



Pokémon statistics

In this project you will train a computer to predict the type of Pokemon based on their statistics, like their size and fighting abilities.

This image shows a Scratch project titled "pokemon-statistics". The stage features several Pokémon sprites: Squirtle, Magmar, Magikarp, Jigglypuff, Charmander, Pikachu, and a small grey robot. On the right, there's a red mat with a Squirtle sprite and some status information:

height	0.5	weight	9
attack	48	defense	65
speed	43	HP	44
capture rate	45		
name	Squirtle		
prediction	water		

The script area contains the following Scratch script:

```
when green flag clicked
  go to [back v] layer
  hide variable [prediction v]
  set [prediction v] to (...)

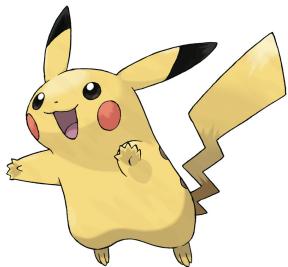
when this sprite clicked
  broadcast [request-to-classify v]

when I receive [classify v]
  hide variable [prediction v]
  set [prediction v] to (recognise numbers height)
  show variable [prediction v]
```

The left sidebar shows the "Pokemon statistics" category selected, along with other categories like Code, Costumes, Sounds, Motion, Looks, Sound, Events, Control, Sensing, Operators, Variables, My Blocks, Images, and a general Motion category.



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This is Pikachu.

Pikachu is an **electric** Pokéémon.

There are lots of different types of Pokéémon.

The screenshot shows the Pokédex entry for Jigglypuff (No. 010). It includes the Pokédex data, training stats, and breeding information. A blue arrow points from the text "Jigglypuff is a **fairy** Pokéémon." to the "Type" section of the Pokédex data, which lists "Normal/Fairy".

Jigglypuff is a **fairy** Pokéémon.

Check the types of other Pokéémon in the Pokéémon database at <https://pokemondb.net>

The types of Pokéémon are:

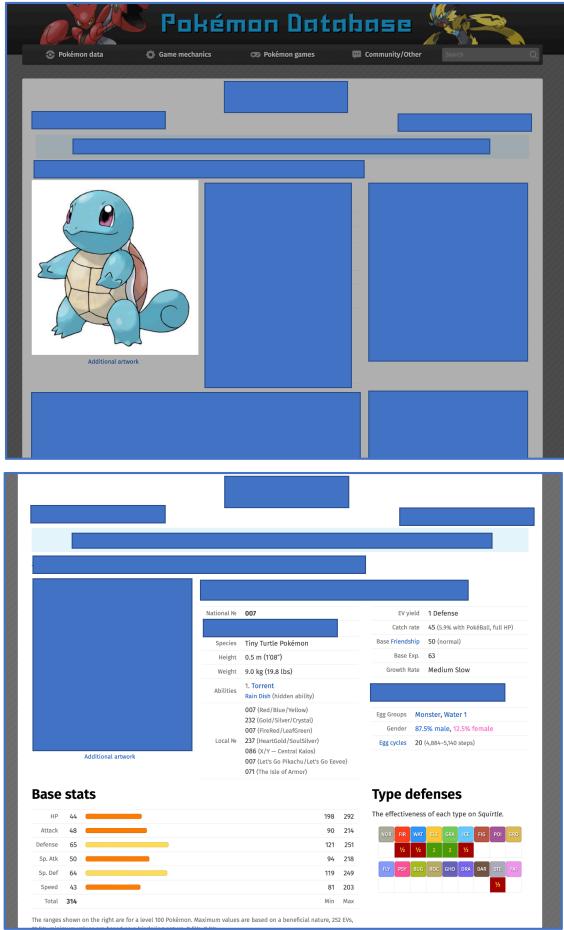
- Normal
- Grass
- Ground
- Rock
- Fire
- Ice
- Flying
- Ghost
- Steel
- Water
- Fighting
- Psychic
- Dragon
- Fairy
- Electric
- Bug
- Dark
- Poison

The screenshot shows the Pokédex entry for Squirtle (No. 007). It includes the Pokédex data, training stats, and breeding information. A blue arrow points from the text "What type of Pokéémon is Squirtle?" to the "Type" section of the Pokédex data, which lists "Water".

What type of Pokéémon is Squirtle?

Try to guess.

What information do you think you could use to guess the type?



Would you use the way that it **looks**?

Do you think the colours and the shapes would give you a good clue for what the type is?

Would you use the **statistics** that describe the Pokémon's size, abilities, and fighting style?

Do you think those numbers would give you a good clue for what the type is?

Neither is perfect.

There aren't rules. But we can learn what they have in common and use this to make a guess.

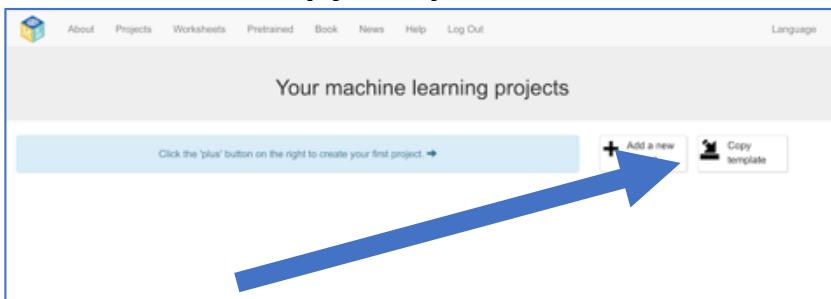
Computers can do this. Computers can work without relying on rules, by learning what things have in common and using this to make predictions.

We call this type of computing **Machine Learning**.

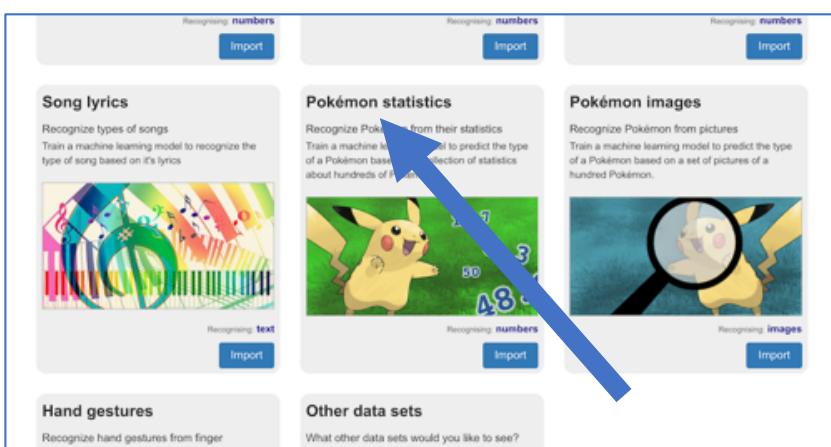
In this project, you will train a computer to be able to predict the type of a Pokémon based on their statistics, by training it with the statistics for a few hundred example Pokémon.

To make things a little quicker, we won't train the computer to recognise every type of Pokémon, we'll just focus on six of the types as an example.

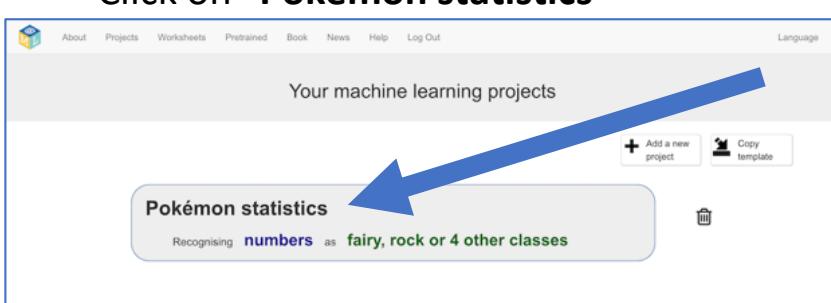
1. Go to <https://machinelearningforkids.co.uk/> in a web browser
2. Click on “Get started”
3. Click on “Try it now”
4. Click on “Copy template”



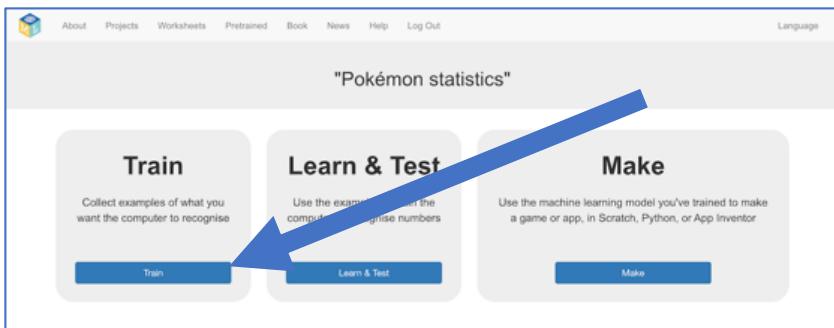
5. Click on “Pokémon statistics”



6. Click on “IMPORT”, then store the project on your computer
7. Click on “Pokémon statistics”



8. Click on “Train”



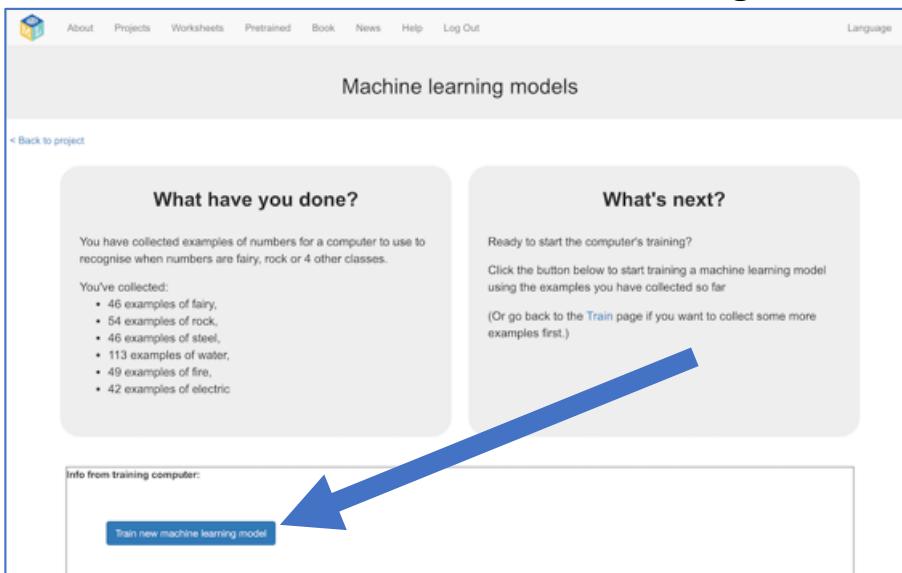
9. Look through the training statistics

These are the statistics for a few hundred Pokémon that you will use to train the computer with.

10. Click on “Back to project”

11. Click on “Learn & Test”

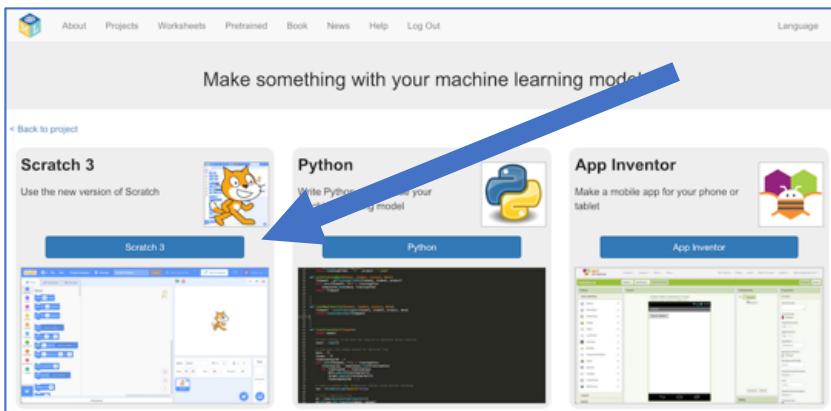
12. Click on “Train new machine learning model”



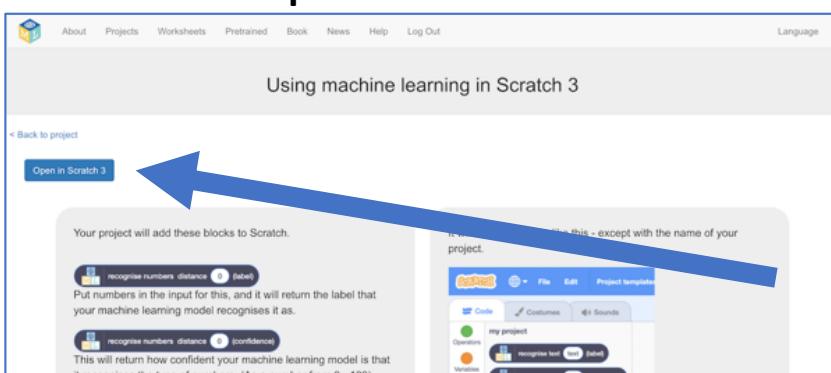
13. Click on “Back to project”

14. Click on “Make”

15. Click on “Scratch 3”



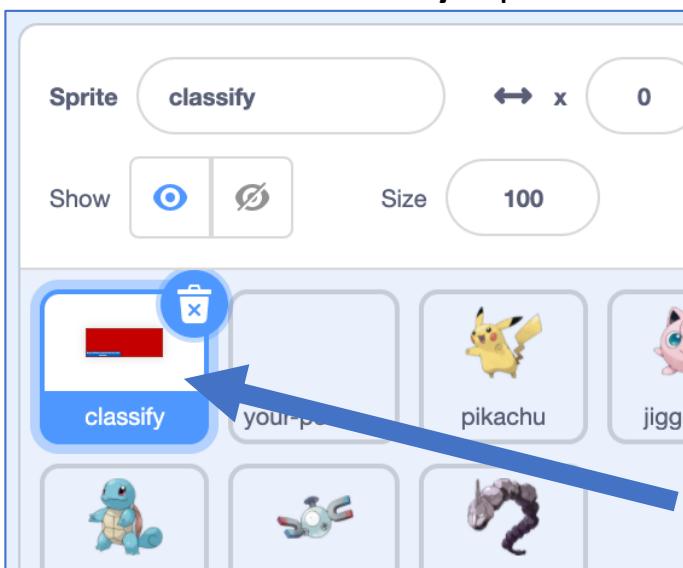
16. Click on “Open in Scratch 3”



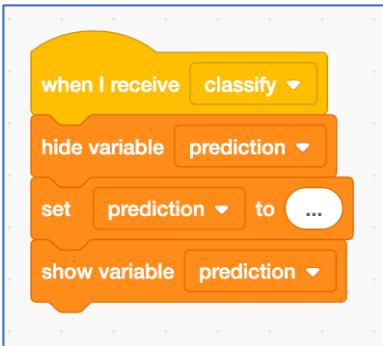
17. Click on “Project templates”

18. Click on “Pokémon statistics”

19. Click on the “classify” sprite



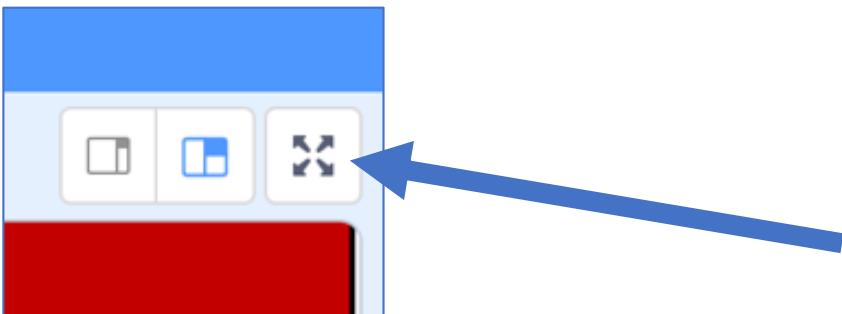
20. Find the “when I receive classify” code



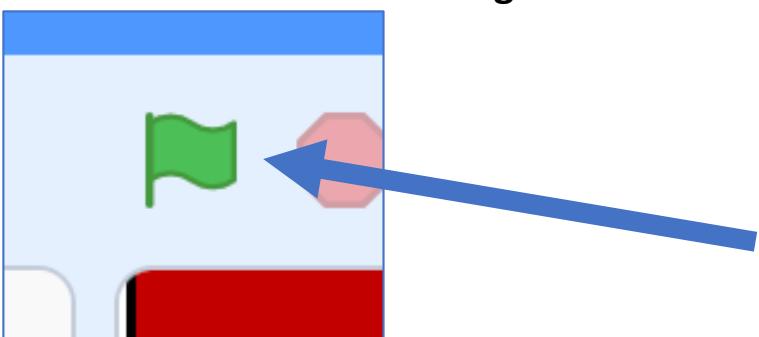
21. Update the code to use your machine learning model



22. Click on the “full-screen” button



23. Click on the “Green Flag”



What have you done so far?

You've used the statistics of a random sample of a few hundred Pokémons to train a computer to be able to predict the type of a Pokémon from the numbers describing their size and abilities. You've set up a Scratch project that can use your machine learning model.

Next, you'll test your model to see how good it is at guessing the type of new Pokémons.

Statistics for **six** Pokémons have been prepared for you in the Scratch project. All six of these are Pokémons that were **not** included in the training data you used to train your machine learning model.

Why do you think this is important?

Drag one of them onto the red box, then click on the blue button.

The statistics for your chosen Pokémon will be displayed, along with the prediction made by your machine learning model.

(The picture of the Pokémon is not used by the machine learning model - it's just included in the project to make it look better!)

Pokémons used in this activity came from
<https://www.kaggle.com/vishalsubbiah/pokemon-images-and-types>

Pokémons data used in this activity came from
<https://www.kaggle.com/abcsds/pokemon>

Other screenshots used in this activity came from
<https://pokemondb.net>

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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?

Design your own Pokémon!

Try inventing your own Pokémon. A sprite called “your-pokemon” is included in the Scratch project ready for you to fill in.

You can draw a Pokémon in Scratch using the drawing tools for a new sprite.

Or you can draw it with pen and paper, and then use the camera tool to create a new costume in Scratch from a webcam photo of your drawing.

Then you can fill in the statistics for your Pokémon.

What type does your machine learning model think it is?