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Llywodraeth Cymru
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Swansea University

Cardiff Metropolitan University | Prifysgol Metropolitan Caerdydd

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micro:bit Machine Learning

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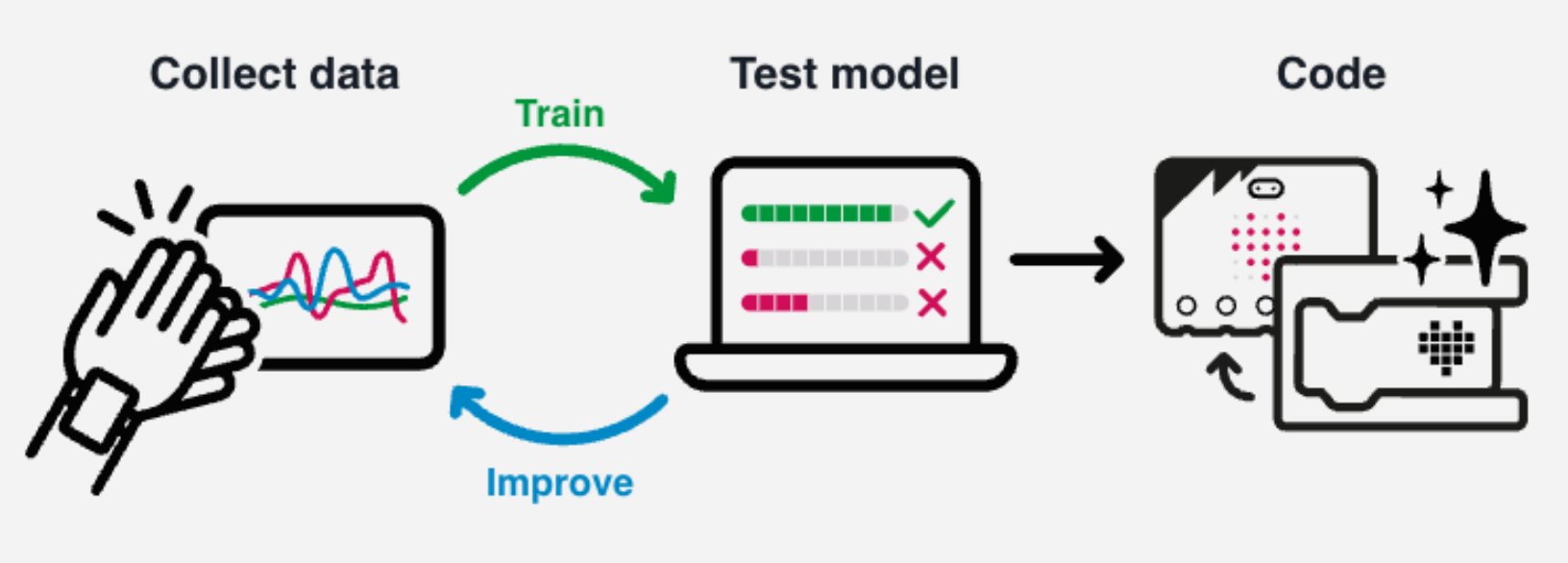
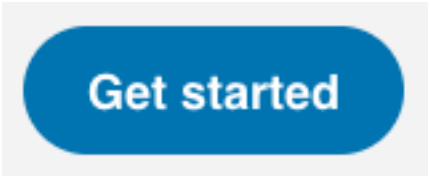
Starting with CreateAI

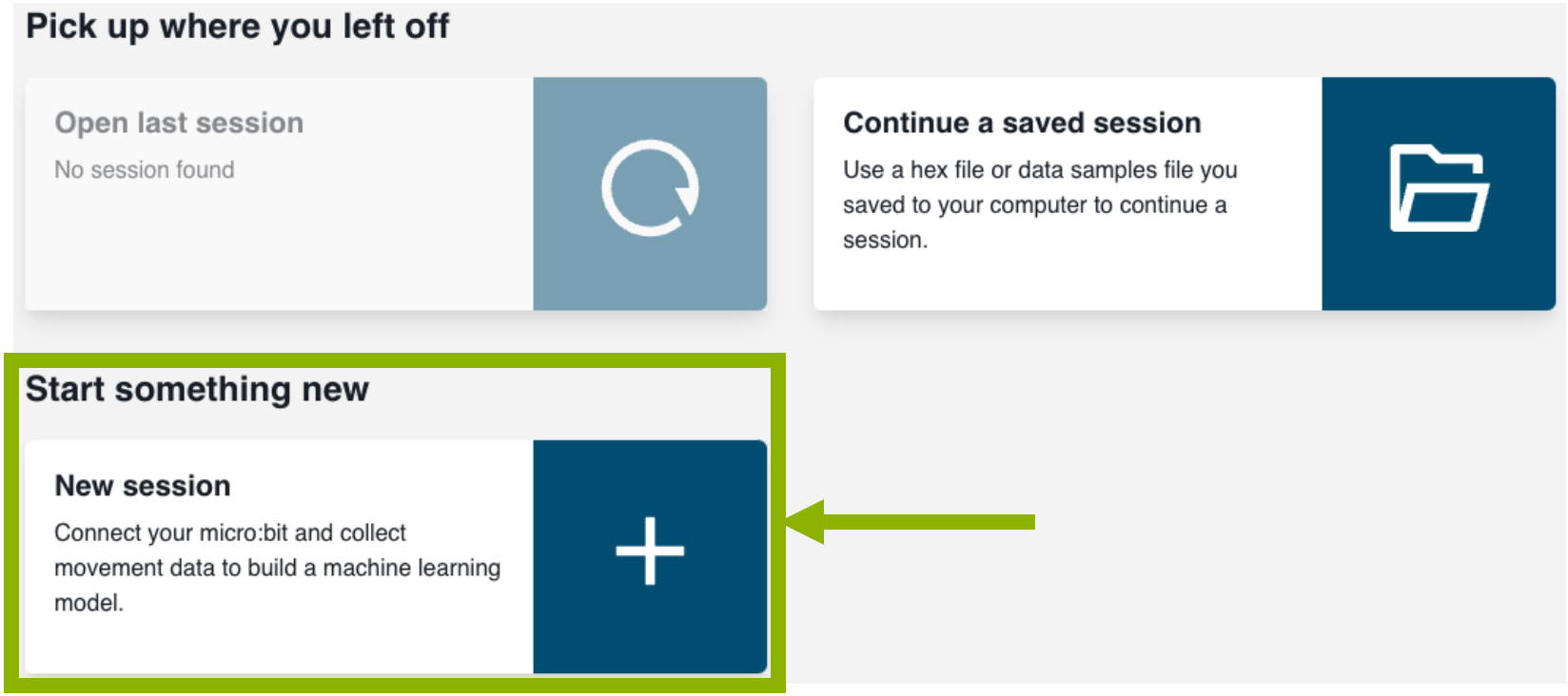
createai.microbit.org



Getting Started

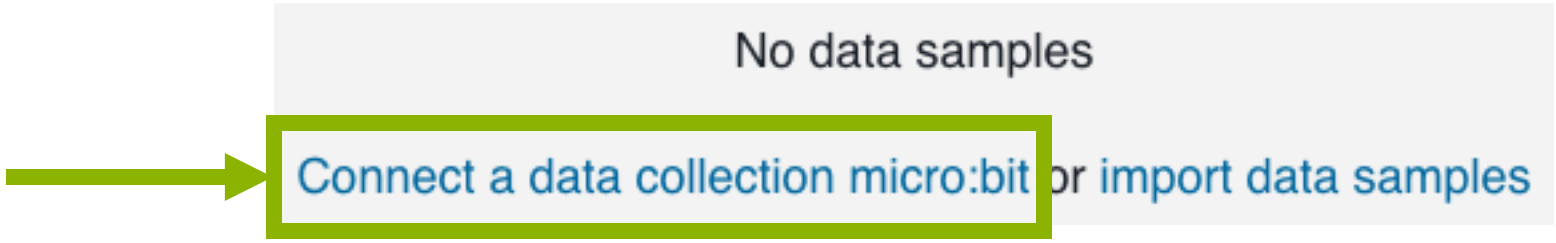


- Click **Get Started**
- Select **New Session**

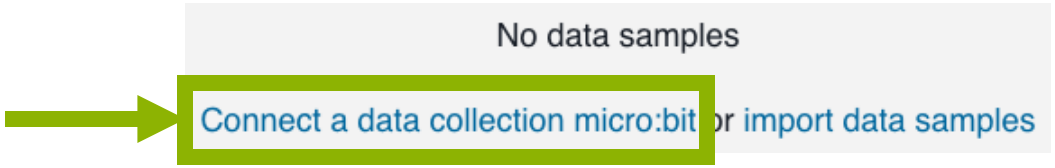


Getting Connected

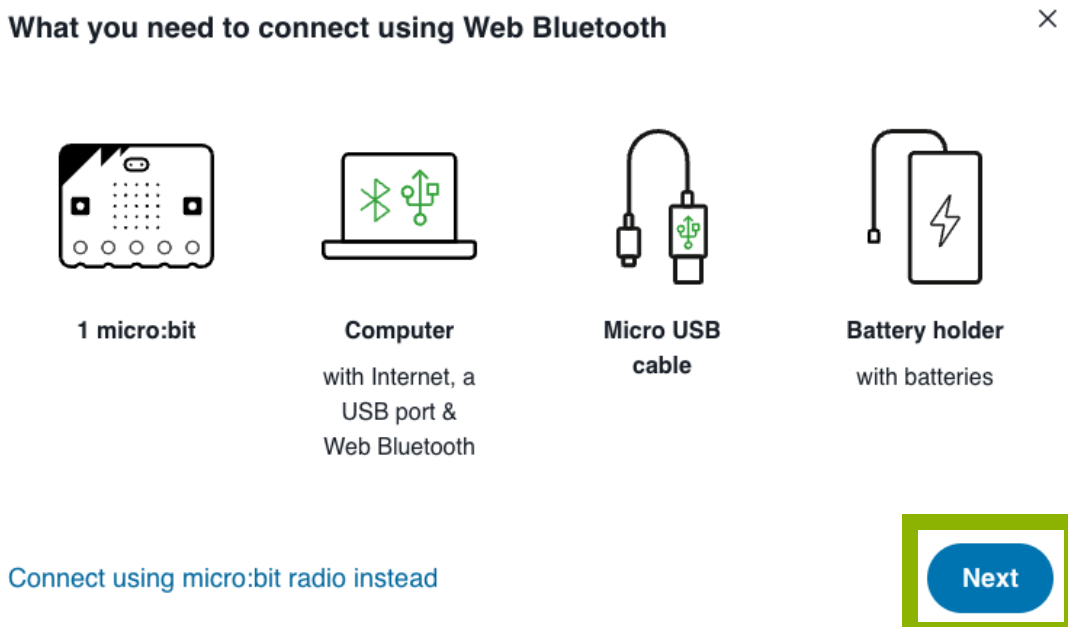
- Click **Connect a data collection micro:bit**



Getting Connected



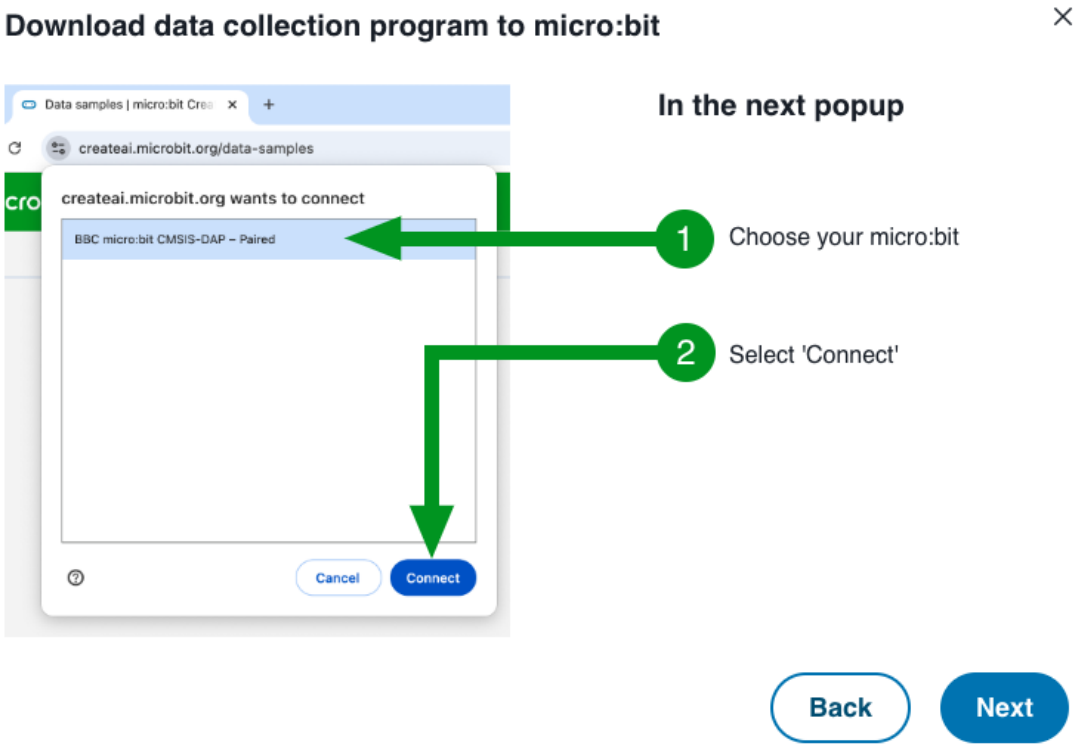
- Click **Connect a data collection micro:bit**



- Click **Next**

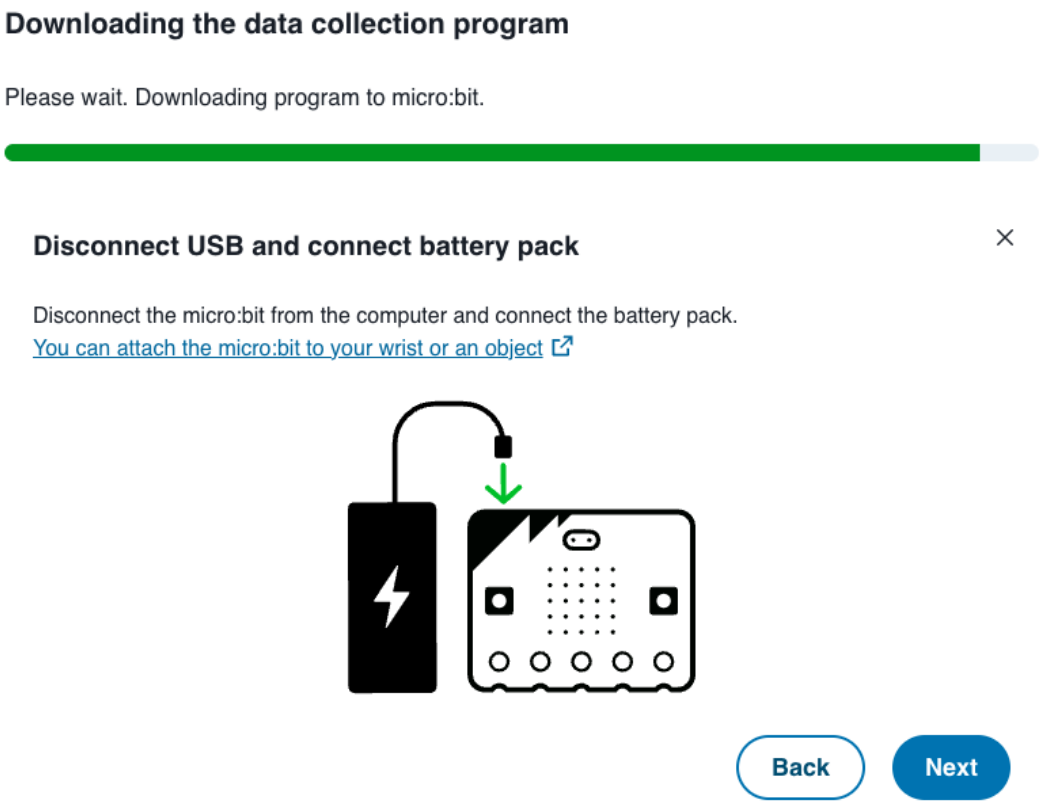
Getting Connected

- Click **Next** to continue
- Follow the instructions for connecting your micro:bit via USB



Getting Connected

- Let the program download then connect the battery pack

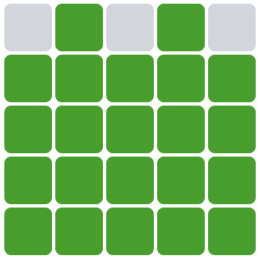


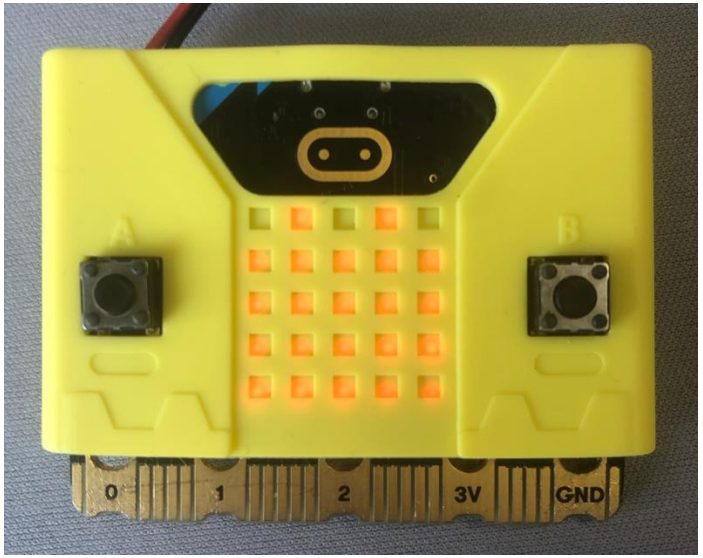
Getting Connected

- Make sure the pattern on the computer screen matches the pattern on your micro:bit

Copy pattern

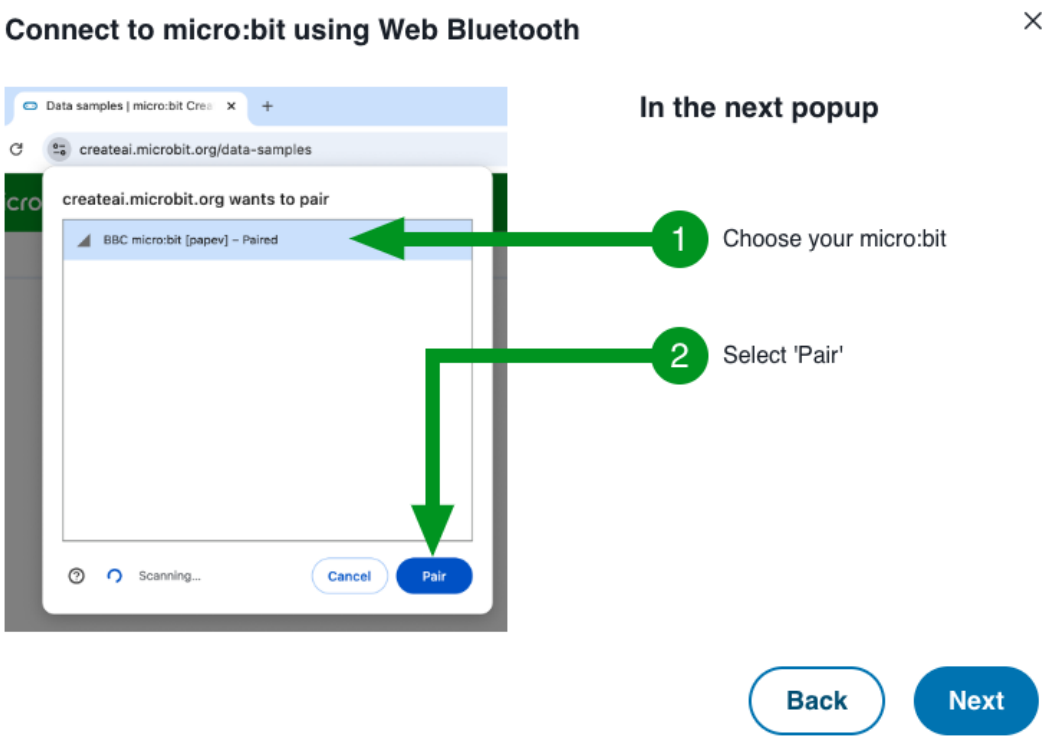
Copy the pattern displayed on the micro:bit.





Getting Connected

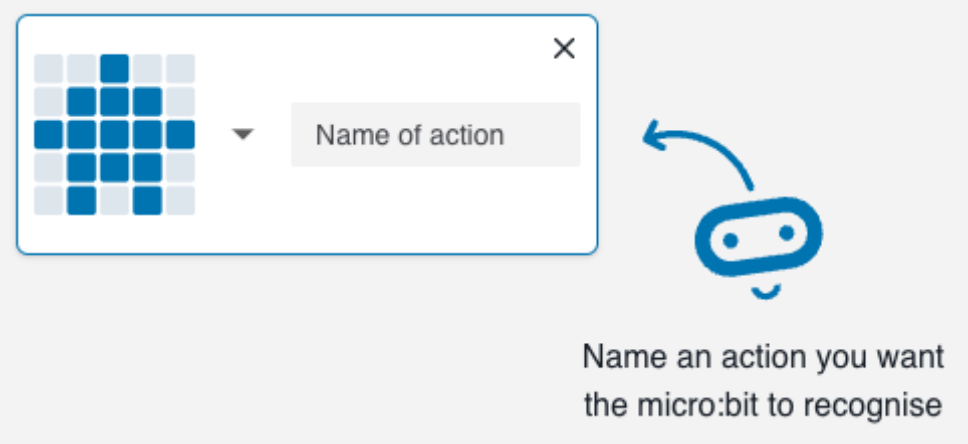
- Click **Next** to continue
- Follow the instructions for connecting via Bluetooth



Adding Actions

Now we will need to add the various actions that we want our model to recognise.

- We can do this giving our action a name and choosing an icon to represent it.



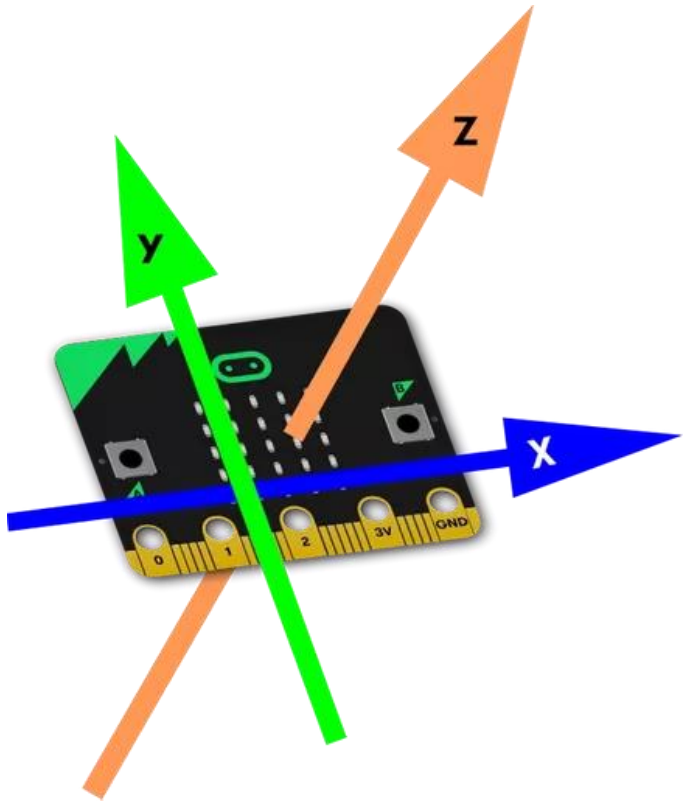
- We can add new actions by clicking 

The Axes

Hold your micro:bit in your hand as demonstrated so that our axes make sense.

You can move the micro:bit back and forth on each axis to test the functionality.

This is displayed on the bottom of the screen.



Adding Actions: Disco Dancing

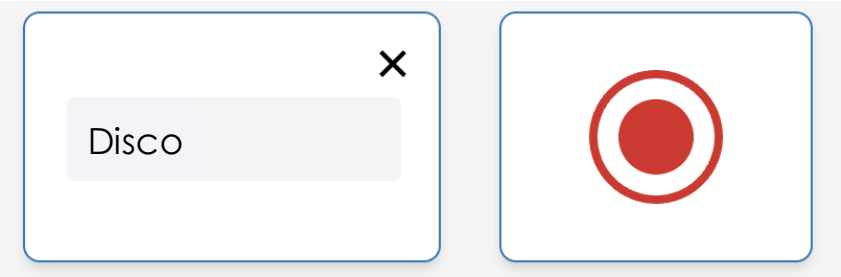
Adding Actions: Disco Dancing

A disco dance is:

- Point to the sky.
- Using the same arm…
- Point at the floor in the opposite direction

Let's try a few practise dance moves

Adding Actions: Disco Dancing



Let's teach our micro:bits what a Disco Dance looks like

Type the name of the dance you are teaching the micro:bit into the box

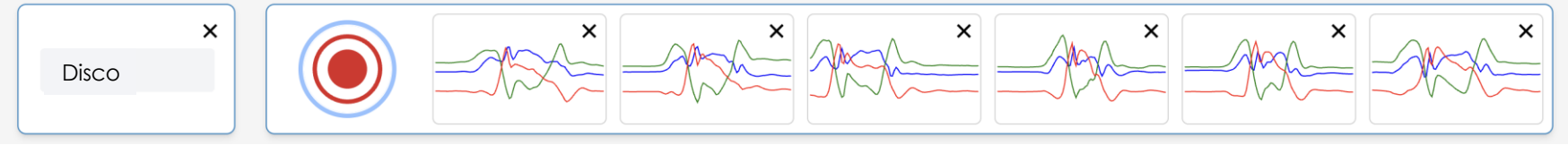
Then click the red button (or press 'b' on your micro:bit) to start recording our movements

Wait for the countdown to finish and then dance!

Adding Actions: Disco Dancing

When we were learning the disco dancing, we did a lot of practise dancing.

Machine learning is the same – we need to provide lots of examples for our micro:bits to learn what disco ***feels*** like



Record a few more moves for your micro:bit – at least 3 but the more the better!

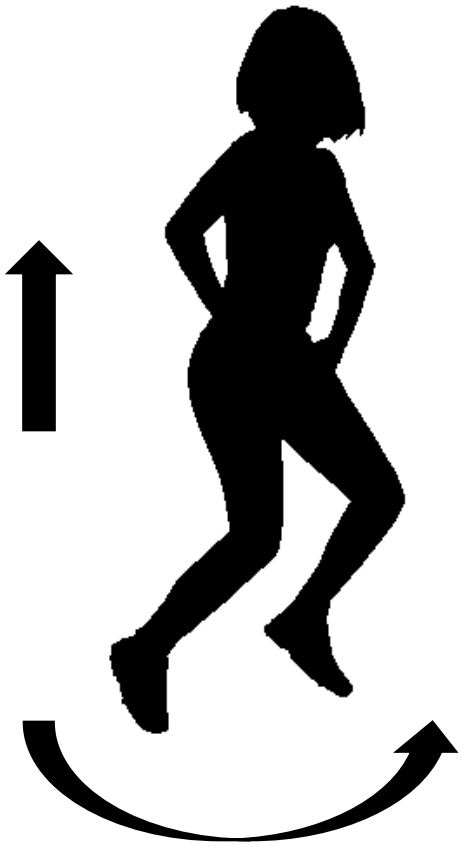
Adding Actions: Macarena

Adding Actions: Macarena

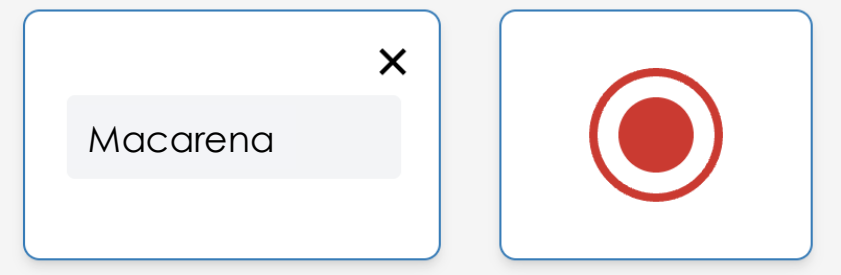
The Macarena is:

- Too long to explain…

Let's try a few practise Macarenas



Adding Actions: Macarena



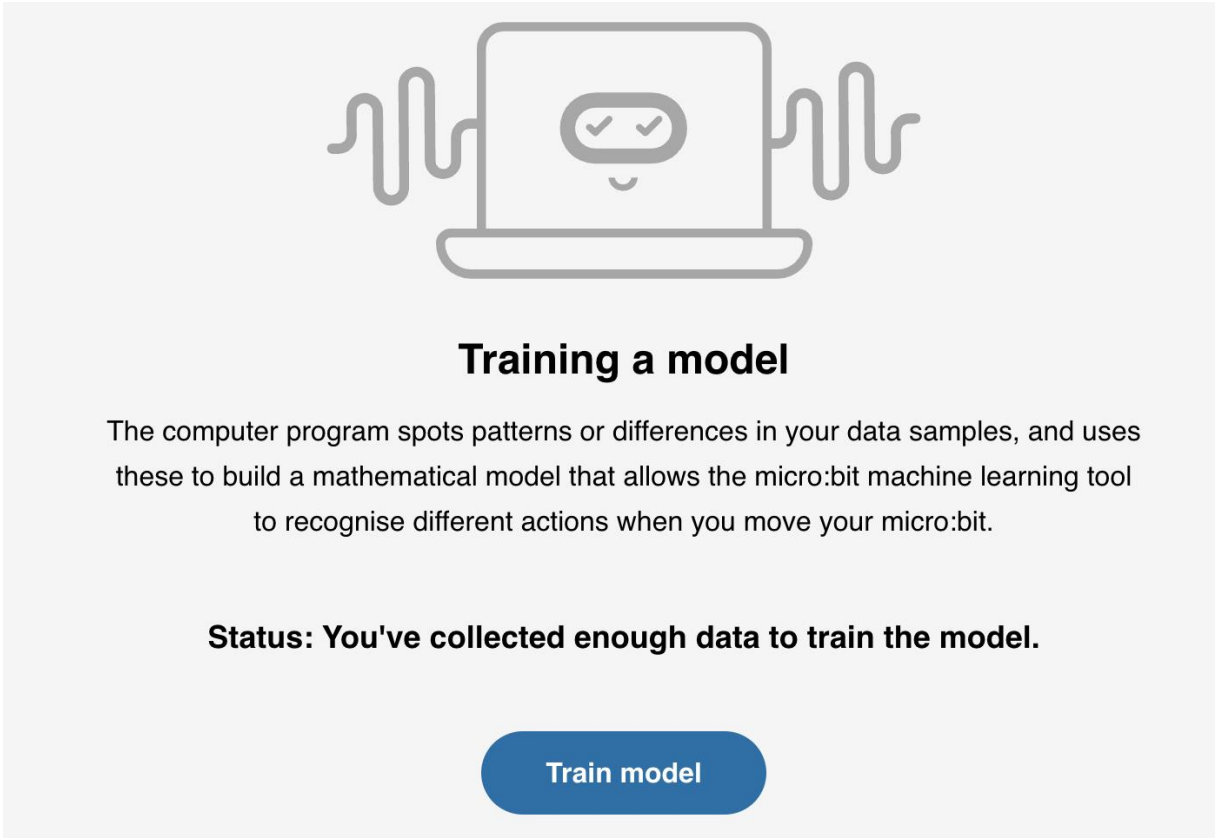
Begin by pressing **Add Action**

As before, enter the name of the dance you are teaching the micro:bit into the box

Then click the red button (or press 'b' on your micro:bit) to start recording our movements

Wait for the countdown to finish and then dance!

micro:bits Learning & Testing



Click Train model to begin training your machine learning model

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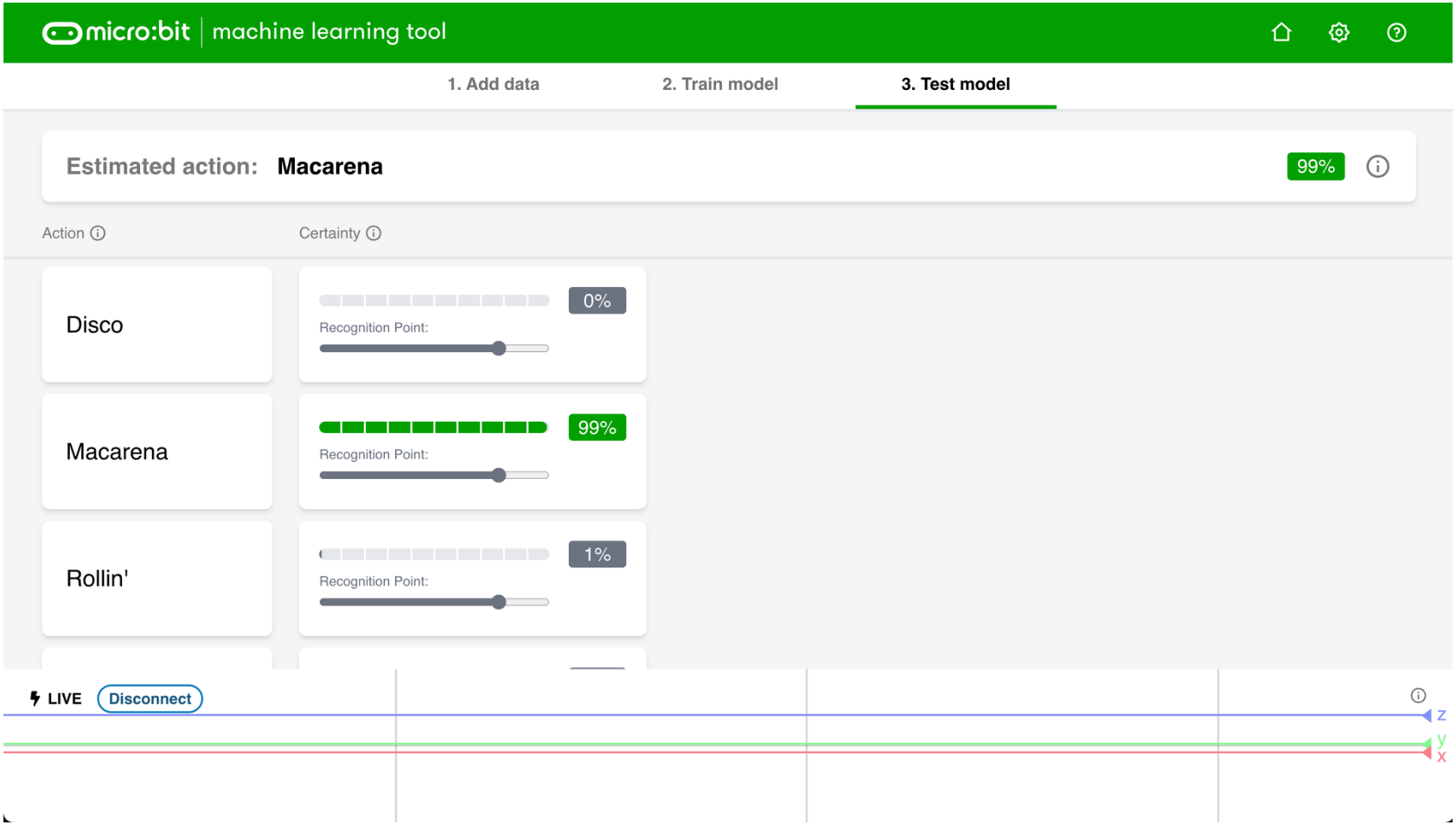
micro:bits Learning & Testing



Proud Mary (Rollin')
&
Ketchup Song

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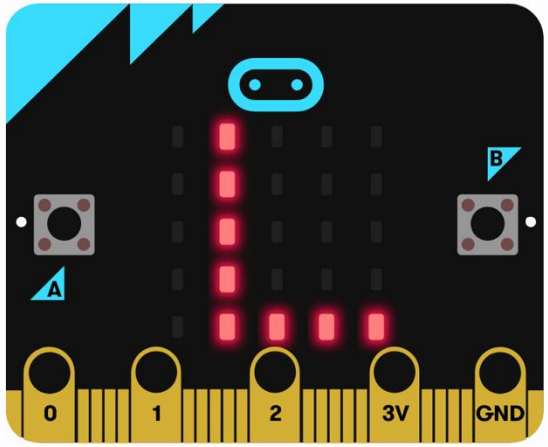
Technology & Inclusion

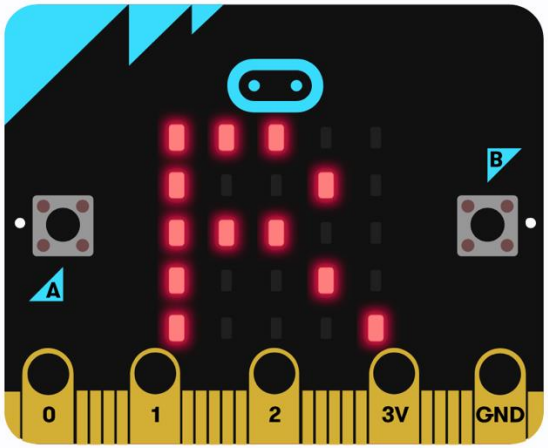
Technology and Inclusion

Your micro:bits have been trained to recognise dance moves on your dominant hand

How well would it work if you swap to your other hand?

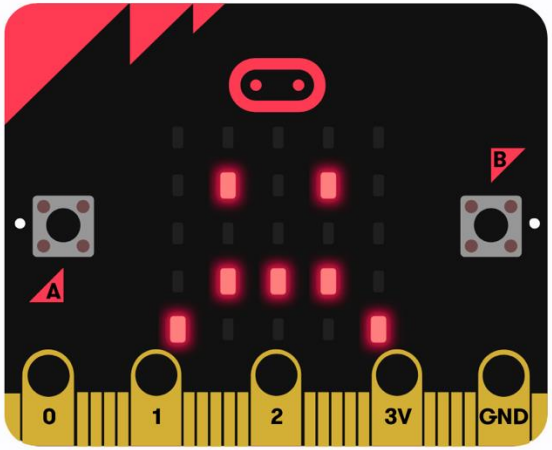
What if we gave the micro:bit to a completely different person?

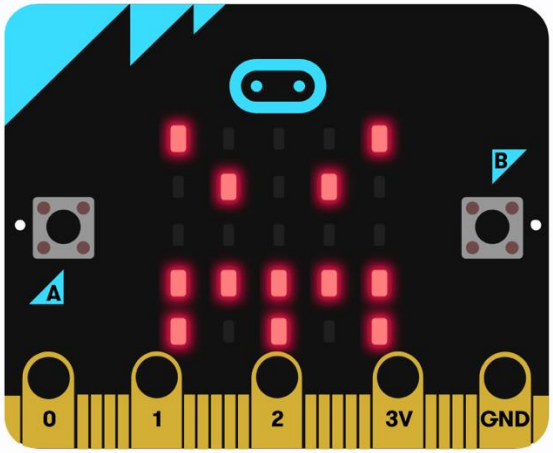




Give the micro:bit to your partner

Technology and Inclusion





How well does your micro:bit work when used by someone else?

When using machine learning we need to use large, even datasets with no gaps or the model may develop bias

These biases lead to exclusion

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Inclusive Machine Learning

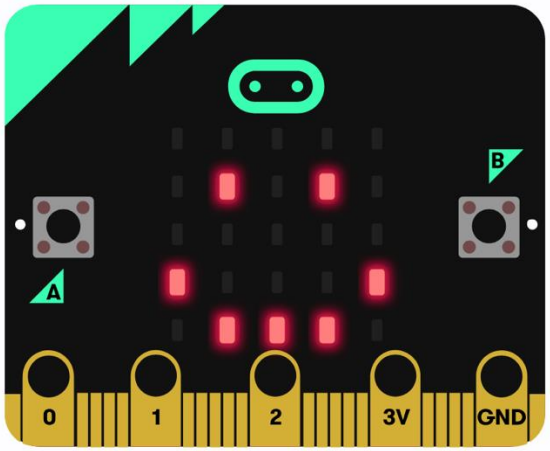
Inclusive Machine Learning

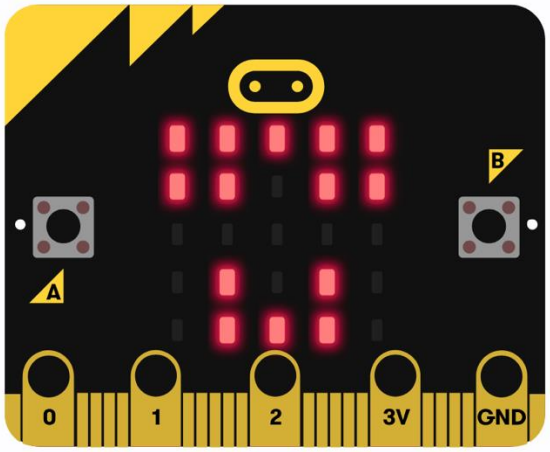
Making any machine learning system more inclusive is simple – give it more data!

Add new data to each of the dance movements for your partner

Test again – does it work?

Try adding new categories for your off-hand movements too.





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Further Analysis

Further Analysis

Following several questions from teachers on whether the Machine Learning data can be used within the Data Analysis tool (***Hint:*** It cannot)

Technocamps have created a new tool that allows learners to do just that! Head to:

tc1.me/microtool