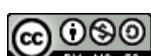
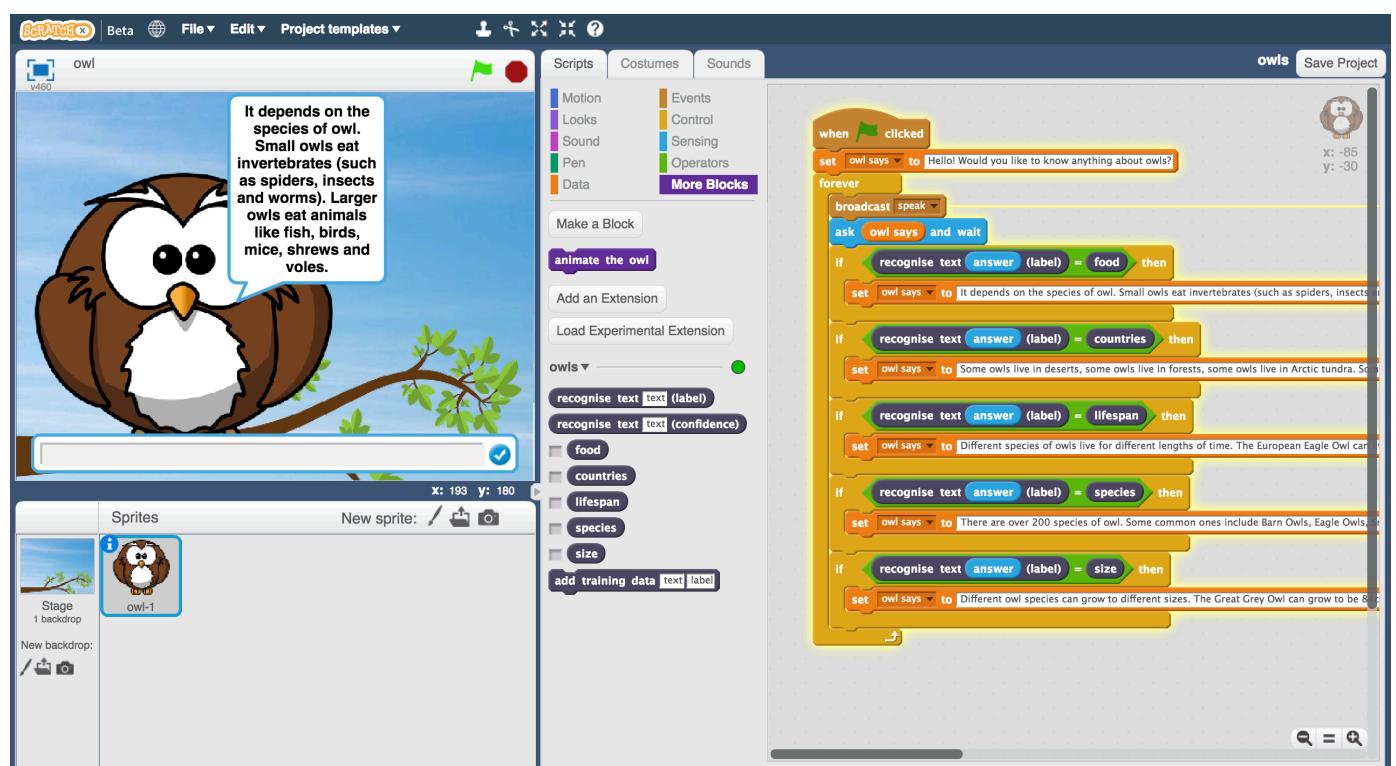


Chatbots

In this project you will make a chatbot that can answer questions about a topic of your choice.



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1. Decide on a **topic** for your chatbot

Choose something that you know well enough to be able to answer questions about.

It could be a place (e.g. The town where you live?)

It could be an animal (e.g. Tigers? Dinosaurs?)

It could be an organisation (e.g. Your school)

It could be something from history (e.g. Vikings? Romans?)

*For the rest of this worksheet, I'll be using **owls***

2. Think of **five things** someone might ask about your topic

*e.g. for **owls**, this could be:*

- * What do owls eat?*
- * Where in the world do owls live?*
- * How long do owls live?*
- * What types of owls are there?*
- * How big do owls grow?*

3. Go to <https://machinelearningforkids.co.uk/> in a web browser

4. Click on “**Get started**”

5. Click on “**Log In**” and type in your username and password

If you don't have a username, ask your teacher or group leader to create one for you.

If you can't remember your username or password, ask your teacher or group leader to reset it for you.

6. Click on “**Projects**” on the top menu bar

7. Click the “**+ Add a new project**” button.

- 8.** Name your project and set it to learn how to recognise “text”.
Click the “Create” button

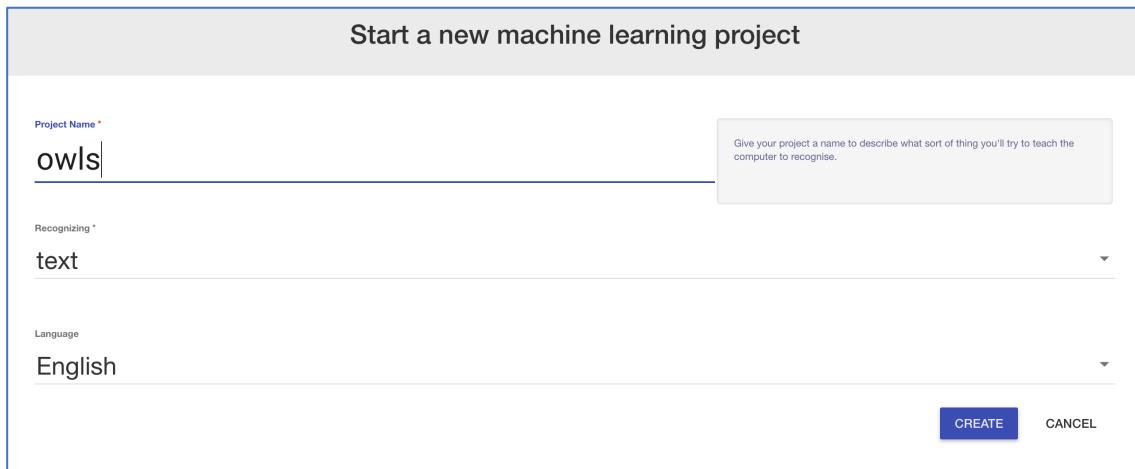
Start a new machine learning project

Project Name *
owls

Recognizing *
text

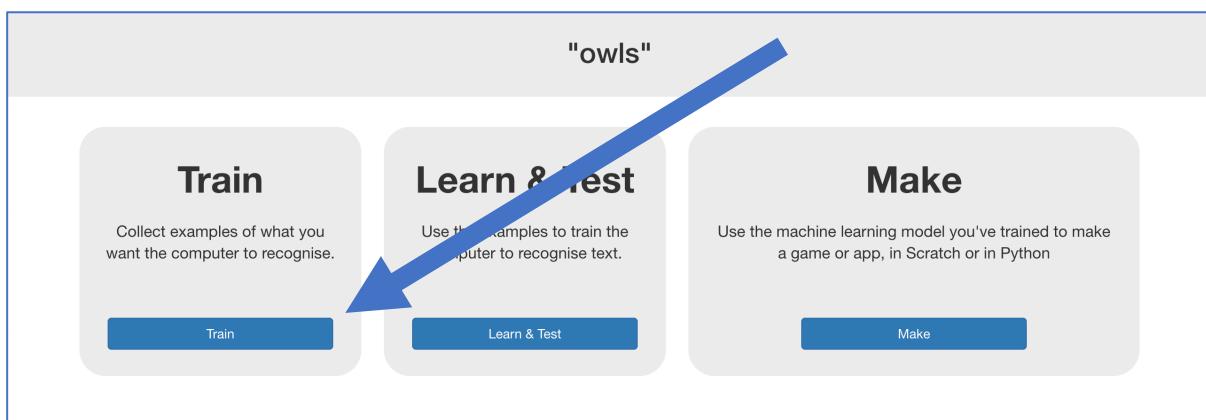
Language
English

CREATE **CANCEL**

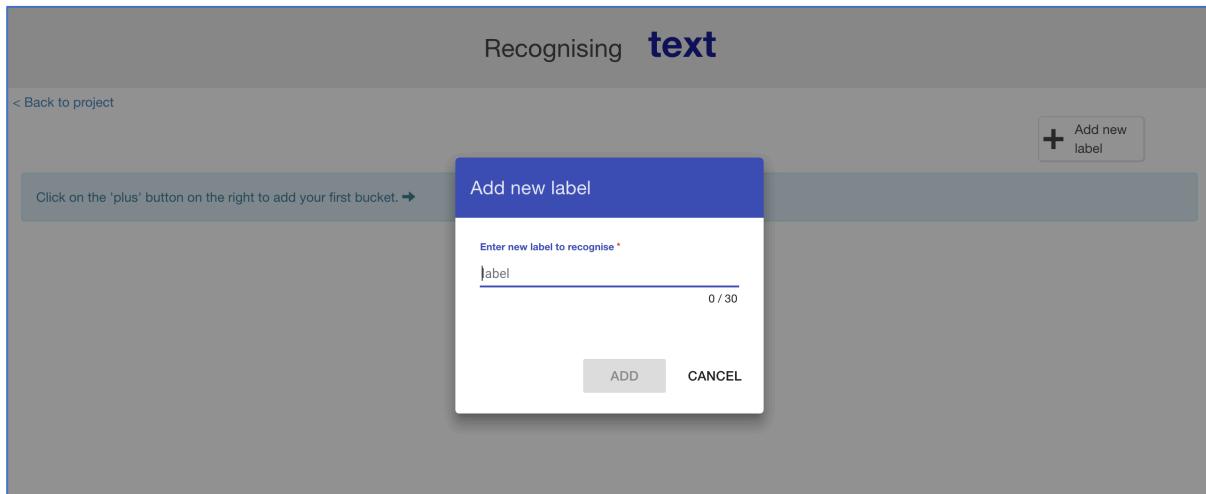


- 9.** Click on your new project in the projects list

- 10.** Click the **Train** button.



- 11.** Click the “+ Add new label” button



12. Type in **one word** that sums up the first of your things from Step 2, then click **Add**.

I used “food” to sum up questions like “What do owls eat?”

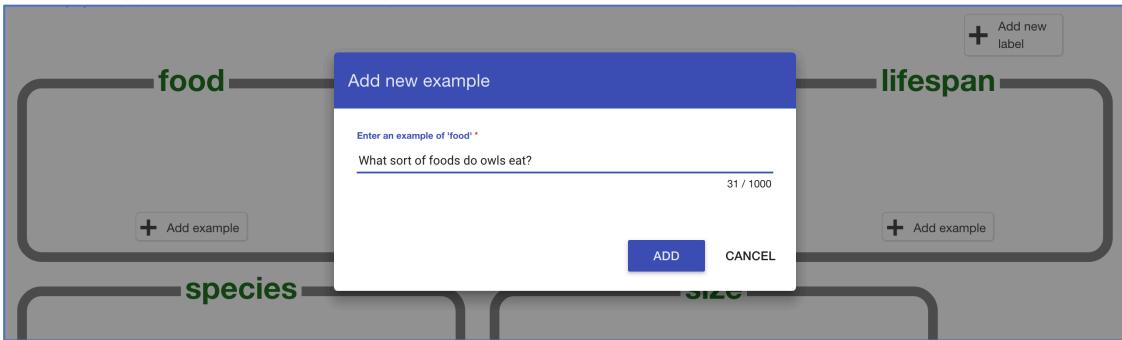
The screenshot shows a user interface for a machine learning project. At the top, there is a navigation bar with links: ml-for-kids, Welcome, About, Projects, Worksheets, News, Help, and Log Out. Below the navigation bar, the title "Recognising text as food" is displayed. A large rectangular bucket labeled "food" is centered on the page. To the right of the bucket is a button labeled "+ Add new label". At the bottom left of the bucket is a small button labeled "+ Add example".

13. Do that again for all of the things in your list from Step 2
The words you choose don't really matter, as long as you understand what they mean.

The screenshot shows a user interface for a machine learning project. At the top, there is a navigation bar with links: ml-for-kids, Welcome, About, Projects, Worksheets, News, Help, and Log Out. Below the navigation bar, the title "Recognising text as food, countries or 3 other classes" is displayed. There are five separate rectangular buckets arranged in two rows. The top row contains three buckets labeled "food", "countries", and "lifespan". The bottom row contains two buckets labeled "species" and "size". Each bucket has a small button labeled "+ Add example" at its bottom left. To the right of the buckets is a button labeled "+ Add new label".

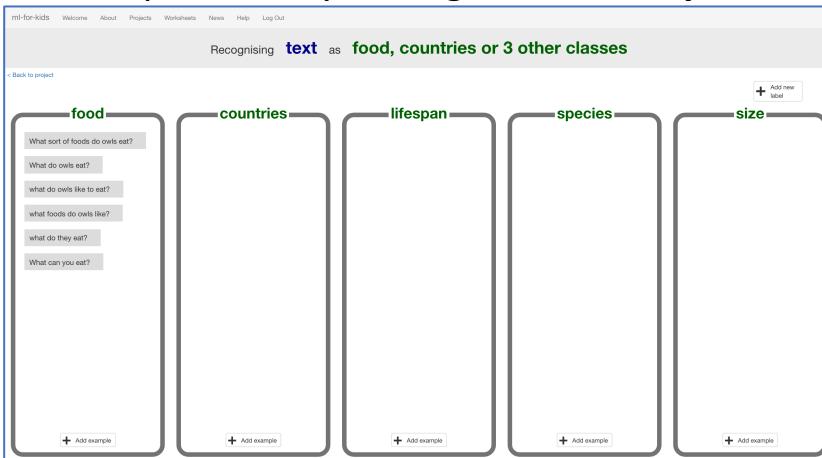
14. Click the “+ Add example” button in one of the buckets

15. Type in an example of how someone might ask that question

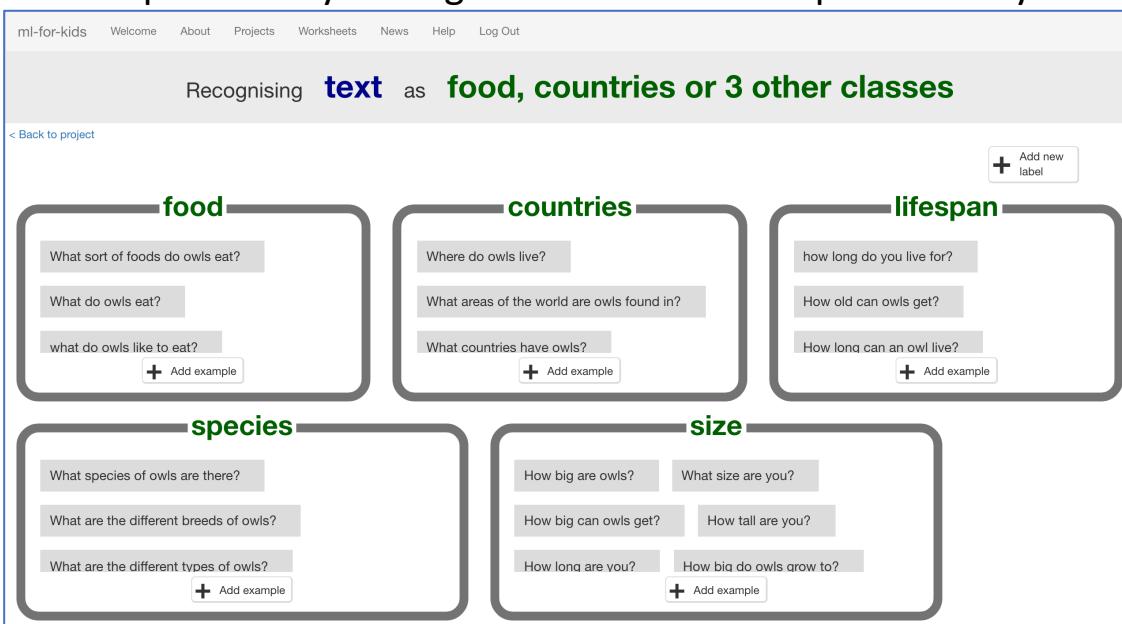


16. Click "Add"

17. Repeat until you've got **five examples** of how to ask that question.



18. Repeat until you've got at least five examples in every bucket



- 19.** Click on the “< Back to project” link

- 20.** Click the “Learn & Test” button

- 21.** Click the “Train new machine learning model” button

As long as you've collected enough examples, the computer should start to learn how to recognise questions from the examples you've given to it.

Machine learning models

< Back to project

What have you done?

You have collected examples of text for a computer to use to recognise when text is food, countries or 3 other classes.

You've collected:

- 6 examples of food,
- 6 examples of countries,
- 6 examples of lifespan,
- 6 examples of species,
- 6 examples of size

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 selected so far.

(Or go back to the [Train](#) page if you want to collect some more examples first.)

Info from training computer:

[Train new machine learning model](#)

- 22.** Wait for the training to complete.
This might take a couple of minutes.
It's finished once you see the “status” change to “Available”

Info from training computer:

Try putting in some text to see how it is recognised based on your training.

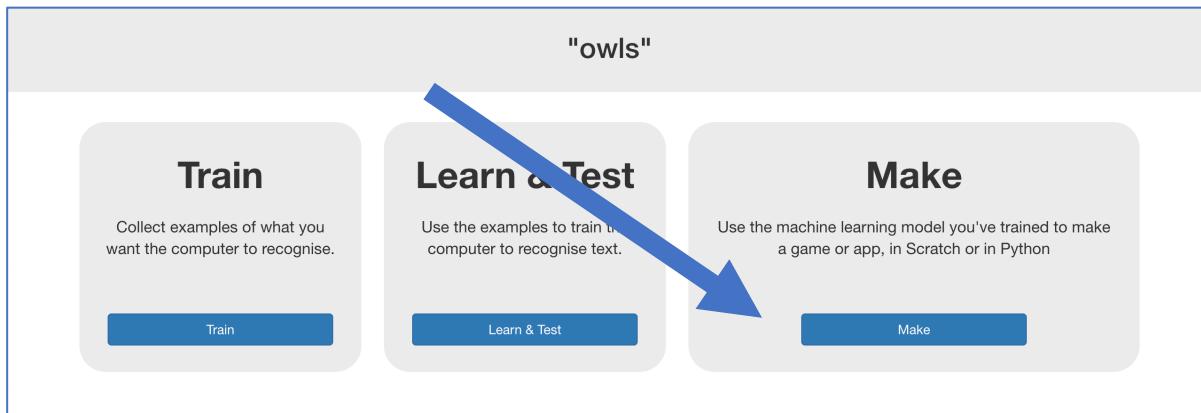
enter a test text here [Test](#)

Model started training at: Wednesday, March 21, 2018 10:46 PM
 Current model status: Available
 Model will automatically be deleted after: Thursday, March 22, 2018 12:46 AM

[Delete this model](#)

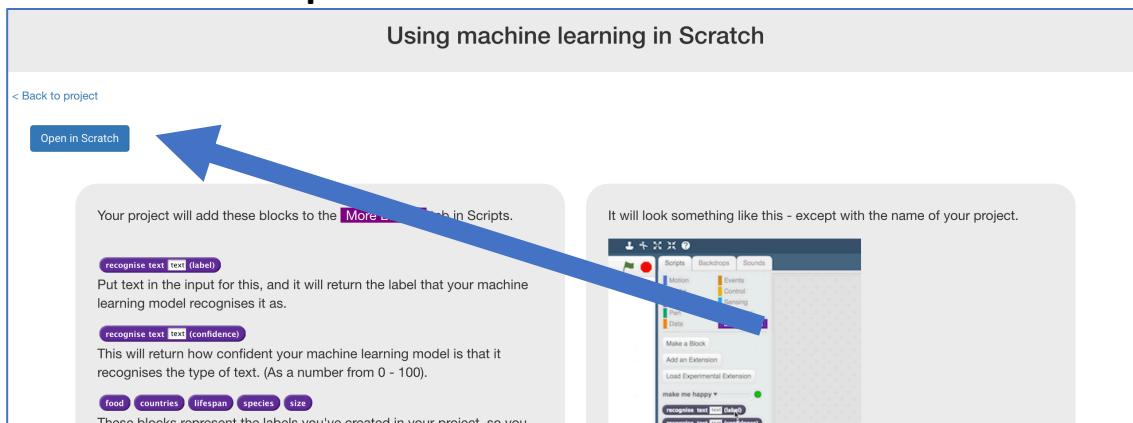
- 23.** Click the “< Back to project” link

24. Click the “Make” button

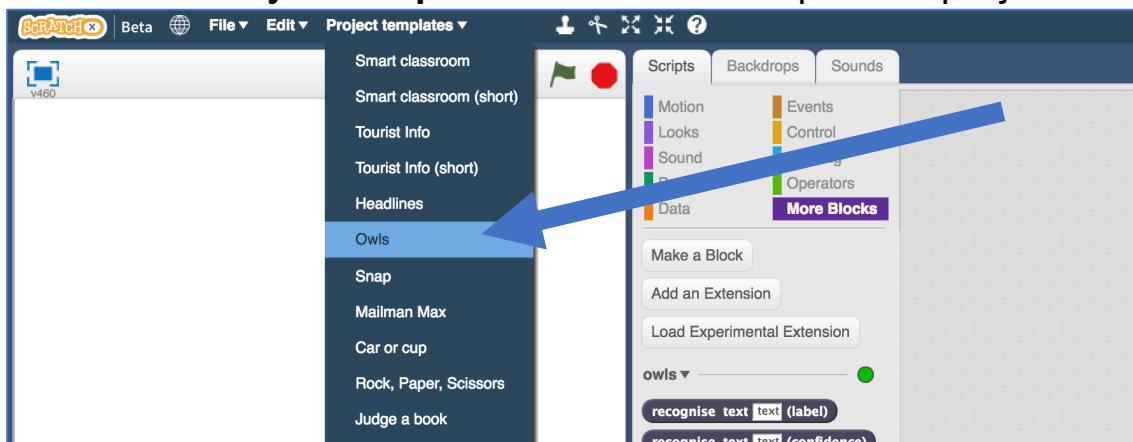


25. Click “Scratch”

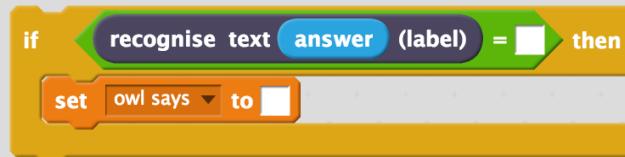
26. Click the “Open in Scratch” button



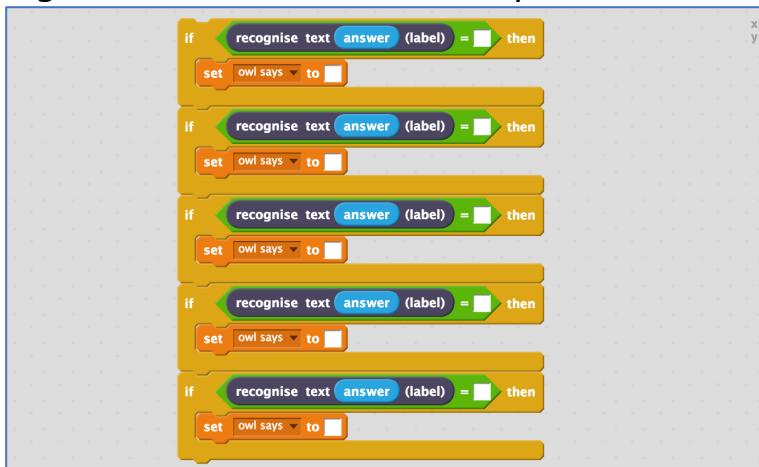
27. Click “Project templates” -> “Owls” to open the project template



- 28.** Create this little snippet of script but don't attach it to anything yet
Make sure you choose "owl says" for the orange block.



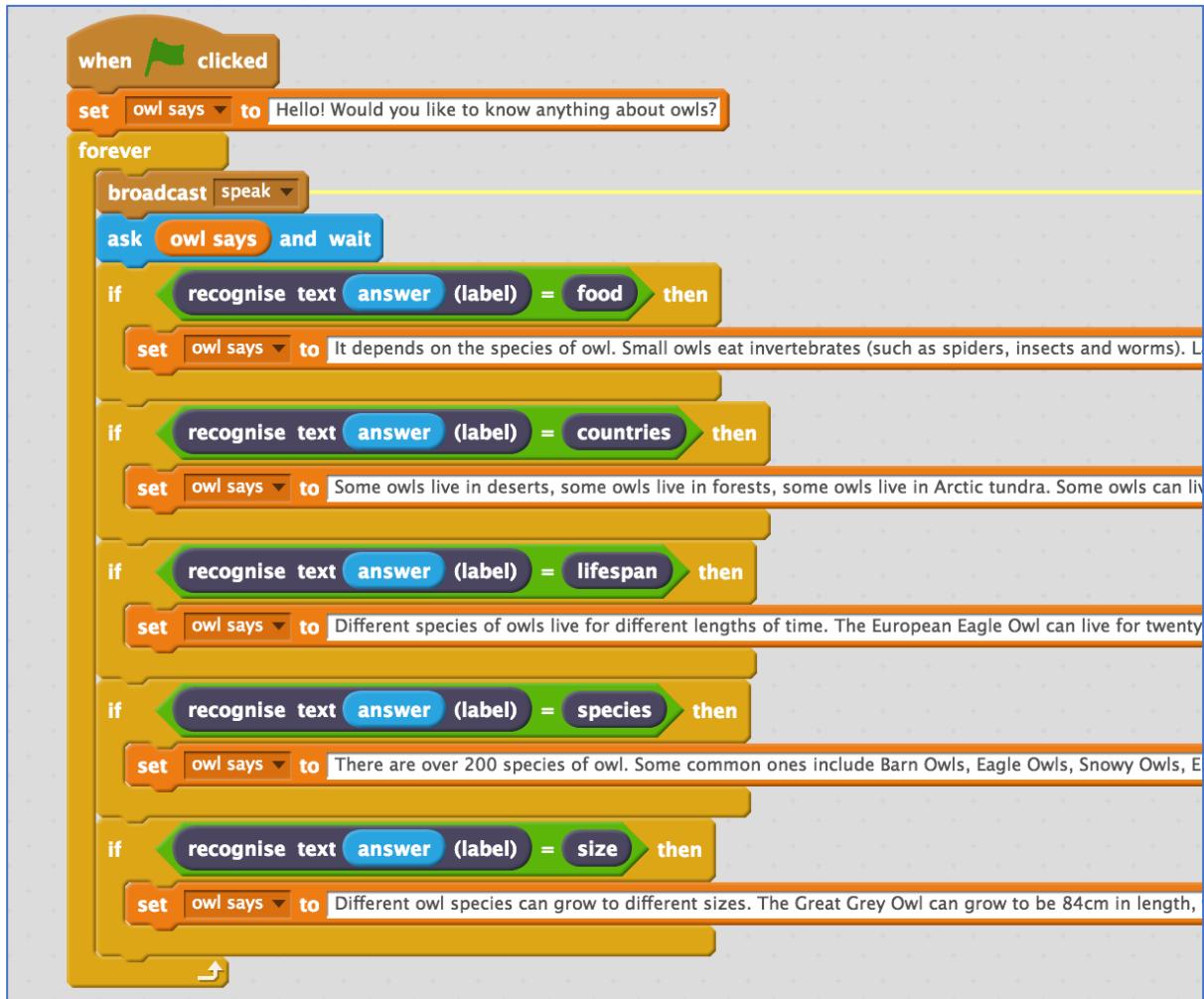
- 29.** Duplicate it four times
Right-click on it, and click "Duplicate"



- 30.** Fill in each copy of the block
Drag the label for one of your questions into the top space, and Type the answer to the question into the bottom space

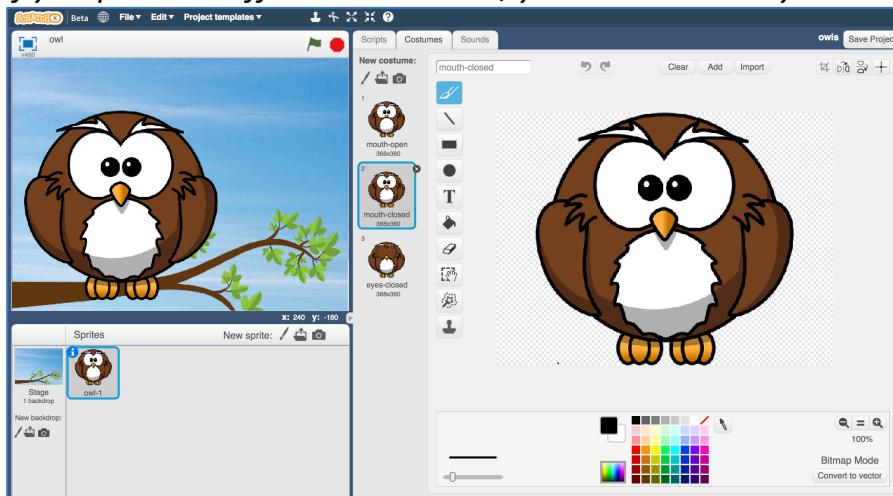


31. Drag this new block into the Green Flag block prepared for you. Replace the “Sorry. I haven’t been taught anything yet.” block with your new chunk of script.



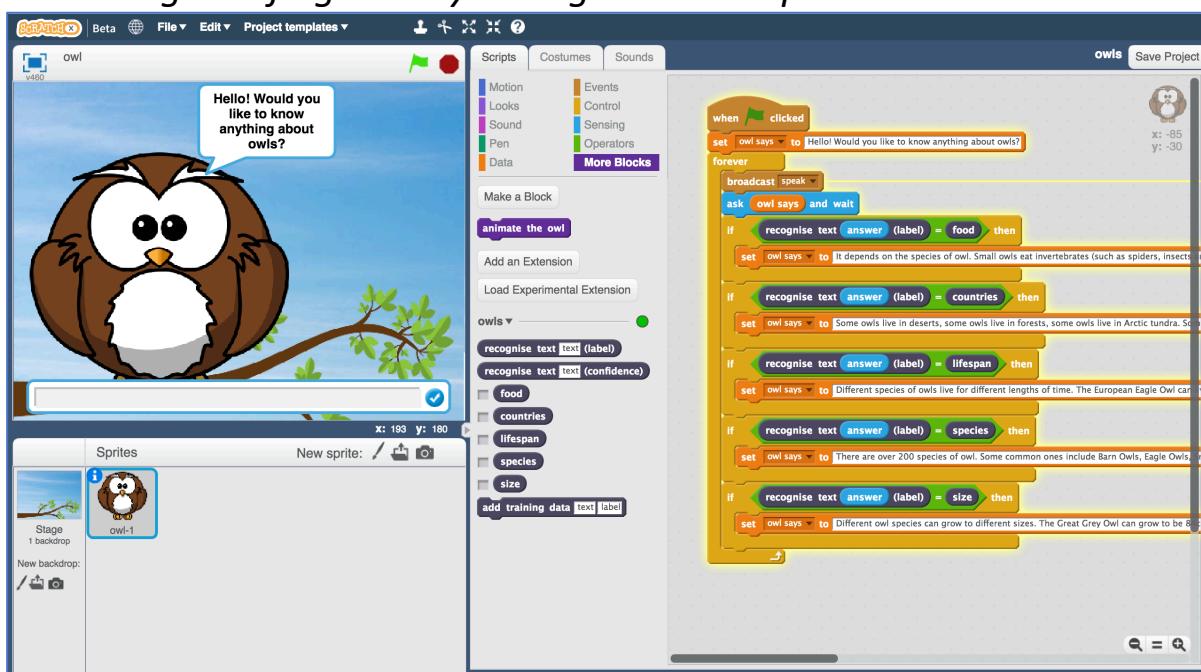
32. Draw your chatbot

Unless you’ve chosen **owls** as a topic, you’ll need to draw your own character. If you provide different costumes, you can animate your character while it talks.



33. Test your chatbot!

Click the green flag and try asking the owl a question



What have you done so far?

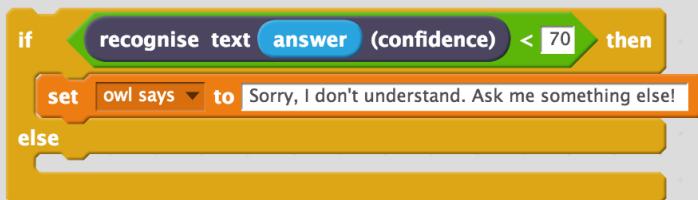
You've started to train a computer to recognise questions on a topic. Instead of trying to write rules to be able to do this, you did this by collecting examples. These examples were used to train a machine learning "model".

This is called "supervised learning" because of the way you are supervising the computer's training.

The computer will learn from patterns in the examples you've given it, such as the choice of words, and the way questions are structured. These will be used to be able to recognise new questions.

The biggest problem with this is that if you ask it something unexpected, it will still give you one of the answers you've written

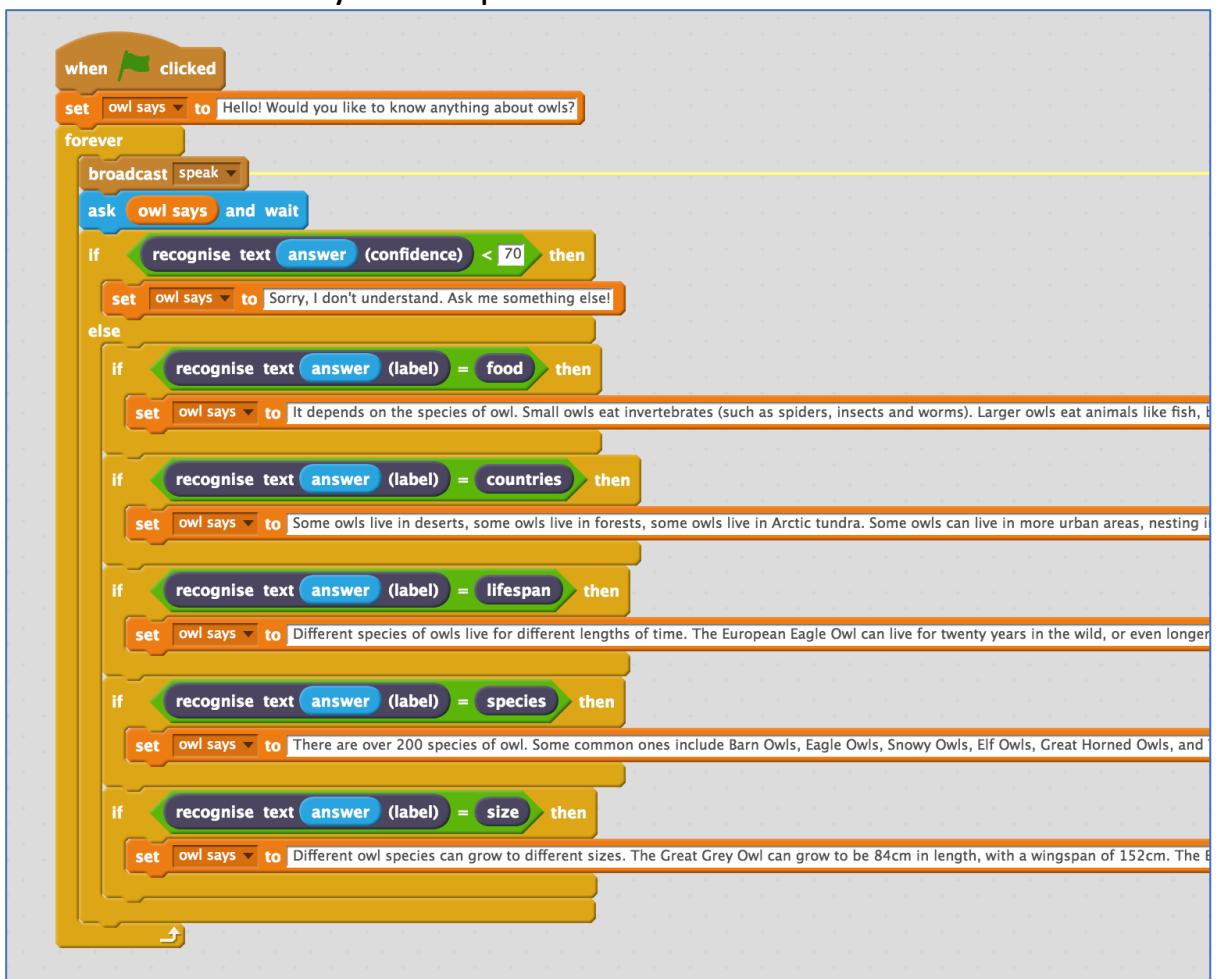
- 34.** Create this little chunk of script, that you can use when someone asks a question that wasn't on your list from step 2.
The confidence score is a percentage (from 0 to 100). It will be lower if someone asks a question that isn't similar to any of the examples you used to train the machine learning model. Use this to return a "I don't understand" message if the score is too low.



```

if [recognise text answer (confidence) < 70] then
  set [owl says v] to [Sorry, I don't understand. Ask me something else!]
else
end
  
```

- 35.** Add this into your script from before.



```

when green flag clicked
forever
  broadcast [speak v]
  ask [owl says v] and wait
  if [recognise text answer (confidence) < 70] then
    set [owl says v] to [Sorry, I don't understand. Ask me something else!]
  else
    if [recognise text answer (label) = food] then
      set [owl says v] to [It depends on the species of owl. Small owls eat invertebrates (such as spiders, insects and worms). Larger owls eat animals like fish, b]
    end
    if [recognise text answer (label) = countries] then
      set [owl says v] to [Some owls live in deserts, some owls live in forests, some owls live in Arctic tundra. Some owls can live in more urban areas, nesting i]
    end
    if [recognise text answer (label) = lifespan] then
      set [owl says v] to [Different species of owls live for different lengths of time. The European Eagle Owl can live for twenty years in the wild, or even longer]
    end
    if [recognise text answer (label) = species] then
      set [owl says v] to [There are over 200 species of owl. Some common ones include Barn Owls, Eagle Owls, Snowy Owls, Elf Owls, Great Horned Owls, and]
    end
    if [recognise text answer (label) = size] then
      set [owl says v] to [Different owl species can grow to different sizes. The Great Grey Owl can grow to be 84cm in length, with a wingspan of 152cm. The B]
    end
  end
end
  
```

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?

Try other chatbots

<http://talktothetrex.com> is a good example of the sort of thing you've made. Give it a try and see if you can get any ideas of how to improve your bot.

Add more topics

Can you add more topics to your chatbot, so that there are more types of question that it can answer?

Provide alternate answers

If someone asks the same question more than once, they'll get the exact same answer every time.

Can you update your Scratch script so that it varies the answers each time a little? Or just starts the answer with "You've asked me this before, but"

Ask follow-up questions

Can you update your Scratch script so that it replies with a question? It can then recognise the answer to that question, in a similar way to how you made it recognise questions.