

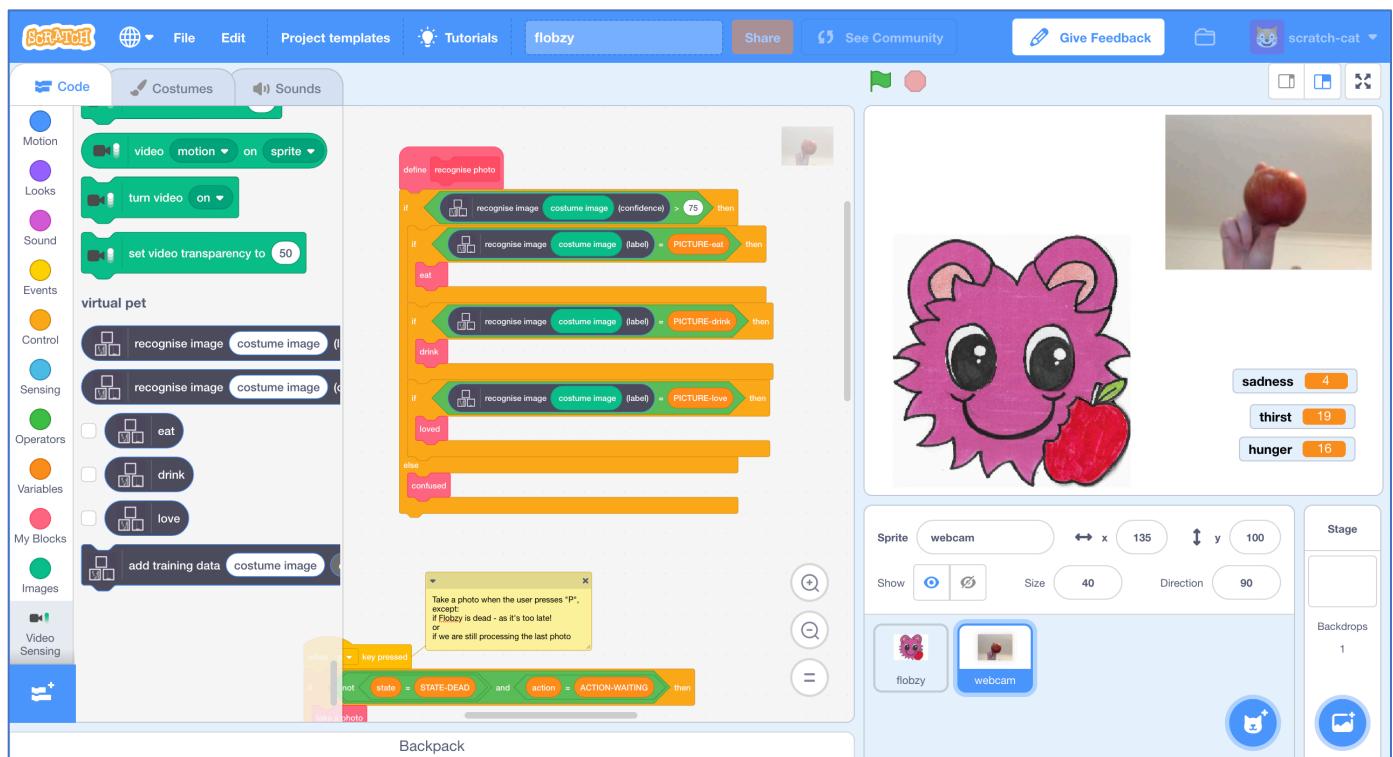
# Virtual Pet

In this project you will make a dancing panda.

It'll be a shy panda, that will get embarrassed and stop dancing if it sees you looking in through the window.

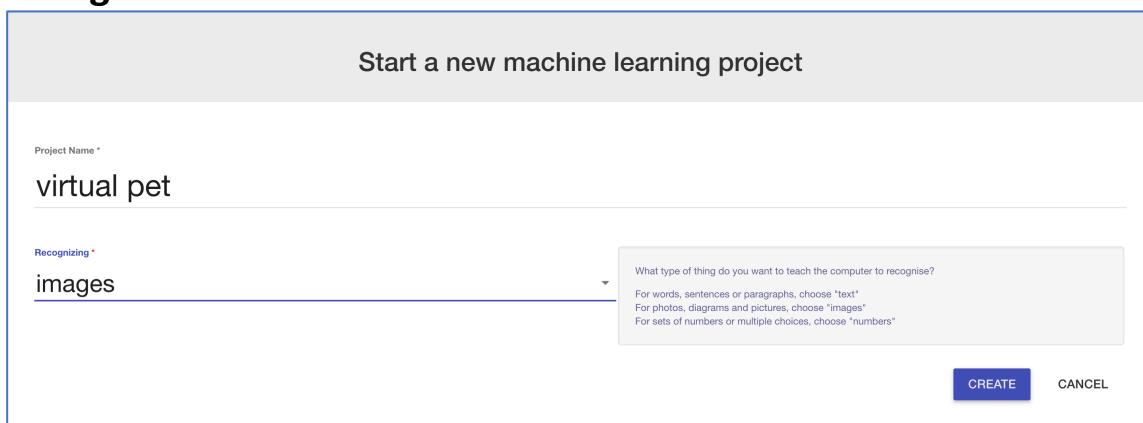
You'll train it so that if you cover your eyes, it'll recognise that you're not looking and keep dancing.

The virtual pet artwork in this project was drawn by Grace Lane.



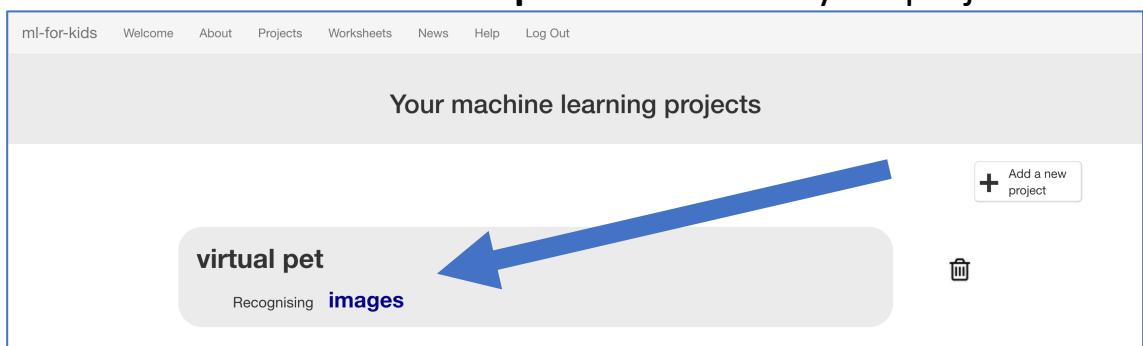
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- 1.** Go to <https://machinelearningforkids.co.uk/> in a web browser
- 2.** Click on “**Get started**”
- 3.** Click on “**Log In**” and type in your username and password  
*If you can't remember your password, ask your teacher to reset it for you.*
- 4.** Click on “**Projects**” on the top menu bar
- 5.** Click the “**+ Add a new project**” button.
- 6.** Name your project “virtual pet” and set it to learn how to recognise “**images**”. Click the “**Create**” button



The screenshot shows a dialog box titled "Start a new machine learning project". It has two main input fields: "Project Name \*" containing "virtual pet" and "Recognizing \*" containing "images". To the right of these fields is a dropdown menu with the question "What type of thing do you want to teach the computer to recognise?". Inside the dropdown, three options are listed: "For words, sentences or paragraphs, choose 'text'", "For photos, diagrams and pictures, choose 'images'", and "For sets of numbers or multiple choices, choose 'numbers'". At the bottom right of the dialog are two buttons: "CREATE" and "CANCEL".

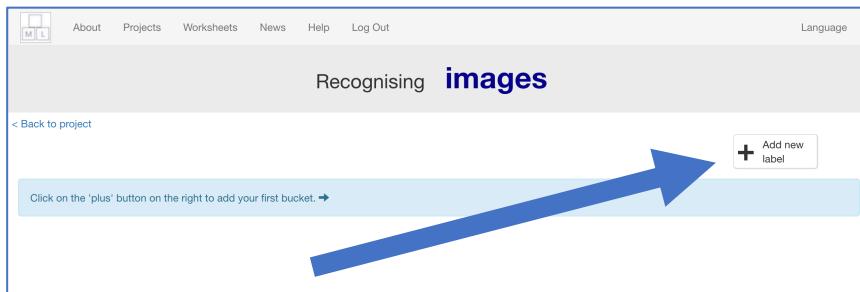
- 7.** You should see “**virtual pet**” in the list of your projects. Click on it.



The screenshot shows a list of machine learning projects under the heading "Your machine learning projects". A single project, "virtual pet", is listed. This project card includes the name "virtual pet", the recognition type "Recognising images", and a "Delete" icon. A large blue arrow points from the left towards the "virtual pet" project card. In the top right corner of the page, there is a button labeled "+ Add a new project".

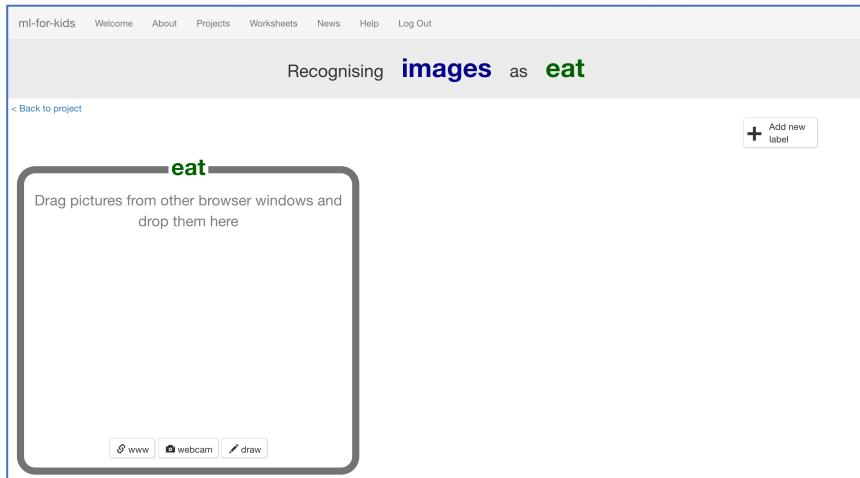
- 8.** Click the “**Train**” button

## 9. Click “+ Add new label”



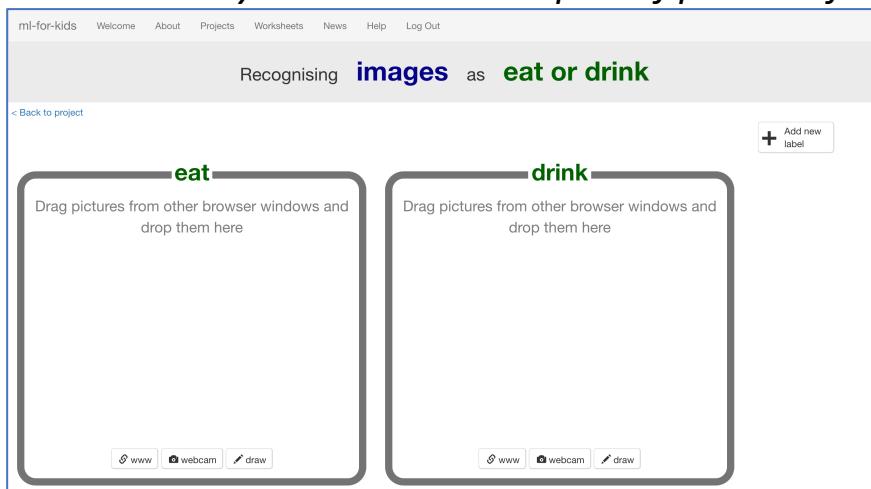
## 10. Type in “eat”, and press “Add”

*This is where you'll collect examples of pictures of food for your virtual pet*



## 11. Click “+ Add new label” again, type in “drink”, and press “Add”

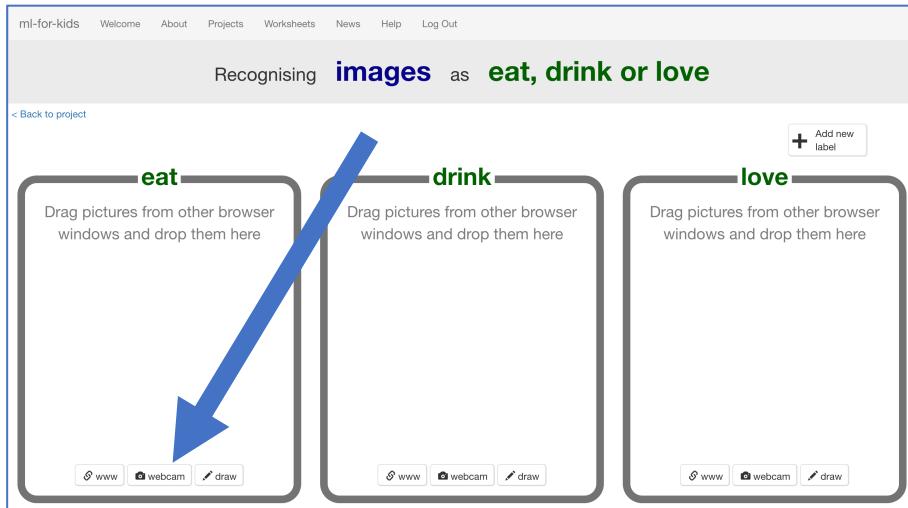
*This is where you'll collect examples of photos of drink for your virtual pet*



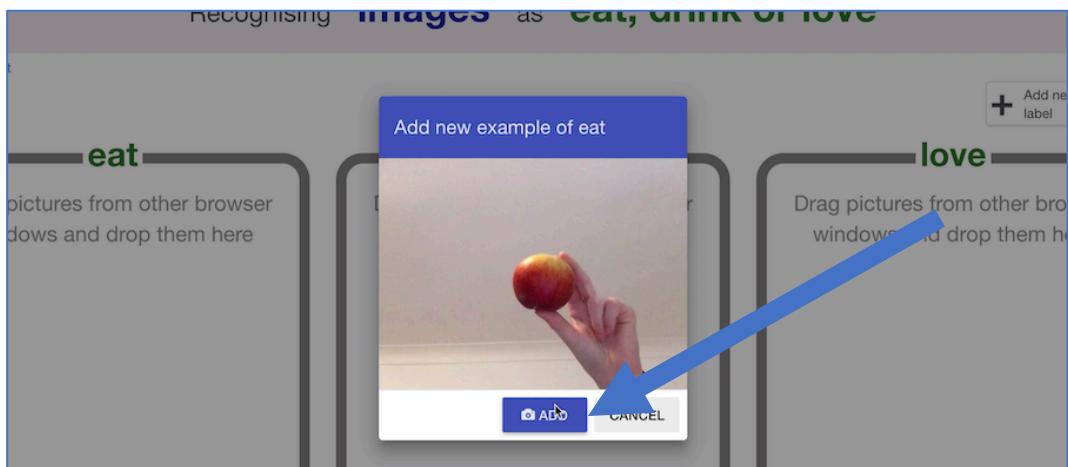
## 12. Click “+ Add new label” again, type in “love”, and press “Add”

*This is where you'll collect examples of pictures of showing love to your virtual pet.*

### 13. Click the “webcam” button in the “eat” bucket

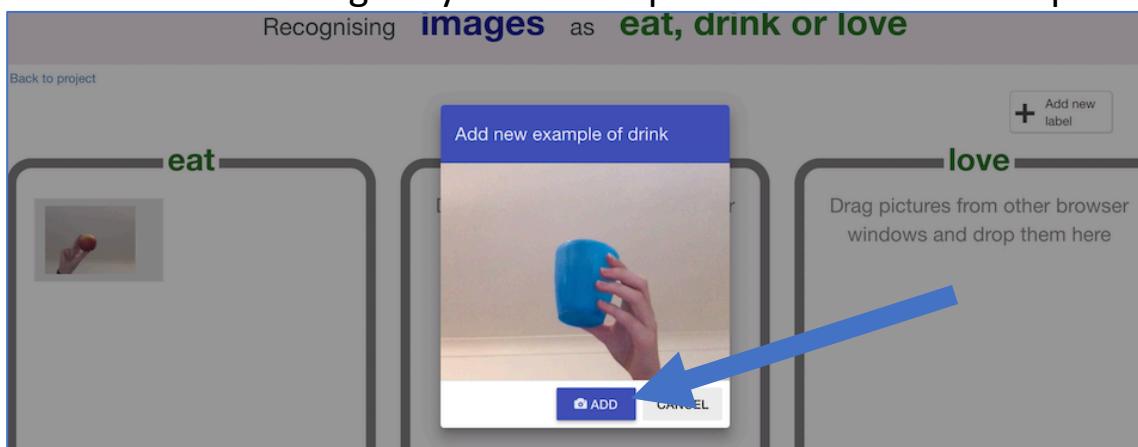


### 14. Find something for your virtual pet to eat and hold it to the webcam Click “Add”



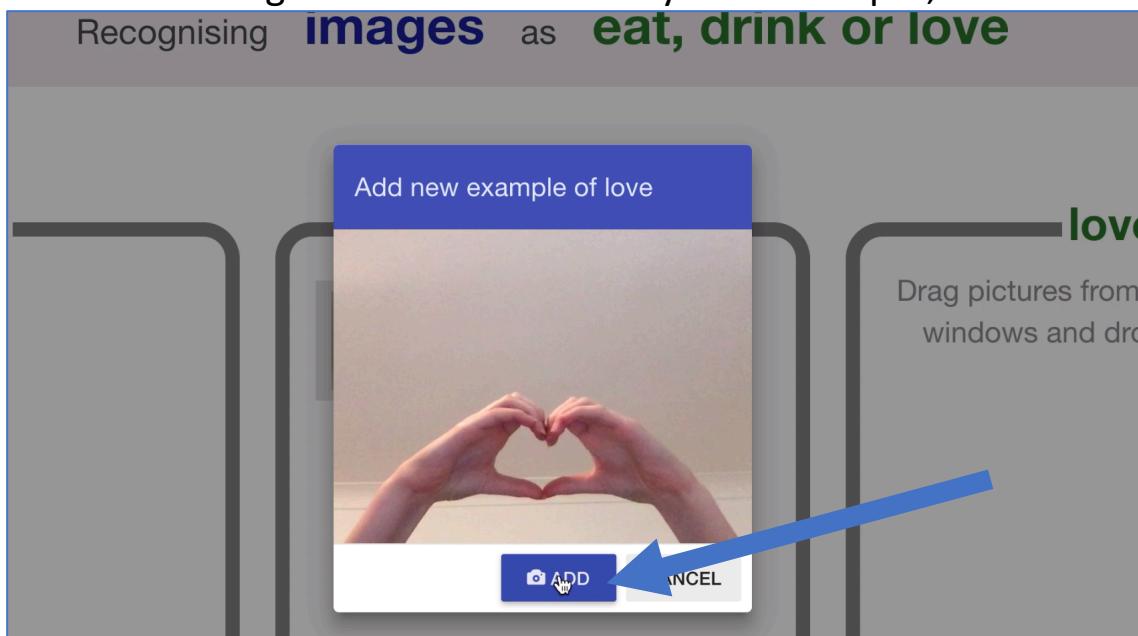
### 15. Click the “webcam” button in the “drink” bucket

### 16. Find something for your virtual pet to drink and take a photo of it.

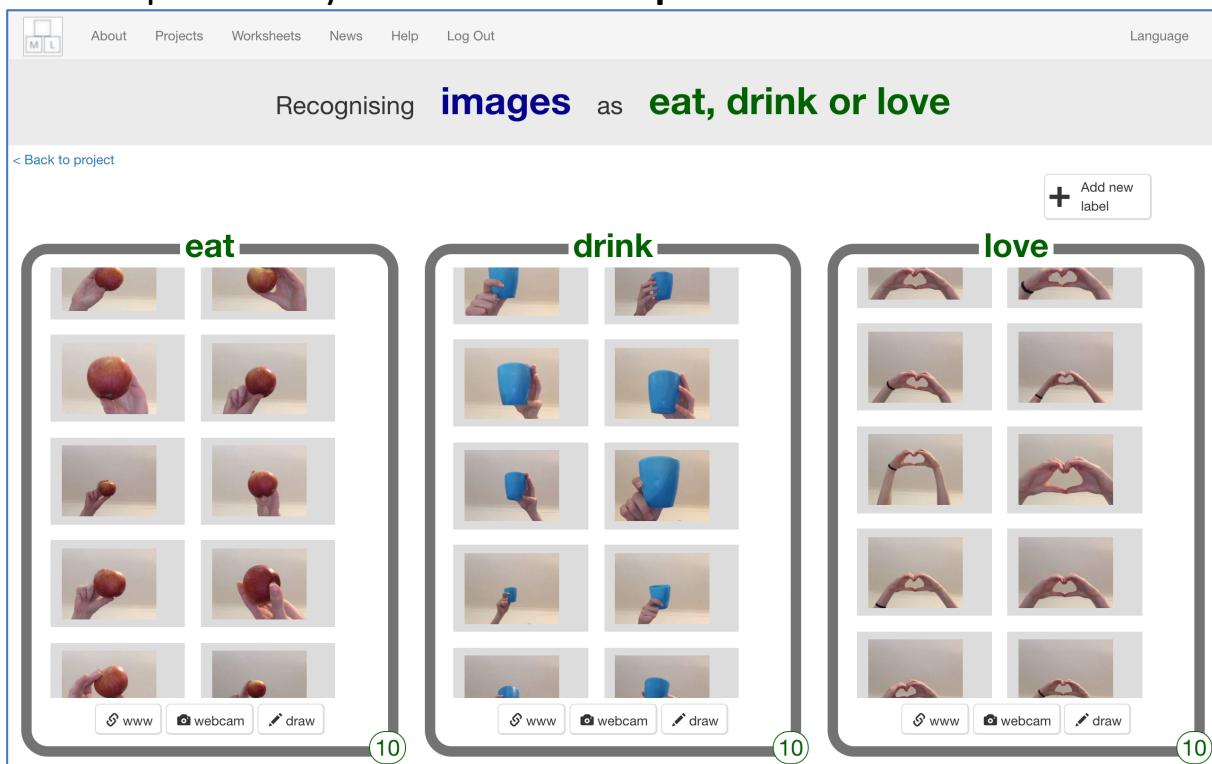


**17.** Click on the “**webcam**” button in the “**love**” bucket

**18.** Make a sign that shows love for your virtual pet, and take a photo  
Recognising **images** as **eat, drink or love**



**19.** Repeat until you have **ten examples** of each action



**20.** Click the “< Back to project” link

## 21. Click the “Learn & Test” button

The screenshot shows a user interface titled "virtual pet". At the top, there are links for About, Projects, Worksheets, News, Help, Log Out, and Language. Below this, there are three main buttons:

- Train**: Collect examples of what you want the computer to recognise. Contains a "Train" button.
- Learn & Test**: Use the examples to train the computer to recognise images. Contains a "Learn & Test" button.
- Make**: Use the machine learning model you've trained to make a game or app, in Scratch or in Python. Contains a "Make" button.

A large blue arrow points to the "Learn & Test" button.

## 22. Click the “Train new machine learning model” button

*It might take a few minutes for the computer to train*

The screenshot shows a page titled "Machine learning models". At the top, there is a link "< Back to project". Below it, there are two main sections:

- What have you done?**

You have collected examples of images for a computer to use to recognise when images are eat, drink or love.  
You've collected:
  - 10 examples of eat,
  - 10 examples of drink,
  - 10 examples of love
- What's next?**

Ready to start the computer's training?  
Click the button below to start training a machine learning model using the examples you have collected so far  
(Or go back to the [Train](#) page if you want to collect some more examples first.)

At the bottom, there is a box labeled "Info from training computer:" containing a "Train new machine learning model" button. A large blue arrow points to this button.

## 23. Click the “< Back to project” link

## 24. Click the “Make” button

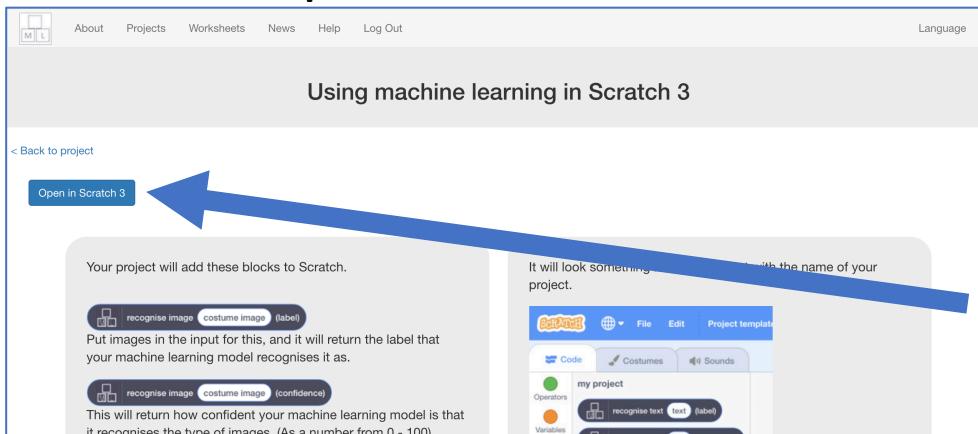
## 25. Click the “Scratch 3” button

The screenshot shows a page titled "Make something with your machine learning model". At the top, there is a link "< Back to project". Below it, there are three main options:

- Scratch**: Make a project in the current version of Scratch. Contains a "Scratch" button.
- Scratch 3**: Use the new (beta) version of Scratch. Contains a "Scratch 3" button.
- Python**: Write Python code to use your machine learning model. Contains a "Python" button.

A large blue arrow points to the "Scratch 3" button.

## 26. Click the “Open in Scratch 3” button



## 27. Click the “Train new machine learning model” button

*It might take a few minutes for the model to train.*

## What have you done so far?

You've started to train a computer to recognise whether photos of a face and photos of a covered face. You are doing it by taking example photos. These examples are being used to train a machine learning “model”.

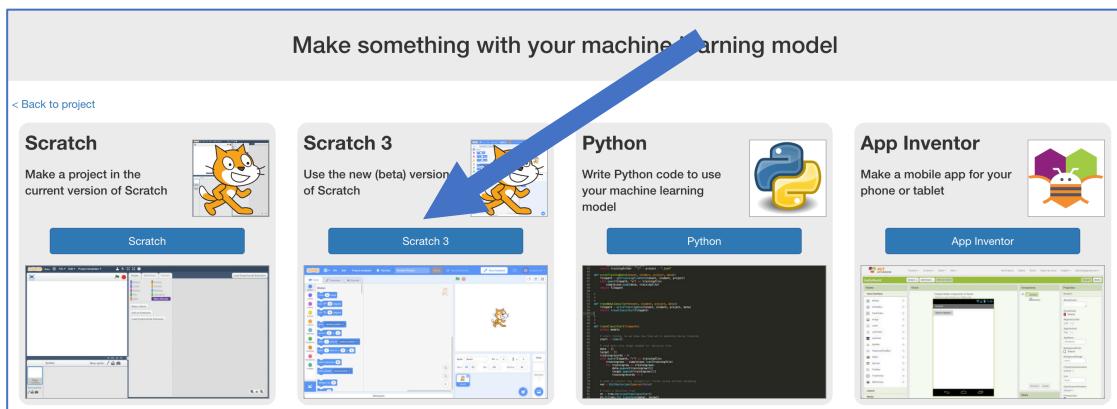
This is called “supervised learning” because of the way you are supervising the computer’s training.

The computer will learn from patterns in the shapes and colours in each of the photos you’ve given it. These will be used to recognise new photos.

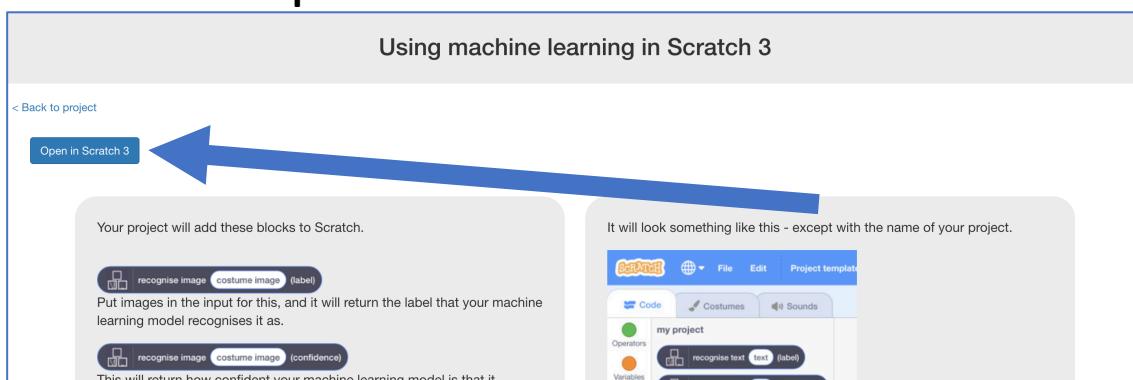
## 28. Click “< Back to project”

## 29. Click the “Make” button

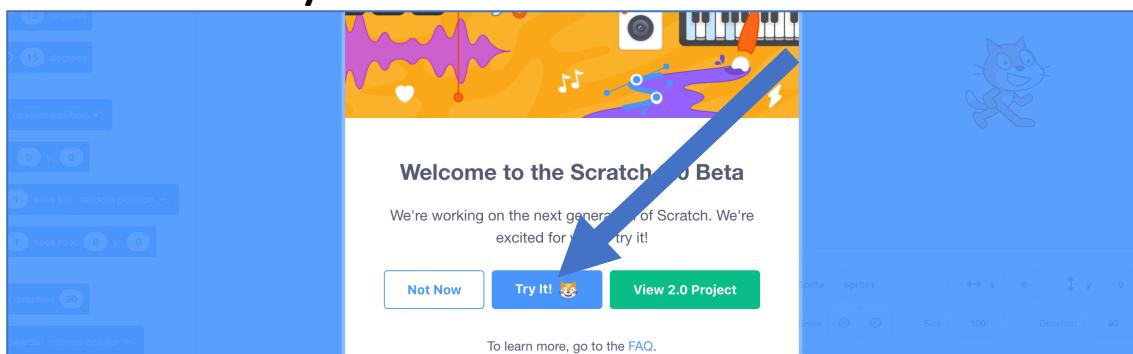
## 30. Click “Scratch 3”



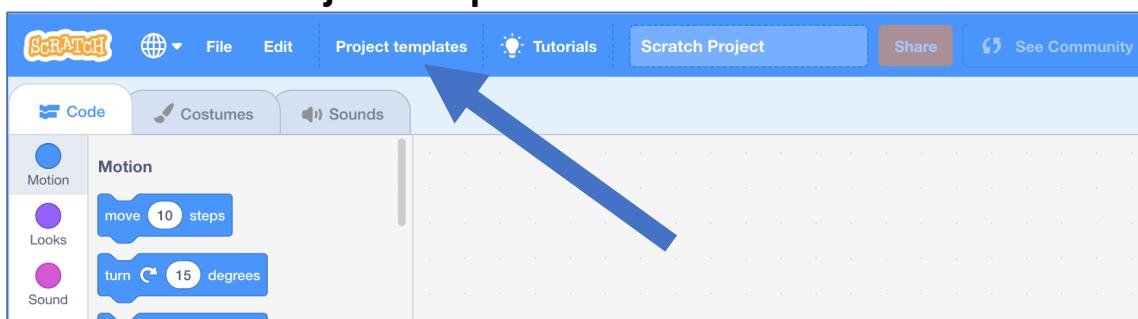
## 31. Click on “Open in Scratch 3”



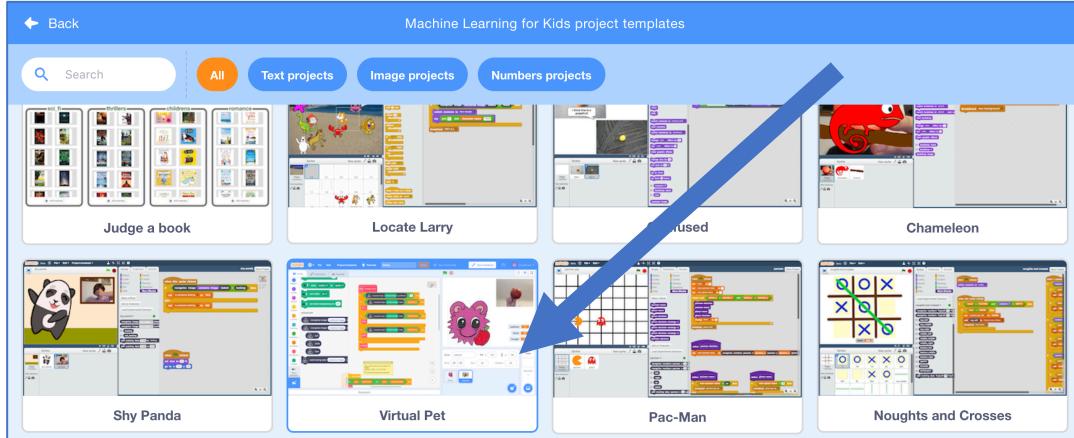
## 32. Click on “Try it!”



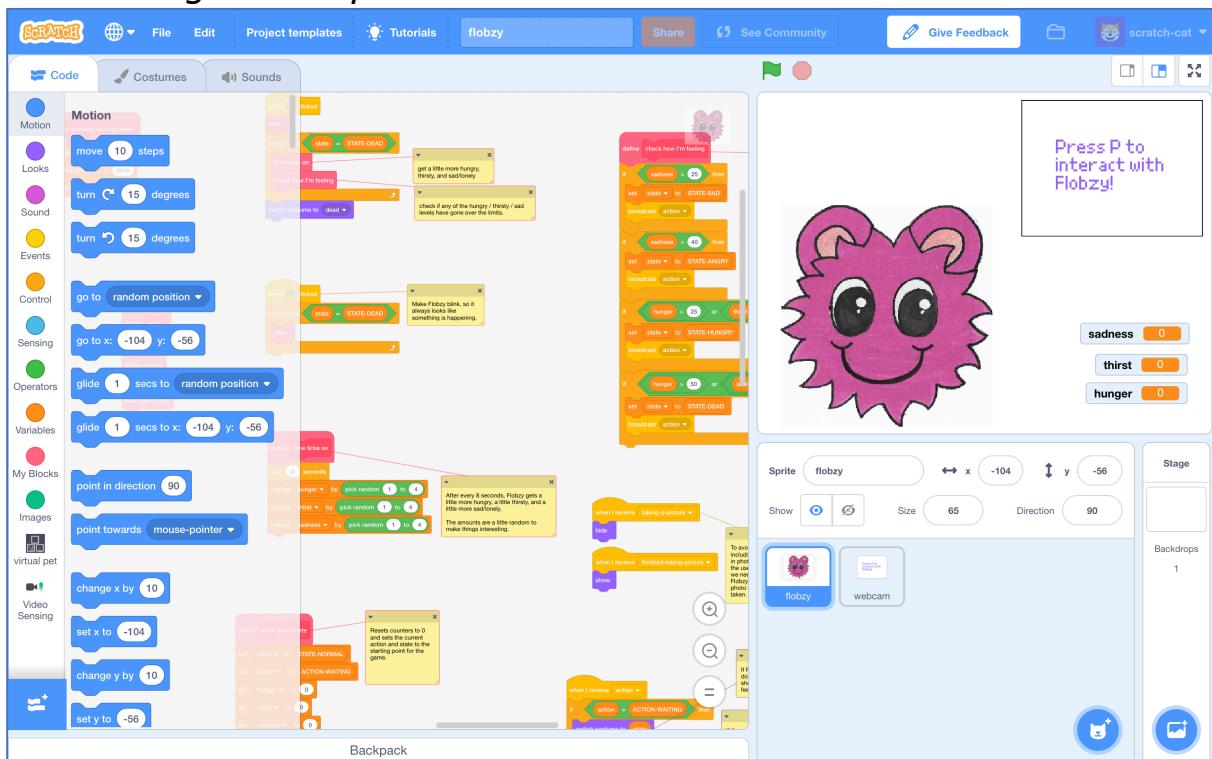
## 33. Click on “Project templates”



**34.** Click on the “Virtual Pet” template  
*You might need to scroll down to it*  
*If your browser asks for permission to use the web-cam, click Allow*

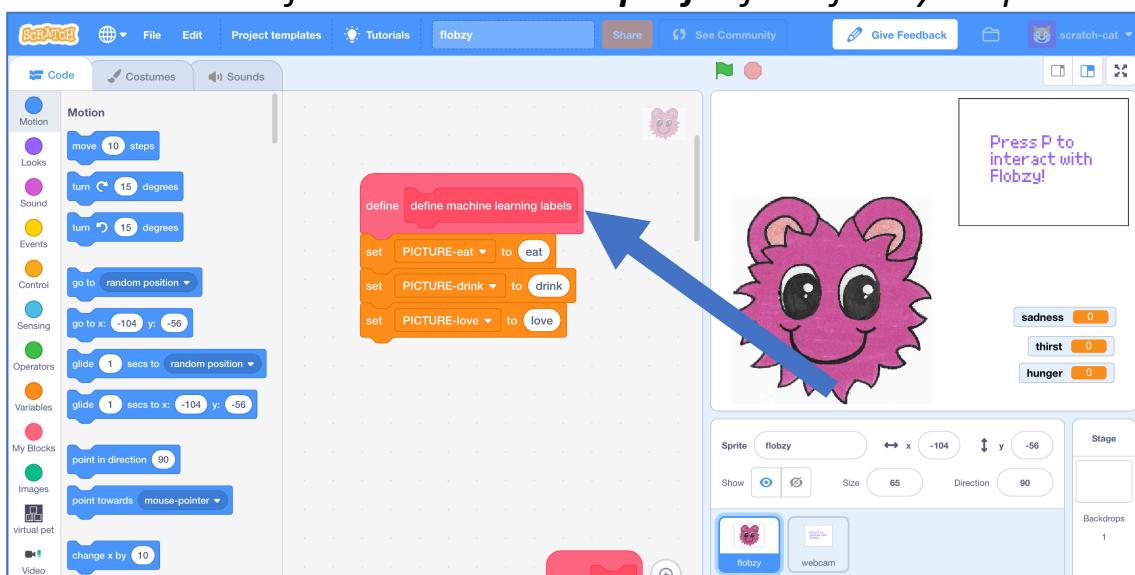


**35.** The project template has a virtual pet called “Flobzy”.  
*It has three variables shown on the stage. They will keep increasing over time, and if they get too high, it'll be game over.*  
*“hunger” will go down if you give it food*  
*“thirst” will go down if you give it a drink*  
*“sadness” will go down if you show it love*  
*You'll do that by taking photos with the webcam.*  
*But first, you'll need to add your machine learning model to the project so it can recognise the photos.*

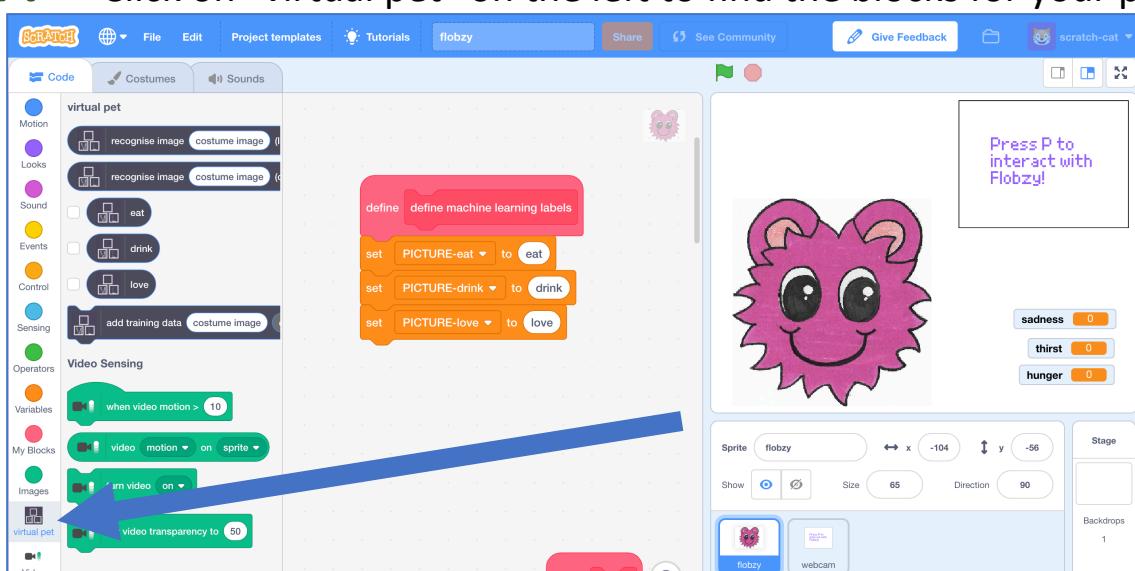


## 36. Find the “define machine learning labels” script

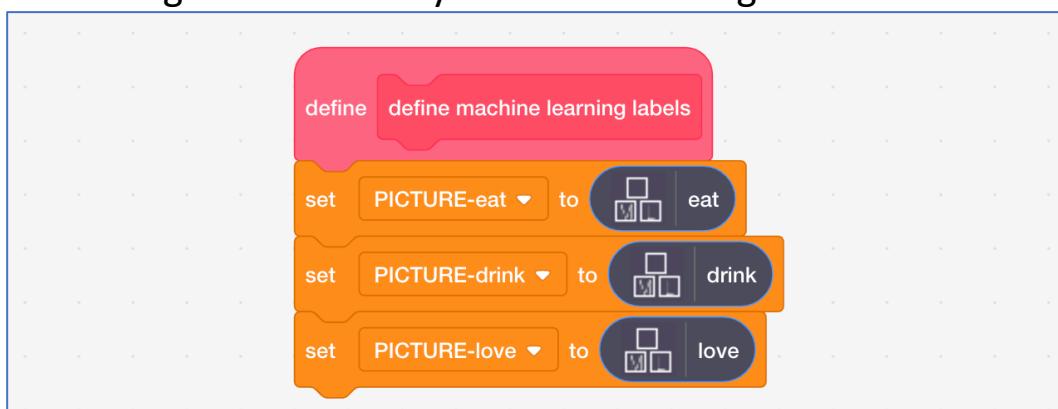
Scroll around to find it. It’s at the top left of the flobzy scripts.



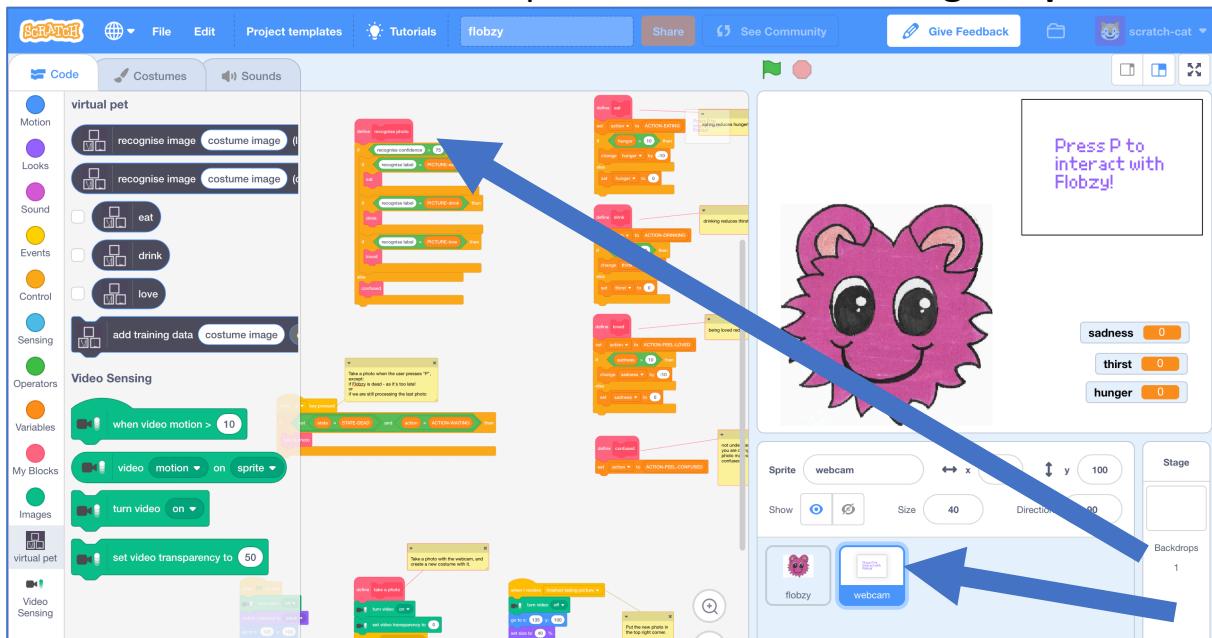
## 37. Click on “virtual pet” on the left to find the blocks for your project.



## 38. Drag the names of your three training buckets into the script

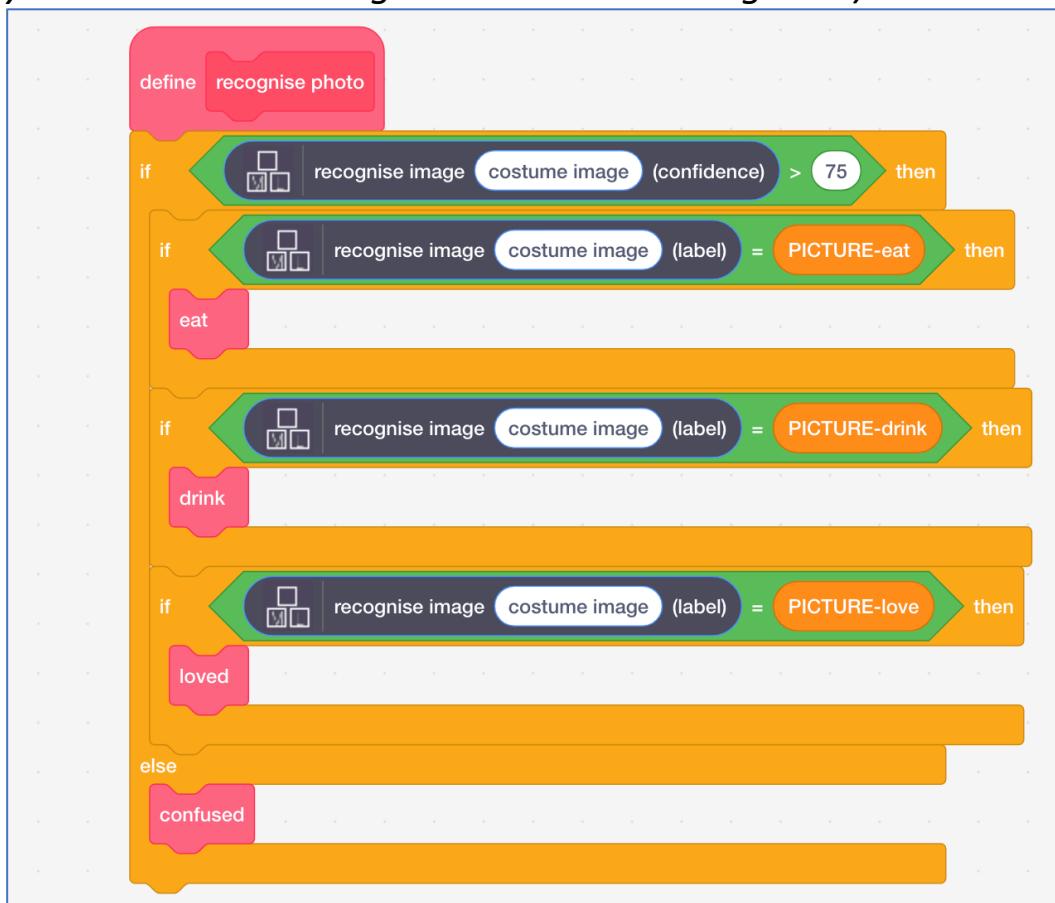


### 39. Click on the “webcam” sprite, and find the “recognise photo” script

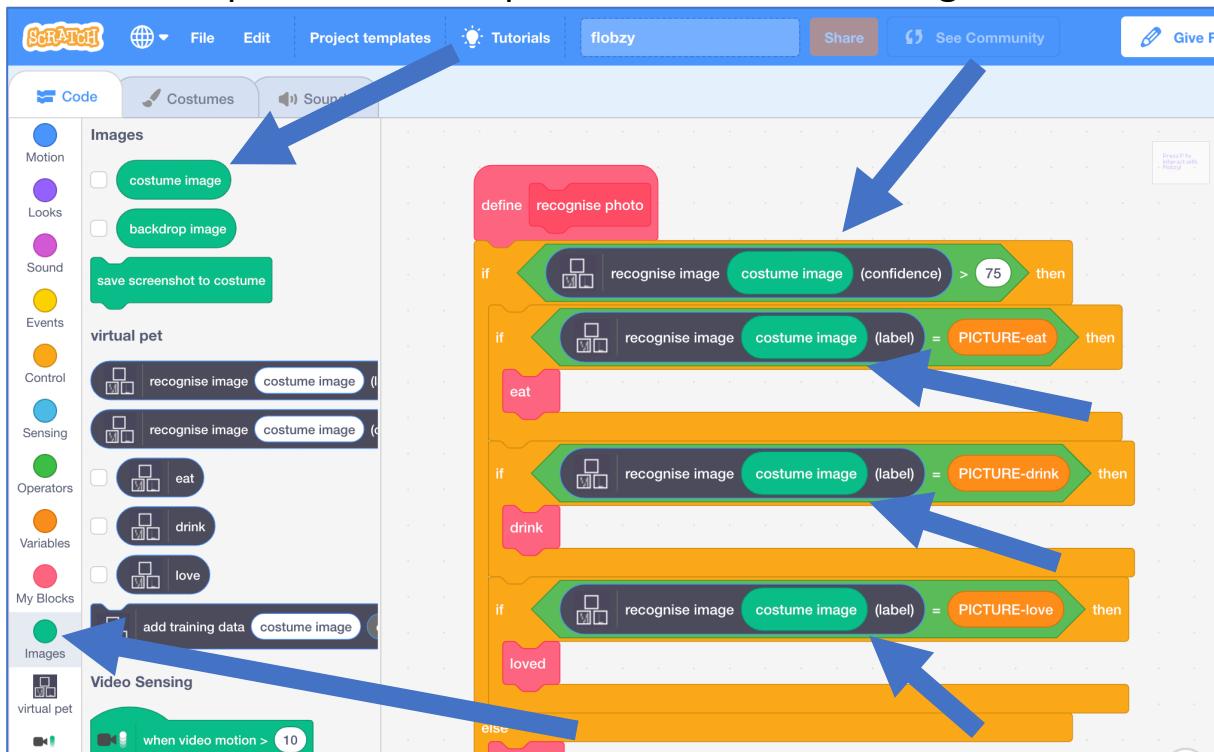


### 40. Modify the “recognise photo” script using blocks from your project

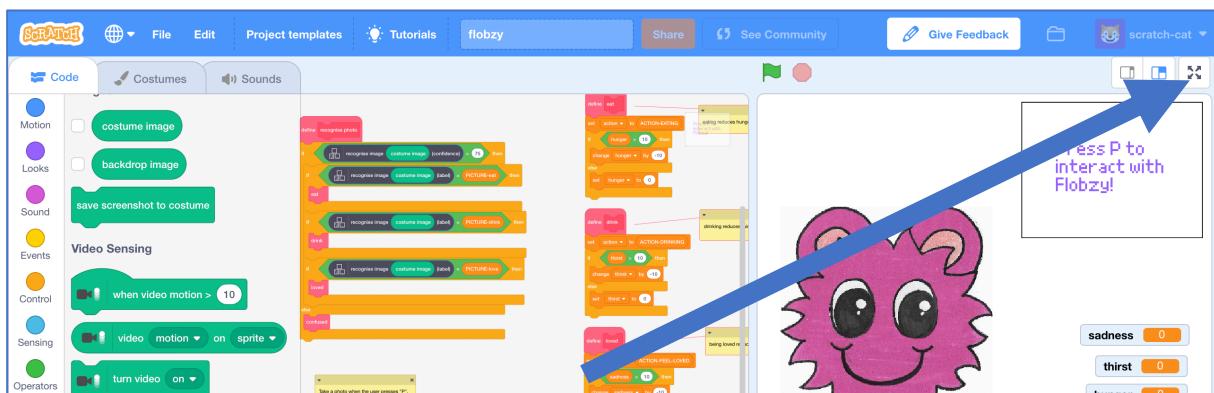
*Notice that the first one is using the confidence score (how sure your machine learning model is), and the next three are using the label (what your machine learning model thinks it recognised).*



- 41.** Click on “images” to find the “costume image” block. Drag it into each of the spaces in the script labelled “costume image”.



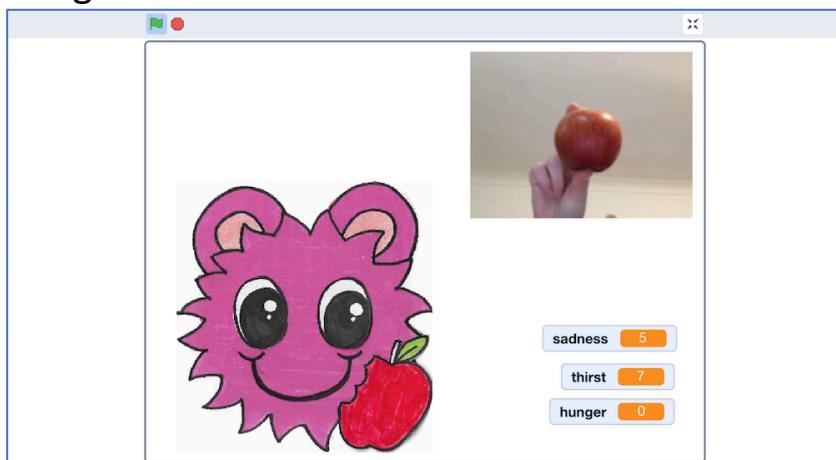
- 42.** Click the full-screen button



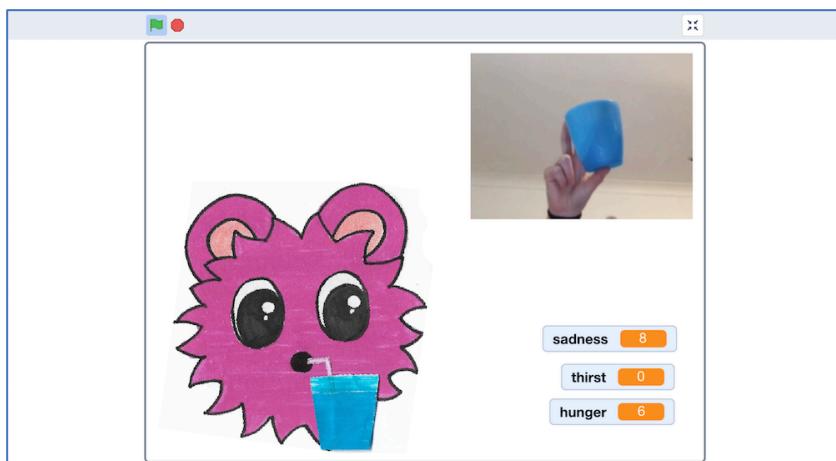
- 43.** Click on the Green Flag to start the game  
*The sadness, thirst, and hunger values will start to increase.  
 You need to look after your virtual pet to keep it happy and fed.*

*You'll do that by **pressing the P button on the keyboard** to take a photo.  
 Your virtual pet will use the machine learning model you trained to  
 recognise what you're doing.*

- 44.** If it recognises a photo of food, you'll see your virtual pet eat and its hunger value will decrease

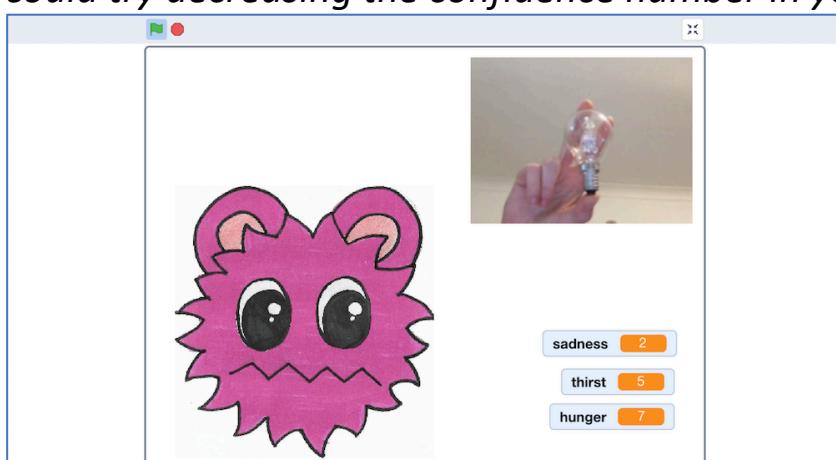


- 45.** If it recognises a photo of drink, you'll see your virtual pet drink and its thirst will decrease



- 46.** If it doesn't recognise your photo, it'll look confused

*If this happens when you're showing it photos of food, drink or love, you could try decreasing the confidence number in your script a little.*



**47.** If the values get too high, it'll be game over



**48.** Save your project

*Click the **full-screen** button again*

*Click “File” -> “Download to your computer”*

### What have you done?

You've created a virtual pet in Scratch that uses machine learning to recognise the actions that you take to look after it.

The machine learning model that you've trained is an image classifier, that is able to classify photos based on the training examples you took.

The more examples you give it, the better it should get at recognising your actions.

## Ideas and Extensions

Now that you've finished, why not give one of these ideas a try?

Or come up with one of your own?

### **Draw your own pet**

You don't have to use the pet in the project template. Why not draw your own character? You'll need costumes for each of the states that the virtual pet can be in.

### **Improving your training**

Try testing it with your classmates. Does your pet understand their photos as well?

How can you improve the training so that your pet does the right thing for these sorts of cases?

### **Change your pet's behaviour**

The Scratch script for your pet is complicated, but there are a lot of comments in there to explain how it works.

Think of something that you'd like to change about how your pet behaves, and try changing the script to make it happen.

Try starting with something small, like changing the reward you get for giving your pet something to eat.