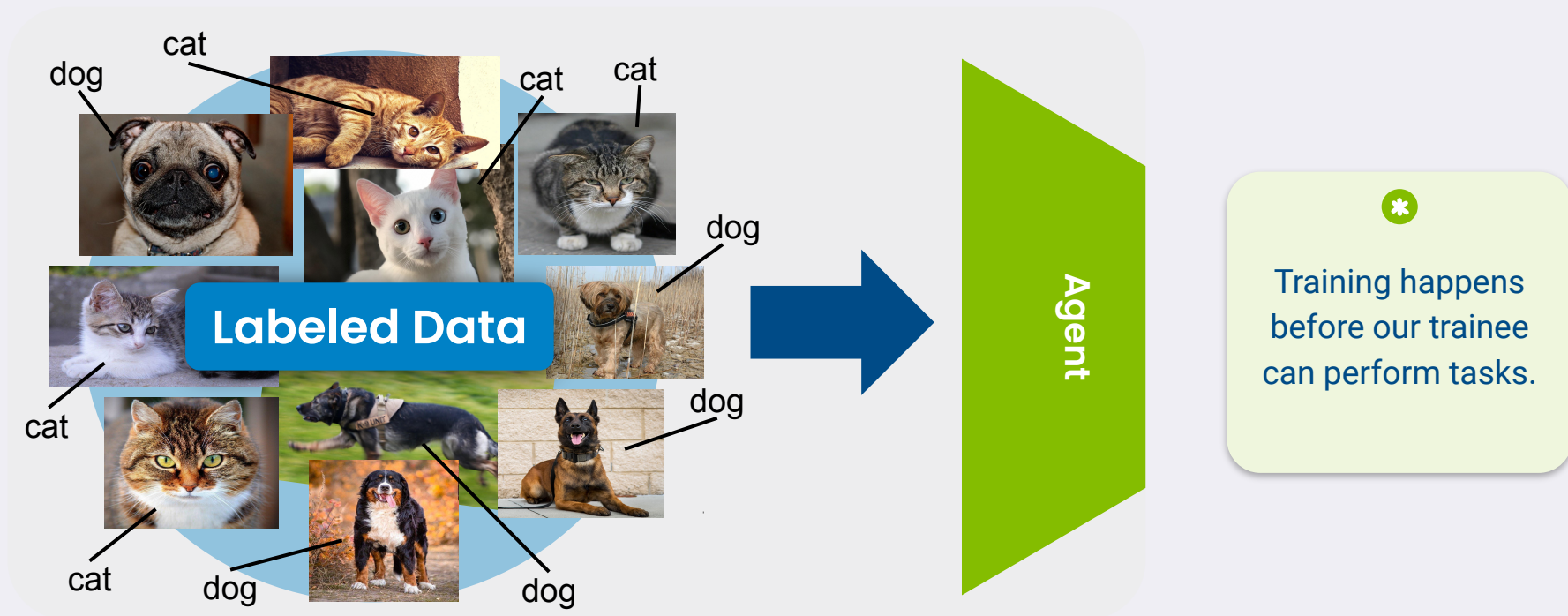
The image shows the Teachable Machine interface in four stages of training:

- Initial State:** The 'Thumbs Up' and 'Thumbs Down' classes each have only 1 image sample. The 'Training' dropdown is set to 'Model Trained'. A red arrow points from the 'Uh-oh no training' callout to this state.
- Training Progress:** The 'Thumbs Up' class now has 76 image samples and the 'Thumbs Down' class has 67 image samples. The 'Training' dropdown is set to 'Advanced'. A red arrow points from the 'Trained!' callout to this state.
- Preview:** The 'Preview' window shows the model's output for the 'Thumbs Up' and 'Thumbs Down' classes. The 'Thumbs Up' class has a 54% output and the 'Thumbs Down' class has a 46% output.
- Final State:** The 'Preview' window shows the model's output for the 'Thumbs Up' and 'Thumbs Down' classes. The 'Thumbs Up' class has a 100% output and the 'Thumbs Down' class has a 98% output.

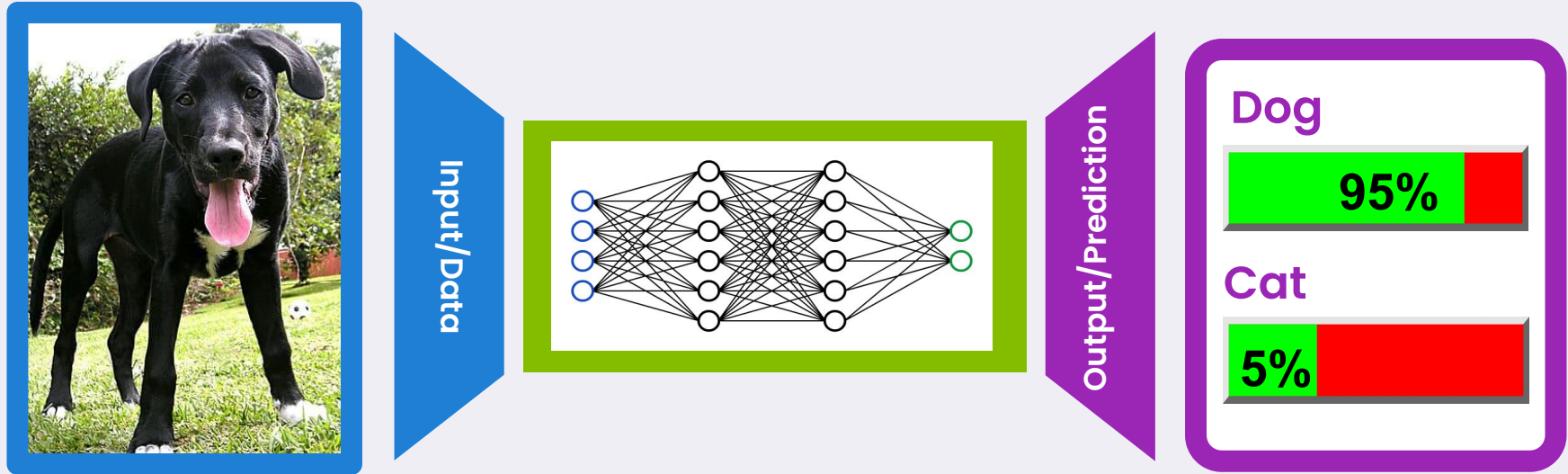
Uh-oh no training

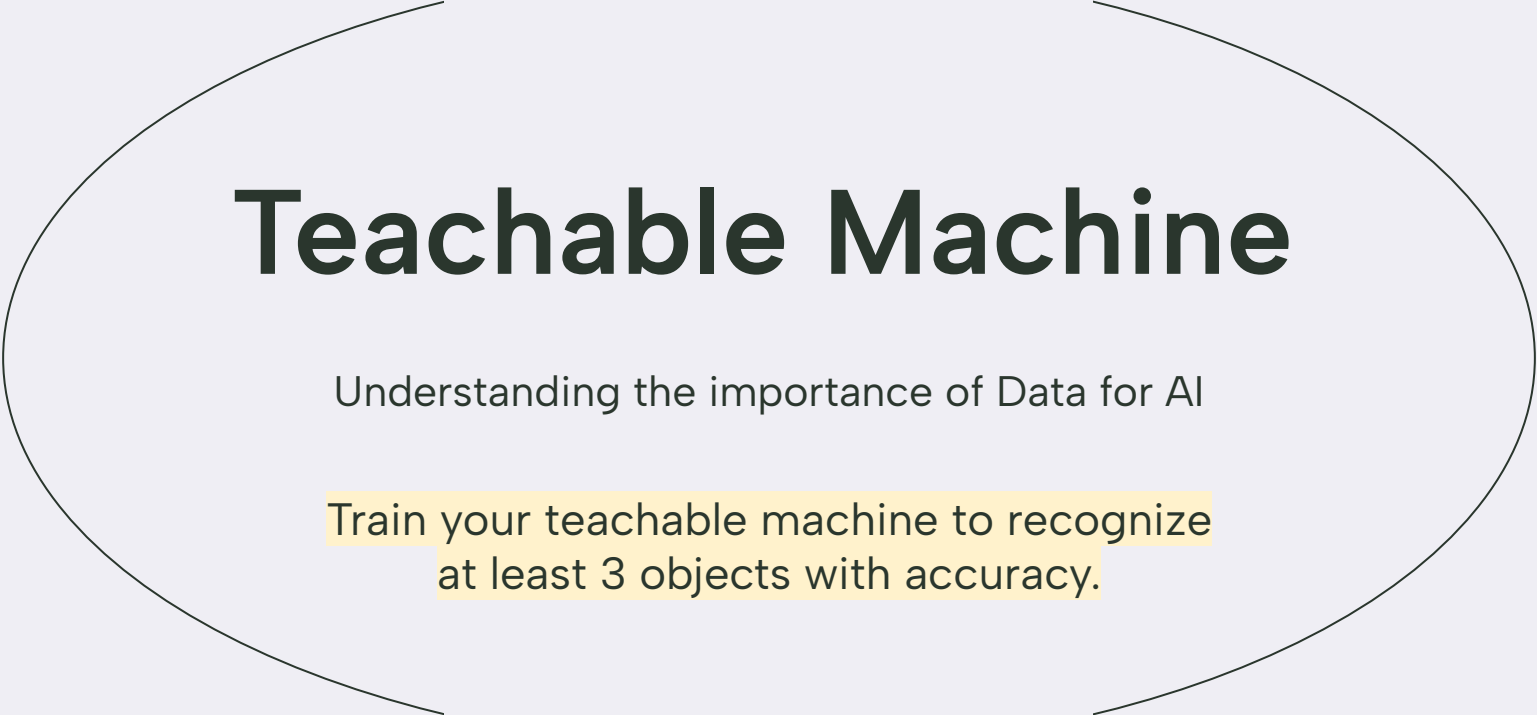
Trained!

We will input a lot of labeled data into our agent.



Once trained- our agent - should be able to predict with pretty good accuracy!





Teachable Machine

Understanding the importance of Data for AI

Train your teachable machine to recognize
at least 3 objects with accuracy.

Teachable Machine



Go to Teachable Machine

<https://teachablemachine.withgoogle.com/train>

Choose Image Project

Standard Model is fine. Make sure that Teachable Machine can access your camera.

Take pictures of 3 objects

Choose objects and upload a good number of pictures from all angles of each object. Give each class a name. One object per class



We will use **Teachable Machine** to complete our mission.

≡ **Teachable Machine**

New Project

 Open an existing project from Drive.

 Open an existing project from a file.

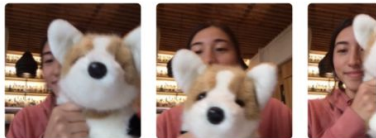
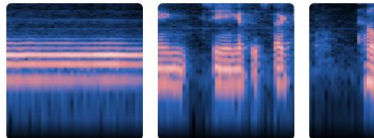


Image Project

Teach based on images, from files or your webcam.



Audio Project

Teach based on one-second-long sounds, from files or your microphone.



Pose Project

Teach based on images, from files or your webcam.

Give the Machine lots of Data (pictures!).

★ Don't forget to give each class a label that represents the picture.

The image shows the Teachable Machine interface with three classes being demonstrated. A red arrow points to the 'Einstein' class, which has 308 image samples. Another red arrow points to the 'Thumbs Up' class, which has 76 image samples. A third red arrow points to the 'Thumbs Down' class, which has 67 image samples. Each class has a 'Webcam' button and an 'Upload' button. In the center, there is a 'Training' section with a 'Train Model' button and an 'Advanced' dropdown menu. To the right of the training section is a 'Preview' section with the text 'You must train before you can preview'. The interface is titled 'Teachable Machine' at the top.

Initial Tests Test your machine



Train your Teachable Machine

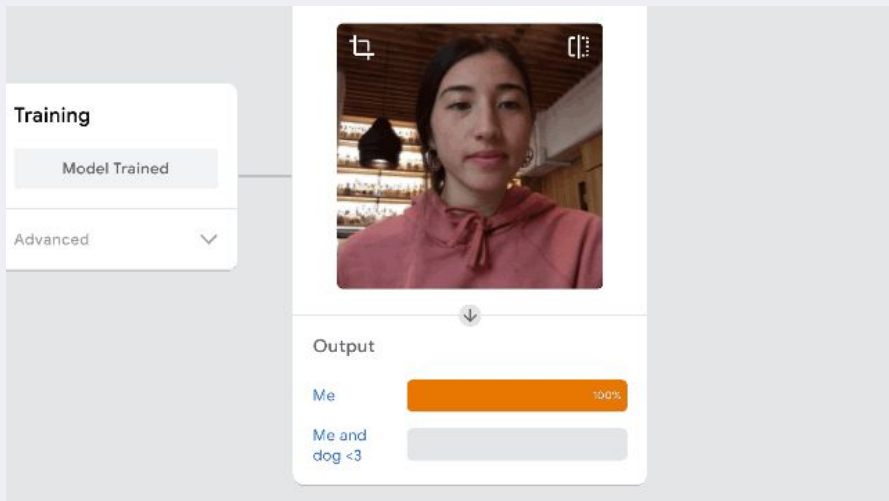
Push the “Train Model” button and wait.

Test your design

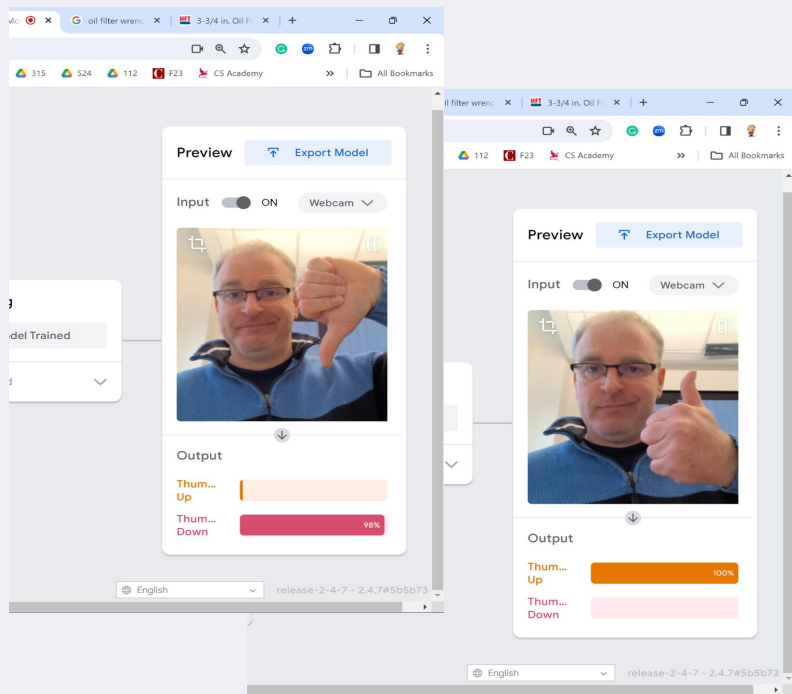
Once trained, test your machine. What happens when you put the objects in front of the camera?

Come up with 2 ways to improve your design and run other tests.

Try adding another object. Can your machine recognize more than 3 objects at a time? Which objects in the classroom are easier for the machine to identify



Discussion



- How accurately did your machine predict the object?
 - Why this is hard / Why is this AI?
 - What types of things can go wrong
 - How to make it better?
 - More data, better data

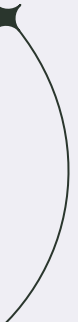
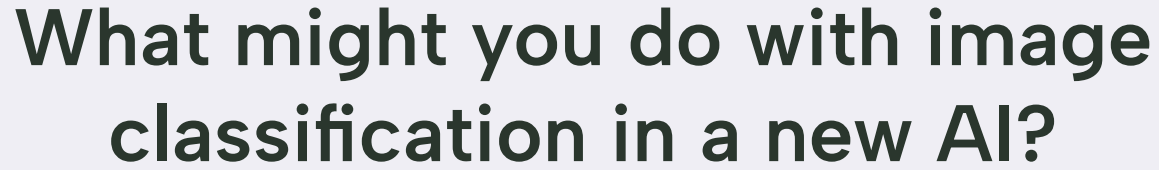


✦

Discussion: Why might the AI have trouble with the task below?

Chihuahua or Blueberry Muffin?





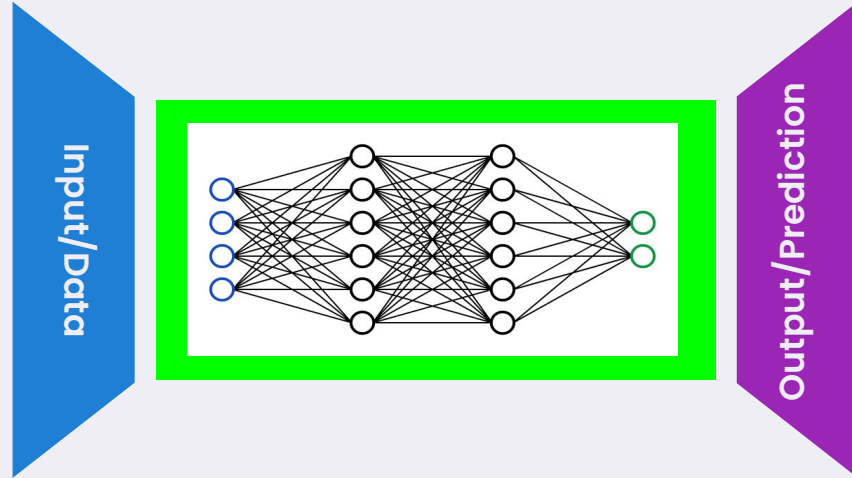


Extension

If you get done training your robot to classify images, try playing pictionary against this AI using Quick Draw. Would you want your robot to be able to play games with you? How do you think this AI is trained?

How does this work with Quick Draw?

We put an
image in ...
your drawing!



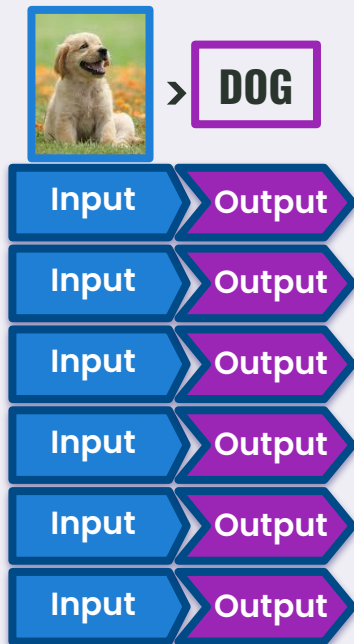
"I see a bee!"



The trained Neural network can begin to guess which of the images you are drawing based on the images it knows exists.



Review



For Image Classification lots of labeled data is needed to make a good model.