

# technocamps



Llywodraeth Cymru  
Welsh Government



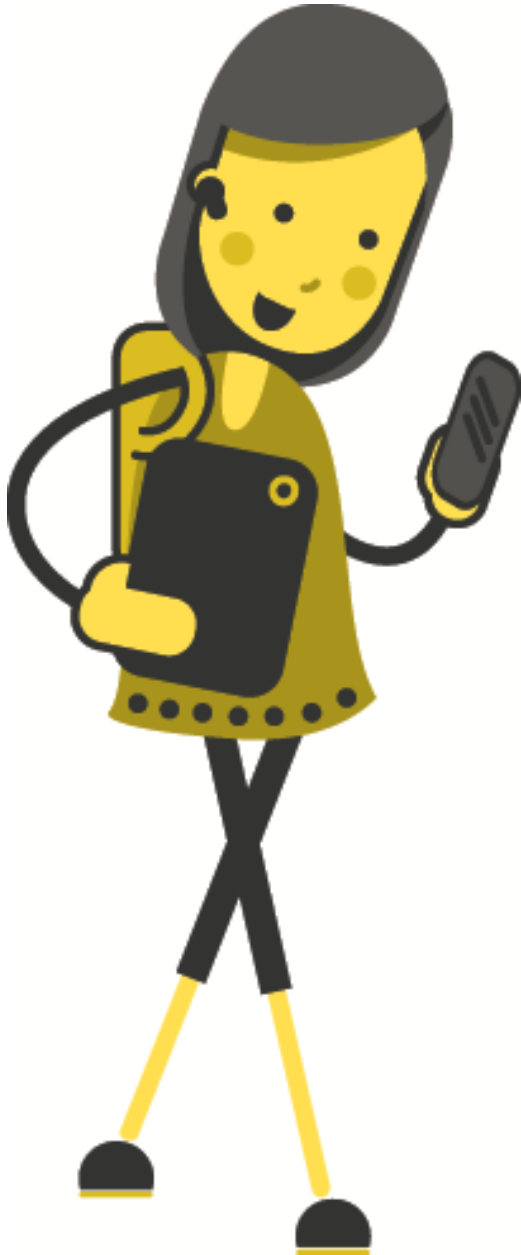
Prifysgol  
Abertawe  
Swansea  
University



Cardiff  
Metropolitan  
University

Prifysgol  
Metropolitan  
Caerdydd

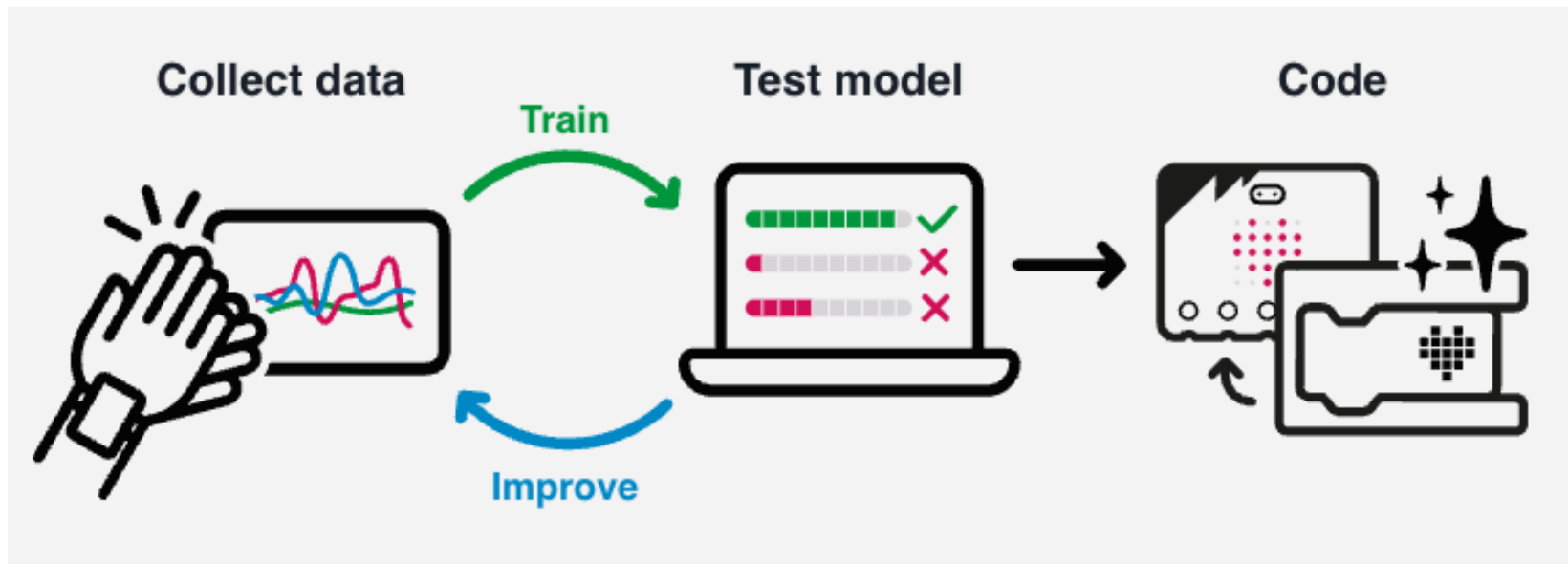




# micro:bit Machine Learning

# Starting with CreateAI

[createai.microbit.org](https://createai.microbit.org)



# Getting Started



Get started

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

## Pick up where you left off

### Open last session

No session found



### Continue a saved session

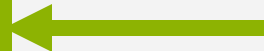
Use a hex file or data samples file you saved to your computer to continue a session.



## Start something new

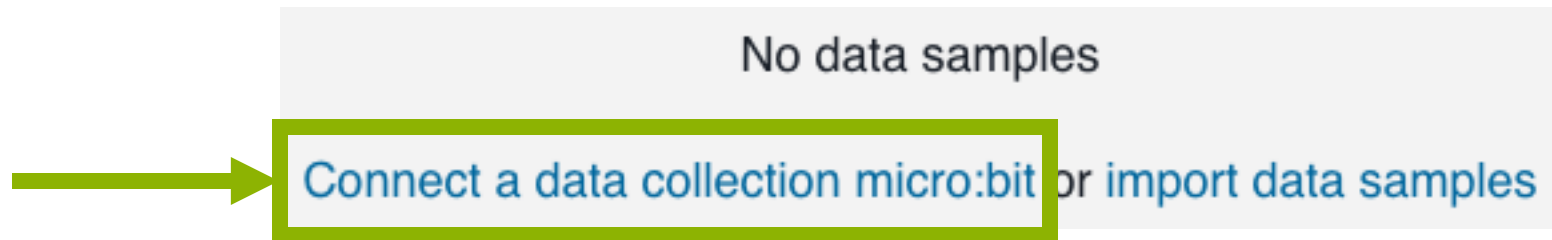
### New session

Connect your micro:bit and collect movement data to build a machine learning model.

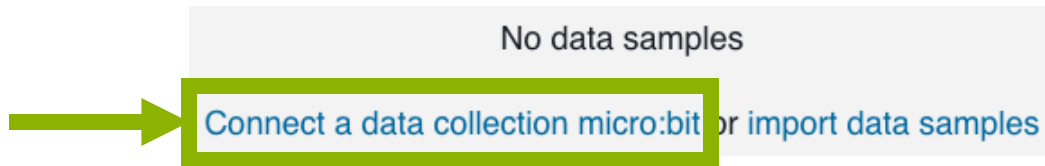


# Getting Connected

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



# Getting Connected

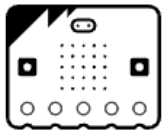


- Click **Connect a data collection micro:bit**

What you need to connect using Web Bluetooth

×

- Click **Next**



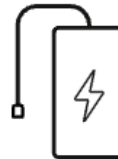
1 micro:bit



Computer  
with Internet, a  
USB port &  
Web Bluetooth



Micro USB  
cable



Battery holder  
with batteries

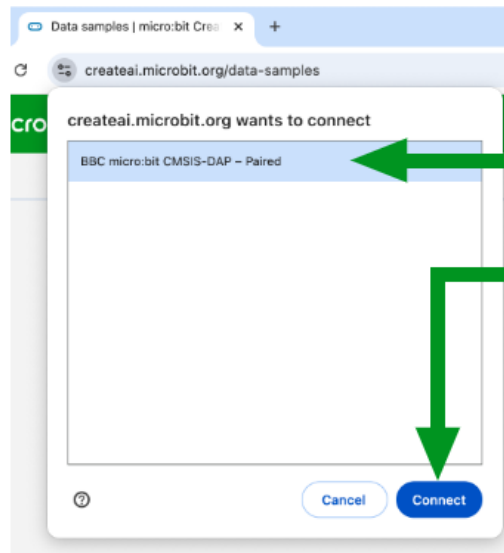
Connect using micro:bit radio instead



# Getting Connected

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

Download data collection program to micro:bit



In the next popup

1 Choose your micro:bit

2 Select 'Connect'

Back

Next

# Getting Connected

- Let the program download then connect the battery pack

## Downloading the data collection program

Please wait. Downloading program to micro:bit.

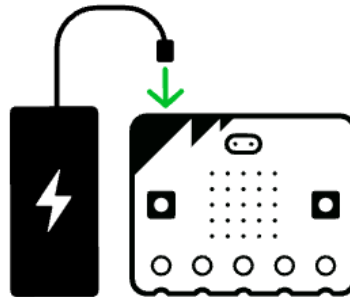


## Disconnect USB and connect battery pack



Disconnect the micro:bit from the computer and connect the battery pack.

[You can attach the micro:bit to your wrist or an object](#) 



Back

Next

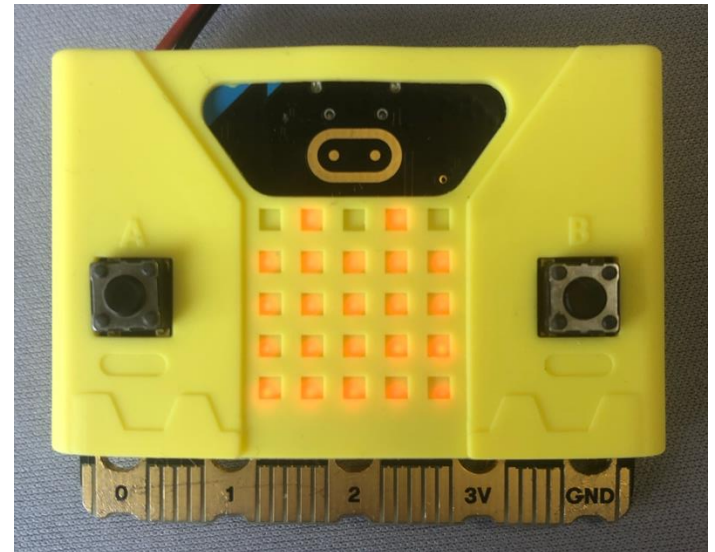
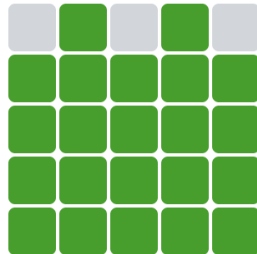


# Getting Connected

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

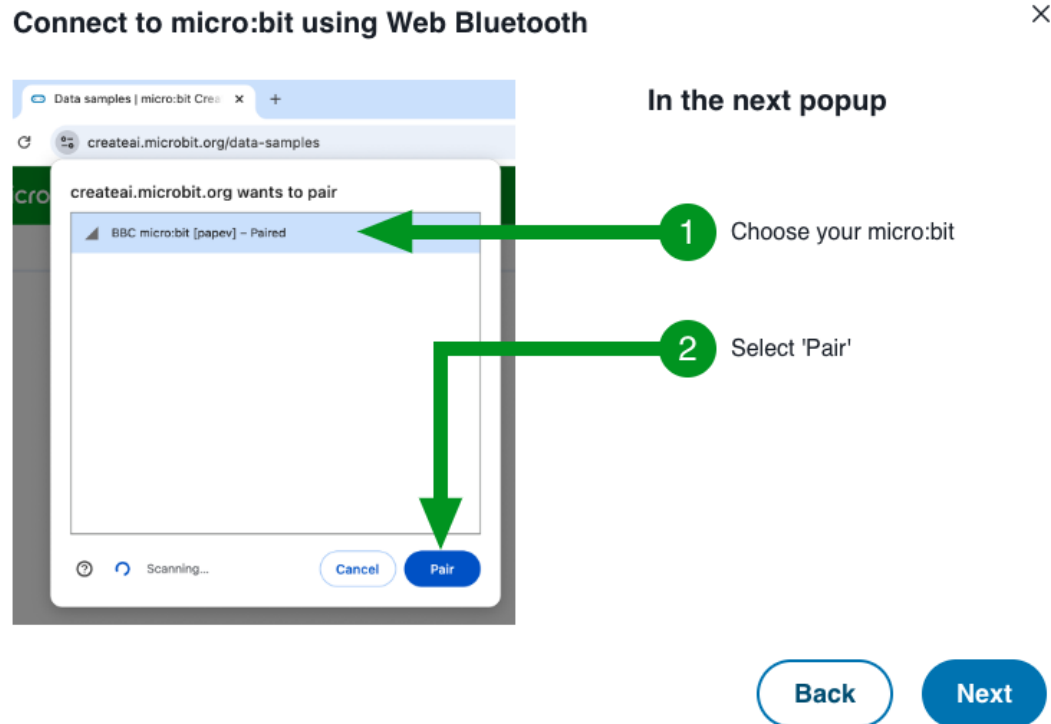
## Copy pattern

Copy the pattern displayed on the micro:bit.



# Getting Connected

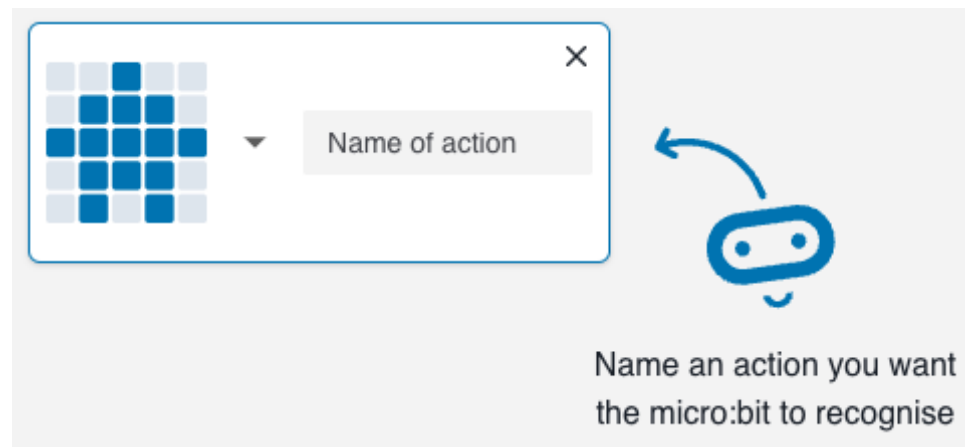
- Click **Next** to continue
- Follow the instructions for connecting via Bluetooth



# 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

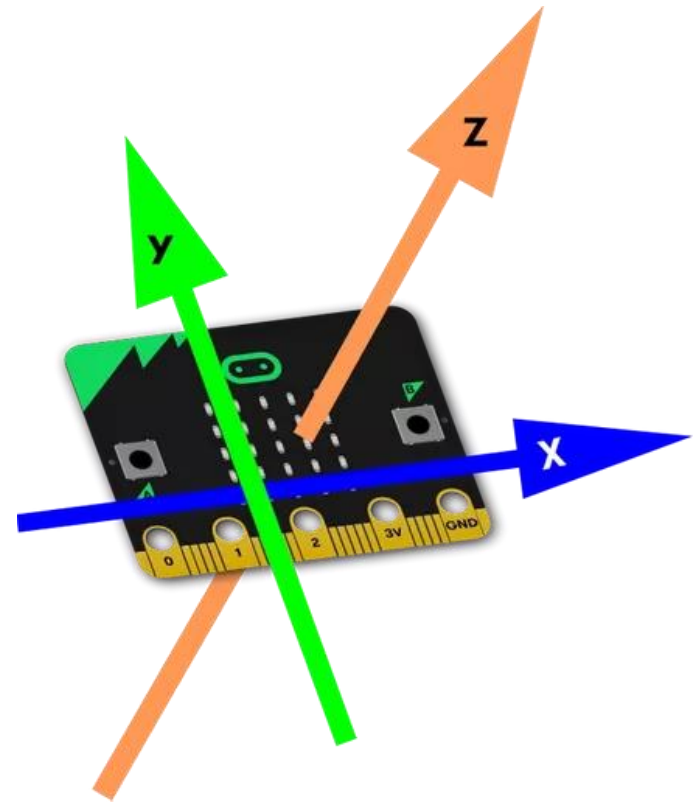
**+ Add action**

# 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

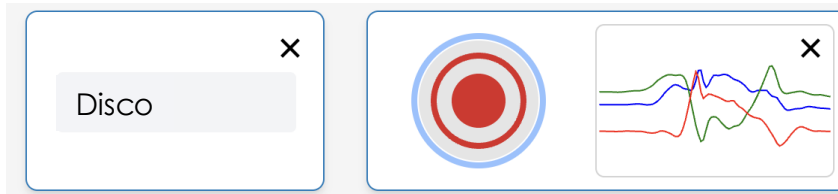


# Adding Actions: Disco Dancing



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



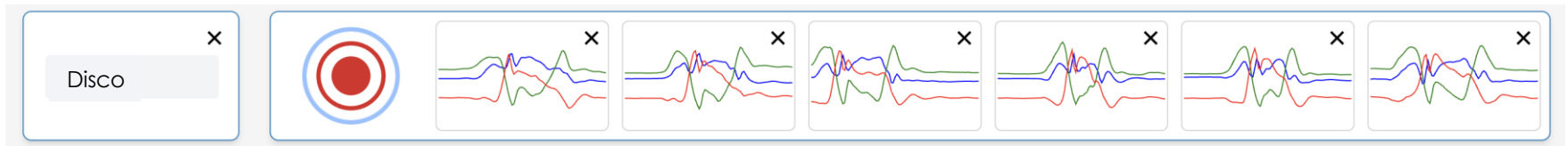
Then click the red button (or press 'b' on your micro:bit) to start recording our movements

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!





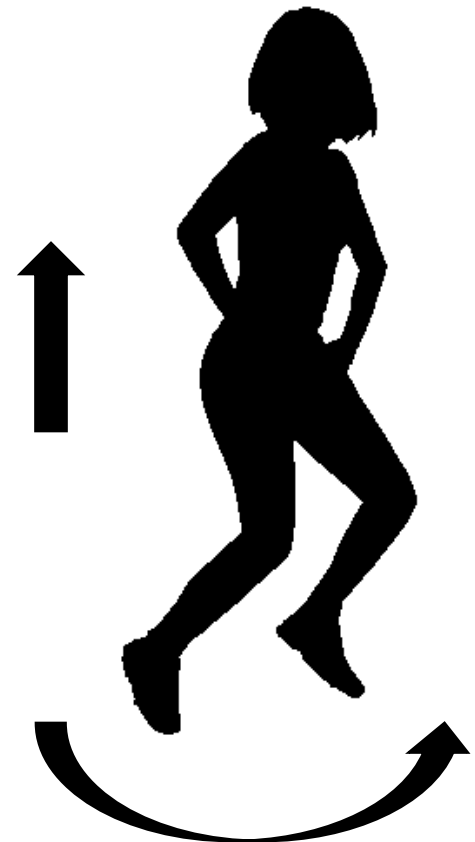
# Adding Actions: Macarena

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The Macarena is:

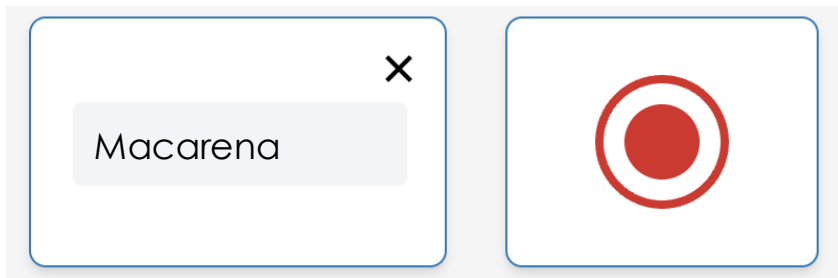
- Too long to explain...

Let's try a few practise  
Macarenas

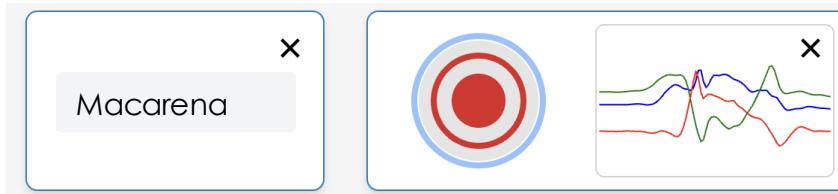


# Adding Actions: Macarena

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



## Training a model

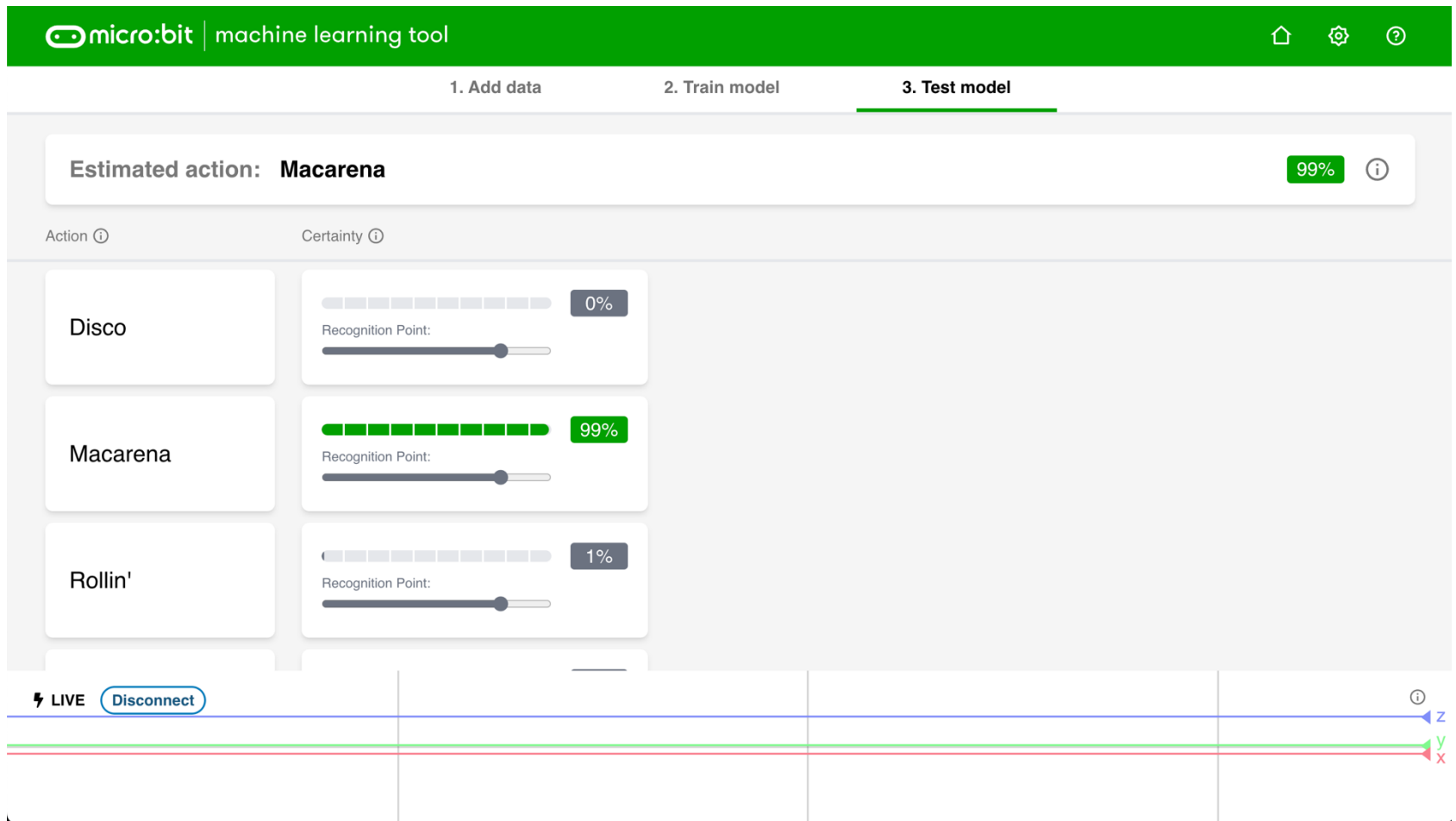
The computer program spots patterns or differences in your data samples, and uses these to build a mathematical model that allows the micro:bit machine learning tool to recognise different actions when you move your micro:bit.

**Status: You've collected enough data to train the model.**

Train model

Click  to begin training your machine learning model

# micro:bits Learning & Testing



# Proud Mary (Rollin') & Ketchup Song



# Technology & Inclusion

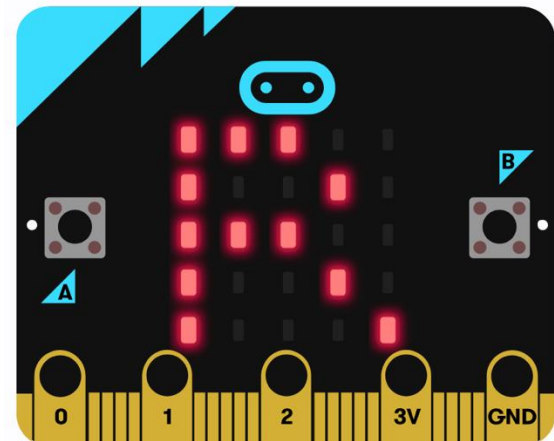
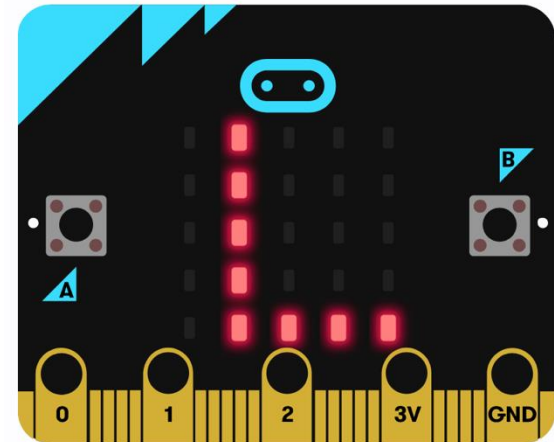


# Technology and Inclusion

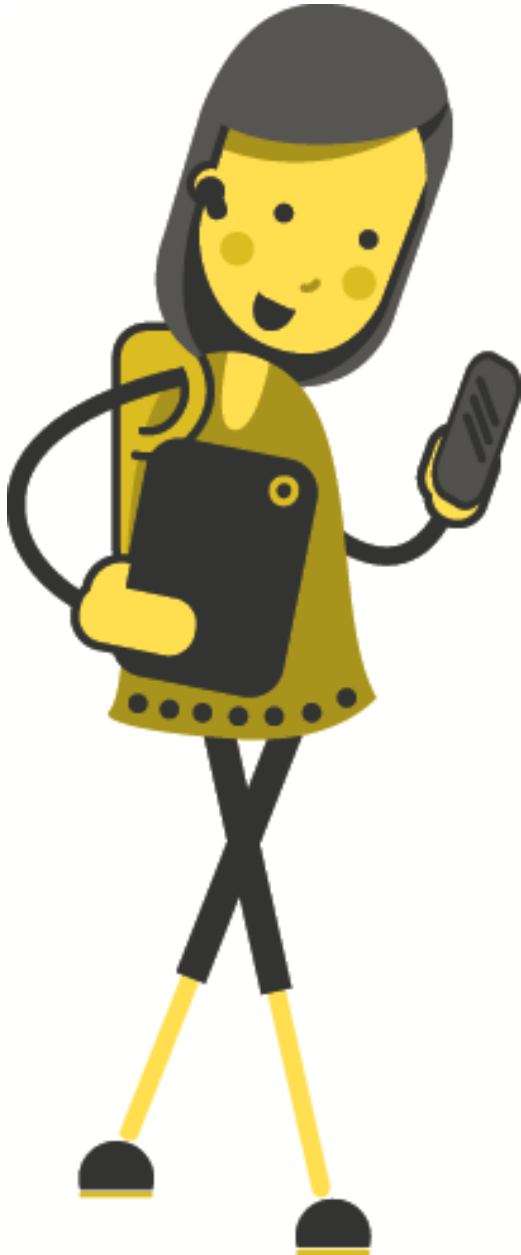
Your micro:bits have been trained to recognise dance moves on your dominant hand

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

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

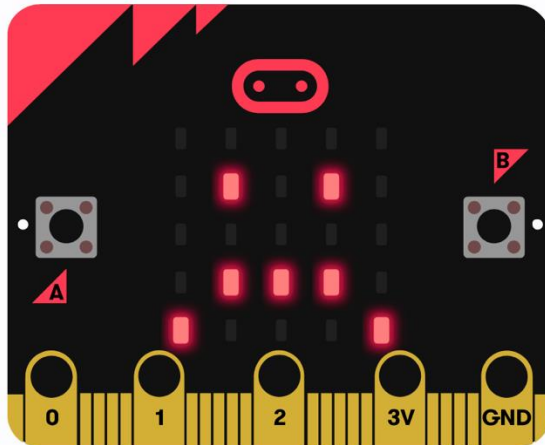






Give the  
micro:bit to  
your partner

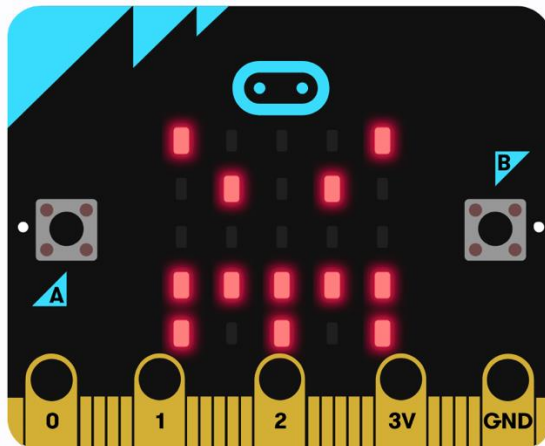
# Technology and Inclusion



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



# Inclusive Machine Learning



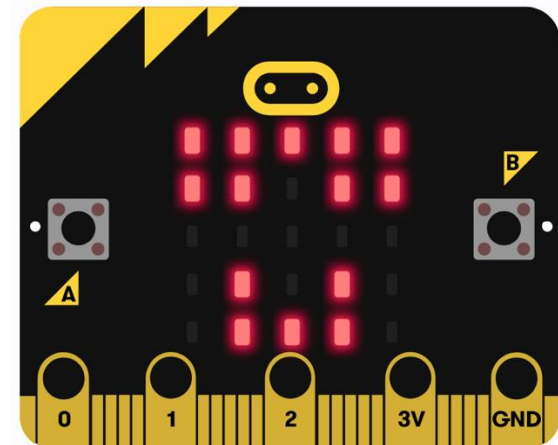
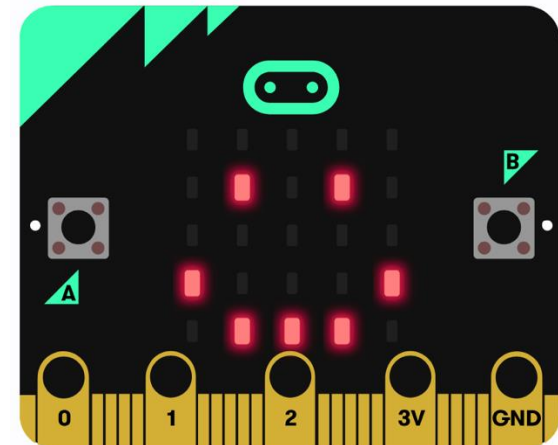
# Inclusive Machine Learning

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.



# 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](https://tc1.me/microtool)