Image Classifier

In this project, we will train the computer to recognize if an image relates more to Soccer or Basketball. However, you can change these two categories to be whatever you would like. In these instructions, you can simply replace these labels with the two categories you choose!

1. Go to https://machinelearningforkids.co.uk/ in a web browser

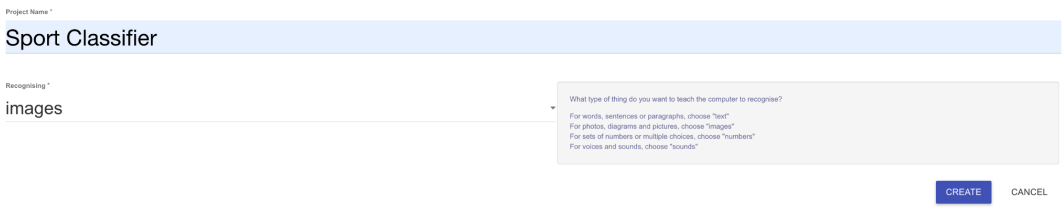
2. Click on “**Get started**”

3. Click on “**Try it now**”

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

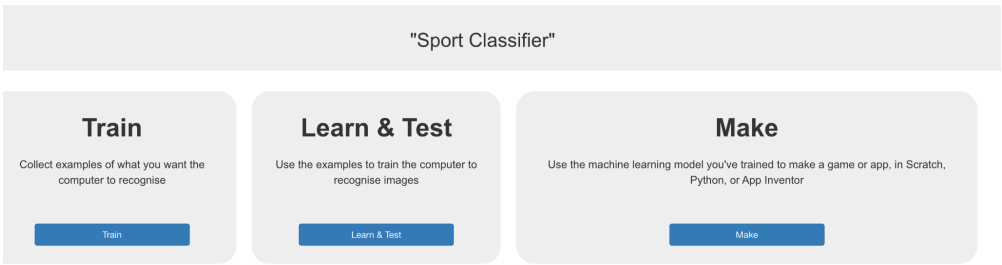
5. Click the **“+ Add a new project**” button.

6. Name your project “Sport Classifier” and set it to learn how to recognise “**Images**”.
Click the “**Create**” button

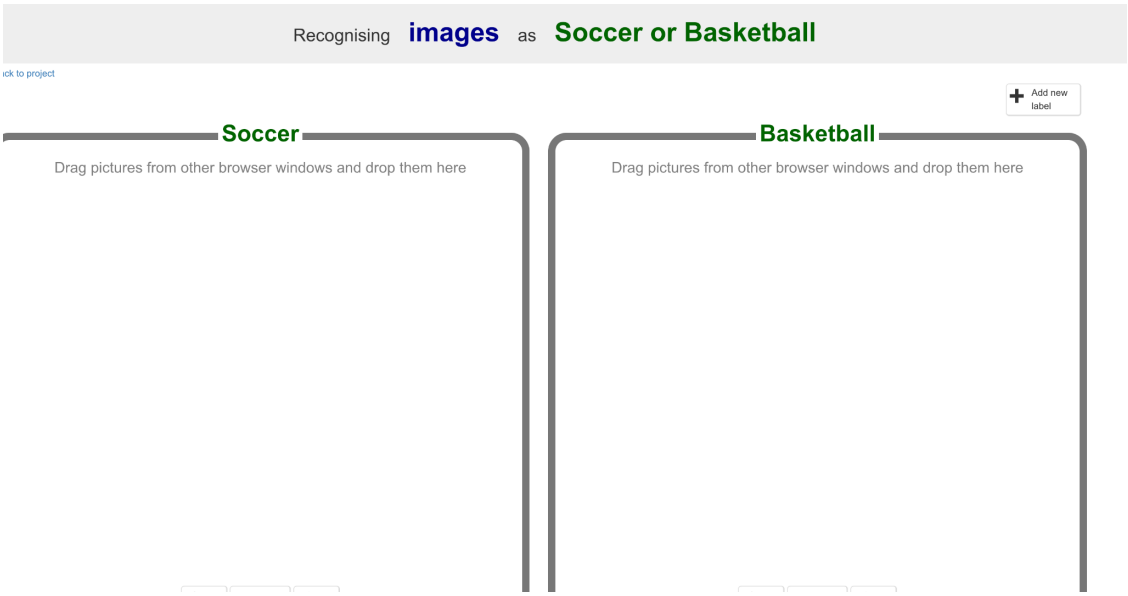


7. You should now see “**Sport Classifier**” in the list of your projects. Click on it.

8. You need examples to train the computer. Click the **Train** button.

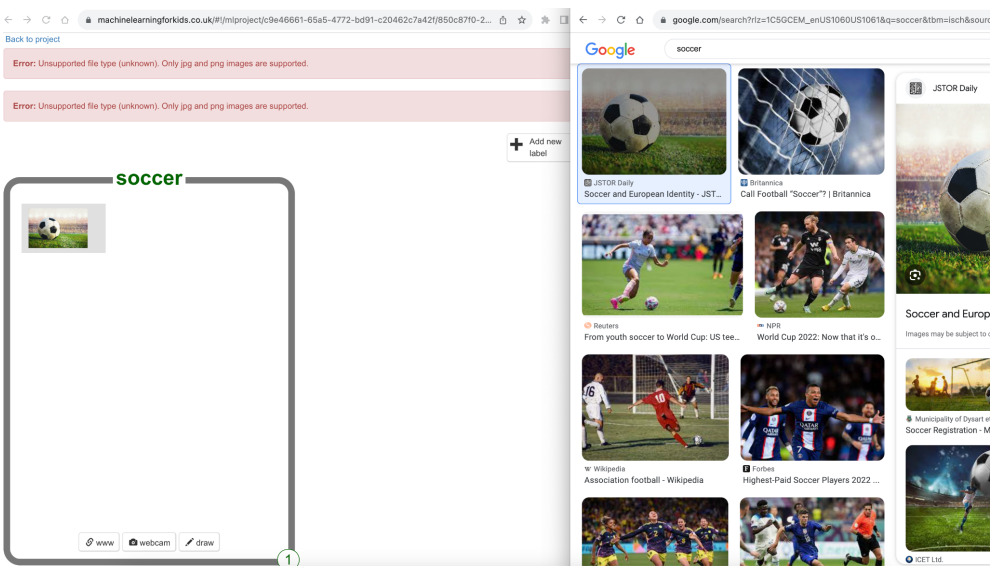


9. Click on **“+ Add new label**” and call it “Soccer”. Do that again, and create a second bucket called “Basketball”.

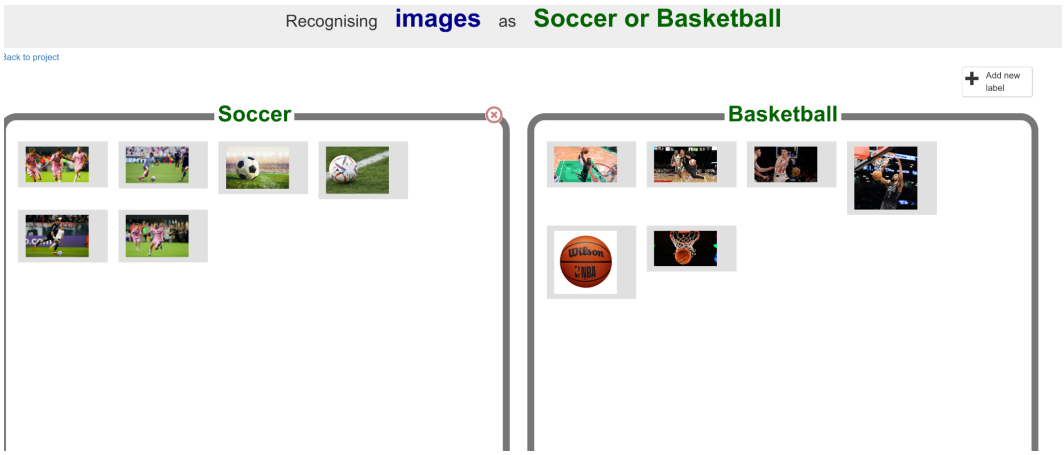


10. Open a new tab. Search “soccer” in the search bar and click on the images tab. Drag and drop **six** soccer images that you find to the soccer bucket.

Tip: Use a split screen with your tabs to be able to easily click and drag!

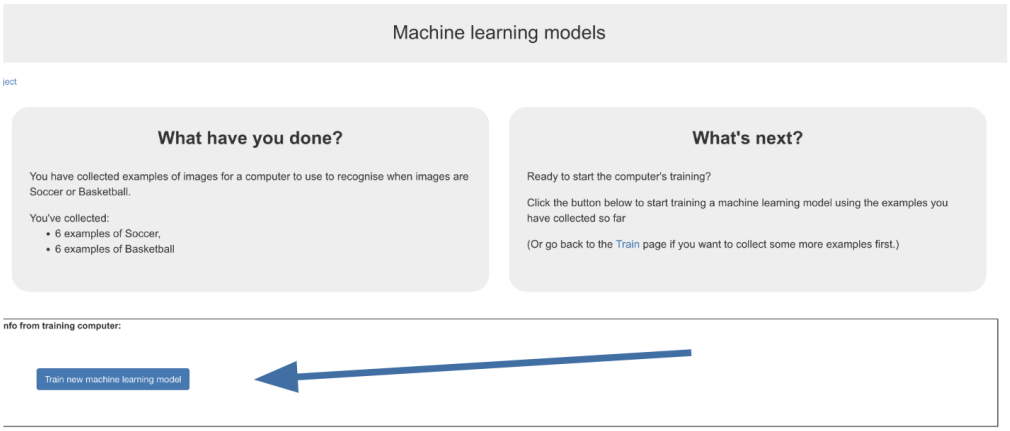


11. Open a new tab. Search “**basketball**” in the search bar and click on the images tab. Drag and drop **six** basketball images that you find to the soccer bucket.



12. Click on the **"< Back to project**" link.
Then click on the "**Learn & Test**" button.

13. Click on the "**Train new machine learning model**" button. *As long as you've collected enough examples, the computer should start to learn how to recognise messages from the examples you've given to it.*

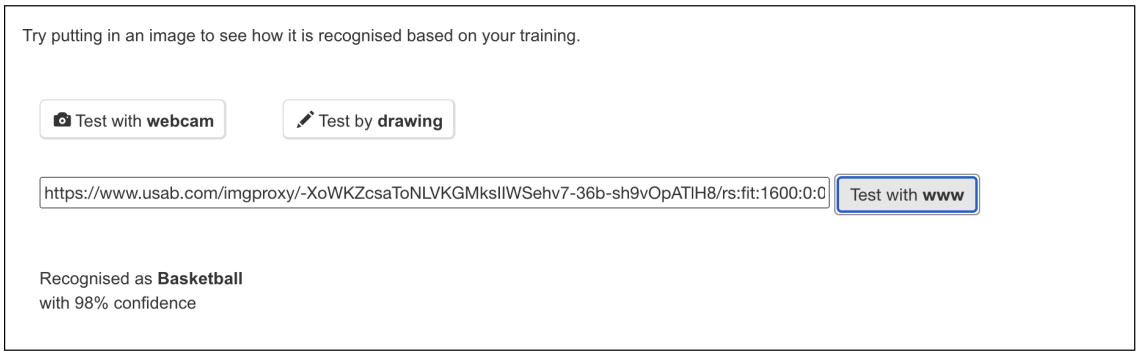


14. Wait for the training to complete. This might take a minute.

15. Once the training has completed, a Test box will be displayed. Try testing your model to see what the computer has learned.

- Go to Google
- Find a different image that you have not uploaded yet of someone playing basketball
- Right click on the image and click on "open image in a new tab".

- Copy and paste the URL at the top and paste it in the box below.
- Try out your model!



What have you done so far?

You've started to train a computer to recognise images as basketball or soccer. Instead of trying to write rules to be able to do this, you are doing it by collecting examples. 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 examples you've given it. These will be used to be able to recognise new messages.

16. Click the **"< Back to project"** link

17. Click the "**Make**" button, then the "**Scratch 3**" button. *This page has instructions on how to use the new blocks in Scratch. MAKE SURE TO READ THE DESCRIPTIONS ON THIS PAGE. Keep the page open if you need to check back on how to use them.*

18. Click the "**Open in Scratch**" button to launch the Scratch editor.

You should see new blocks from your project at the bottom of the list.

Tips

More examples!

The more examples you give it, the better the computer should get at recognising whether a message is kind or mean.

Try and be even

Try and come up with roughly the same number of examples for your topics.

If you have a lot of examples for one category, and not the other, the computer might learn that type is more likely, so you'll affect the way that it learns to recognise images.

Mix things up with your examples

Try to come up with lots of different types of examples.

For example, make sure that you include some pictures of just a basketball or soccer ball, or other ones where people are playing.

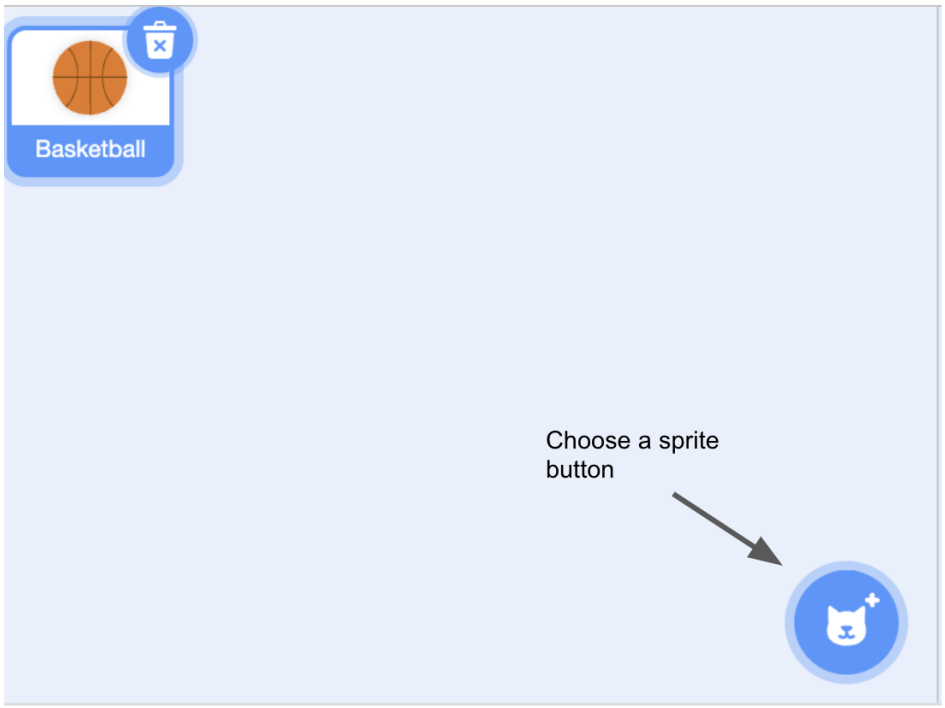
19. Now we can start to code!

- To start, please delete the cat sprite by clicking on the trash

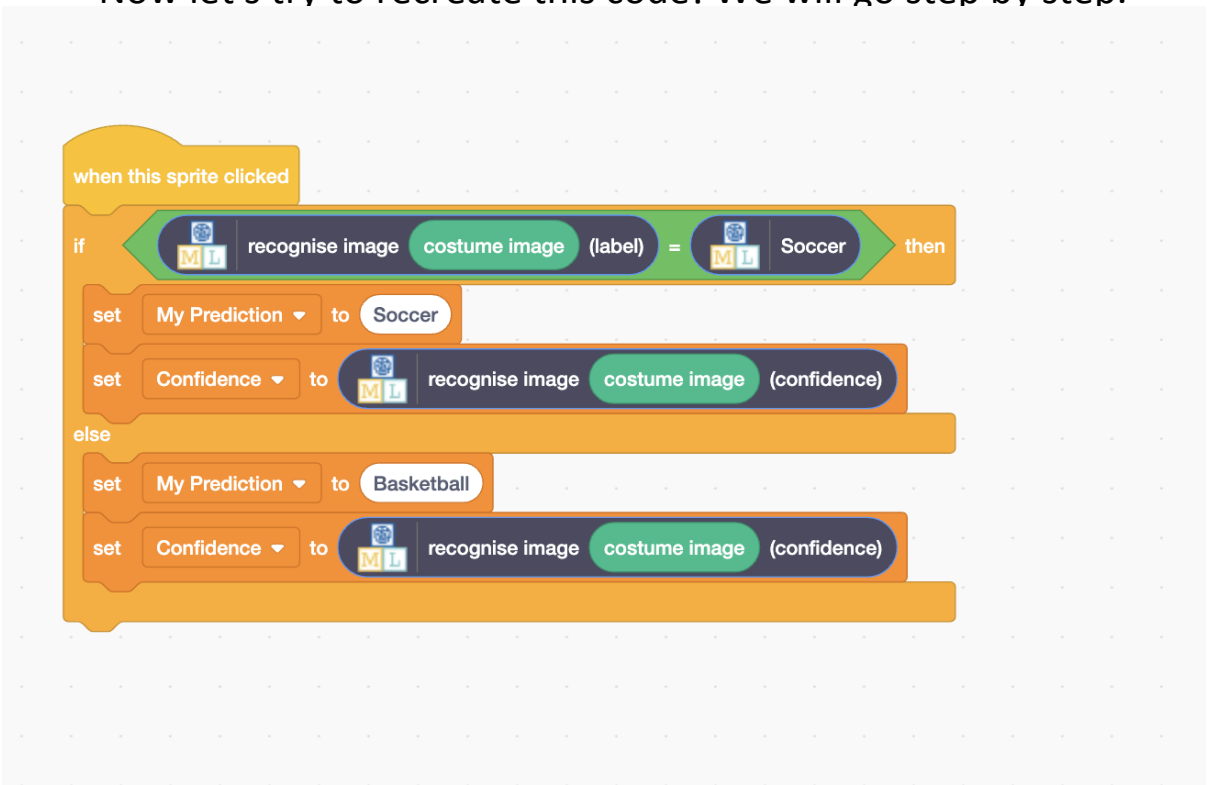
can in the top right corner of the cat.

- In the bottom right corner, click on the choose a sprite button.

Search “**basketball**” and choose this basketball sprite shown below.



20. Now let's try to recreate this code! We will go step by step.

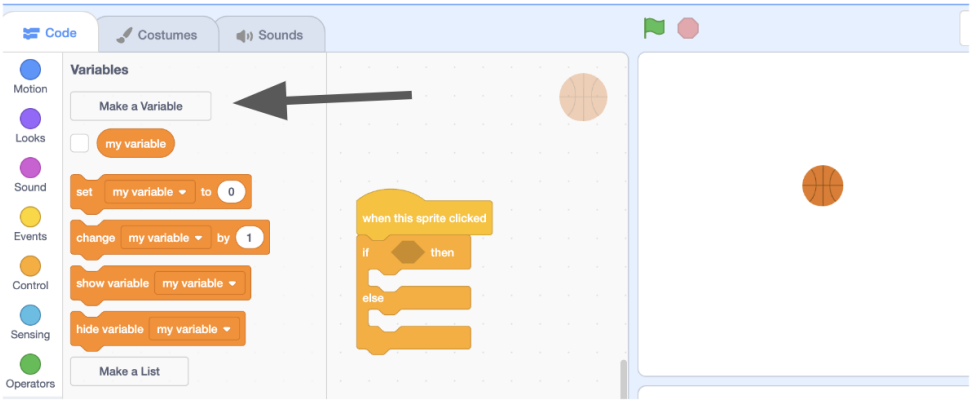


21. When we click the basketball sprite, we want to display the predicted sport and confidence level on our screen.

Go into the **Events** tab and click and drag the “when this sprite clicked” option.

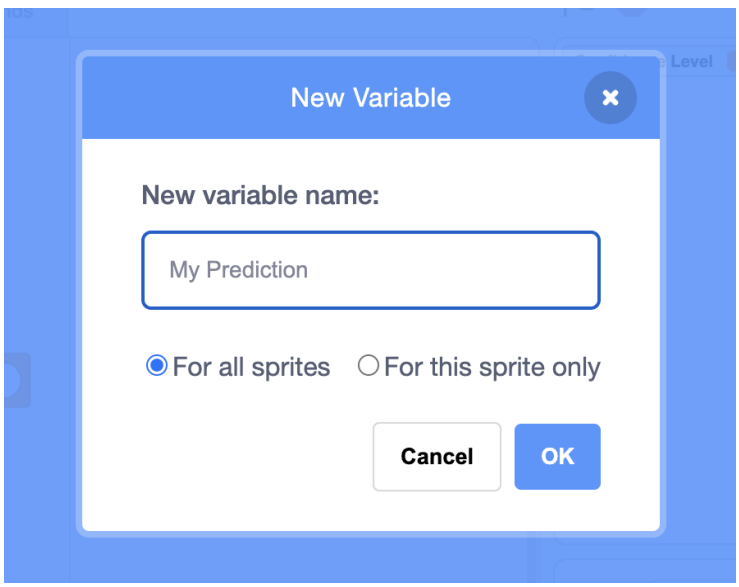
22. Now, we see that we have an if, then, else block. Find the **if then else** block under **Control.**
This is super useful for our project because we want the results to change based on IF the computer thinks that the image is related to soccer or ELSE it's basketball.

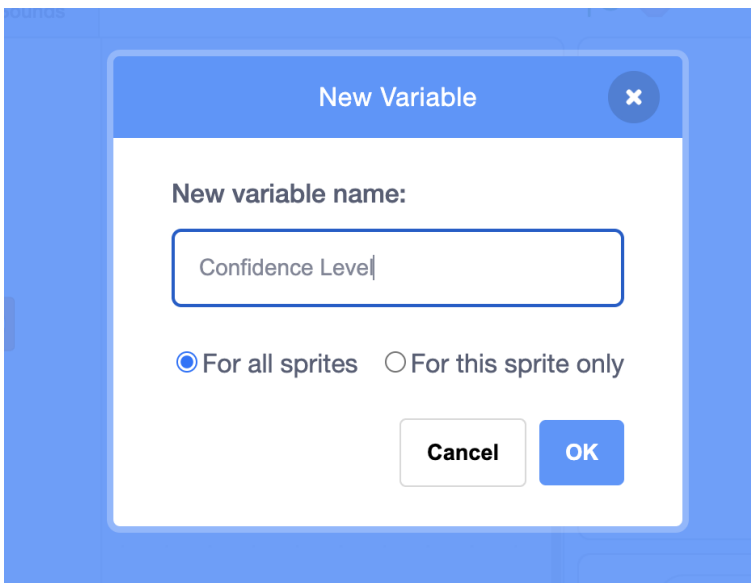
23. Go to the **Variables** Tab and click **Make a Variable**.



Note: A variable stores information. It can be numbers, letters or even pictures. That information can be changed whenever you want.

24. Now let's name our new variable. type "**My Prediction**" into the text box and click **OK**
Repeat **Step 23** to create a new variable. Name this one "**Confidence Level**"

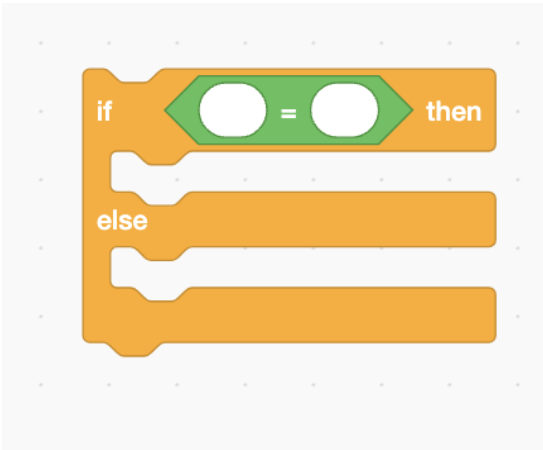




Note: What is Confidence Level?
Confidence level is how sure the computer is of its prediction. 0 means the computer is sure it's wrong. 100 means the computer thinks it's 100% right. Usually the value between 0 and 100

24. We can now start filling in the **if** part of the **if then else** block.

Click and drag the  block (found under **Operators**) to fit into the if block.

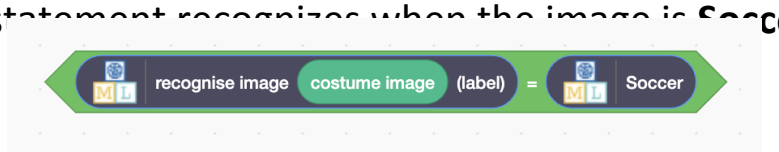


25. For our next step, we will need to use our model that we trained.

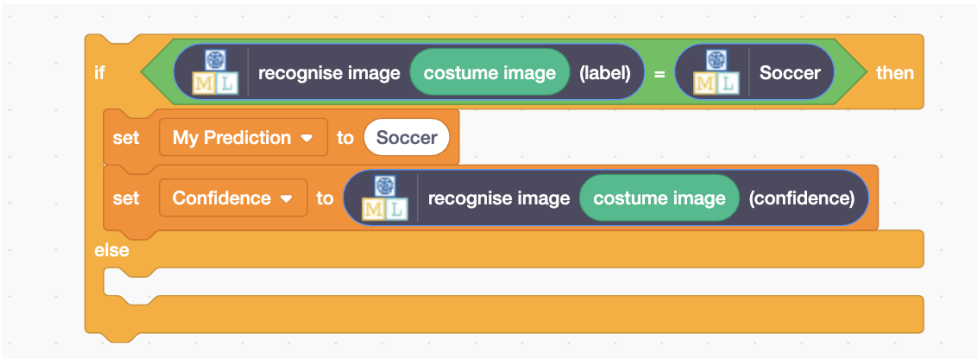
Scroll to the bottom and find the blocks under .

- Click "**Sport Classifier**" on the left side of your screen
- Find the **recognize image (label)** block and click and drag it into the left circle of 
- Go the the "**Image**" tab, and **drag custom image** in place of **image** in the white circle
- Then, find the **Soccer** block and drag it into the right circle of 
- It should look like this:

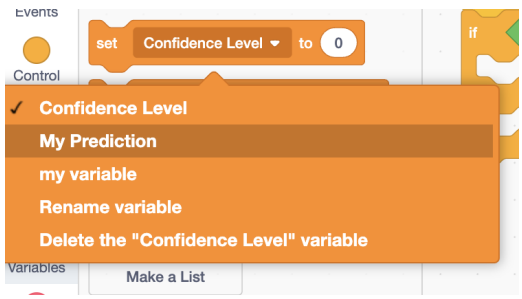
- Now the **if** statement recognizes when the image is **Soccer**



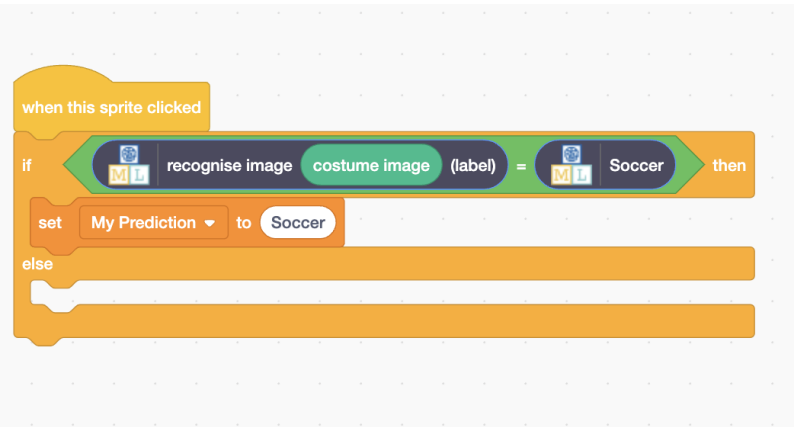
26. Next we just need to set our **My Prediction** and **Confidence Level** variables.



Go under the **Variables** Tab, and find the **set** block. Make sure to change the first value to your **My Prediction** variable. Then replace 0 in the white circle with "**Soccer.**"



Drag the **set** block inside the **if** block.



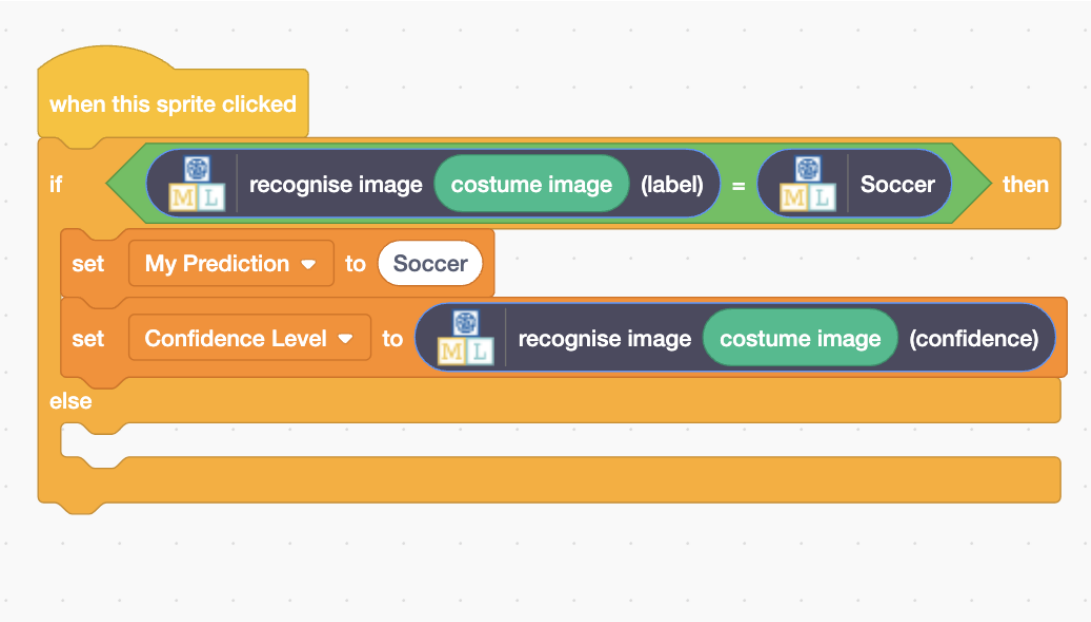
Now, if the image is Soccer, we will set **My Prediction** to Soccer. And we

will also set the **Confidence Level** for the prediction.

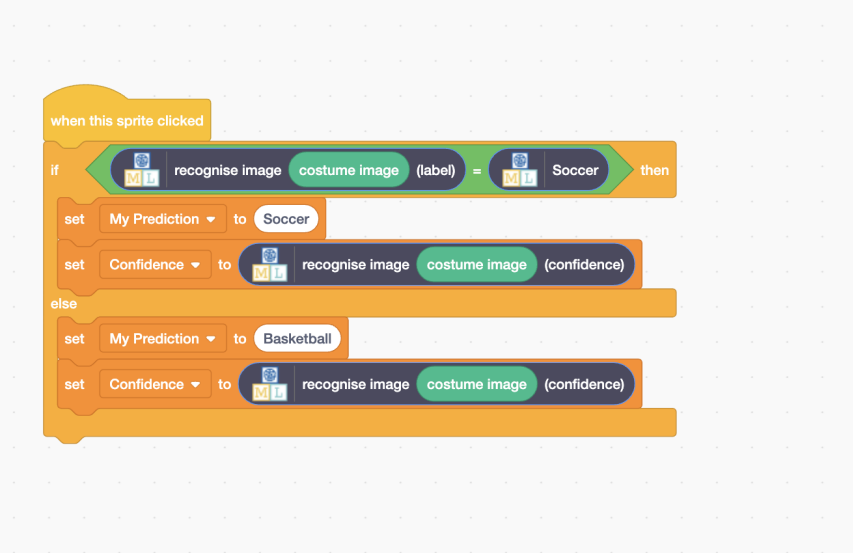
27. Go under Variables again, and find the **set** block. Drag it out and place it under your last My Prediction set block.

Next, change the value to "**Confidence Level.**"

Now go to the Sports Classifier tab and find the "**recognize image costume image (confidence)**" block. Drag this into your **set** block's white space. It should look like this:

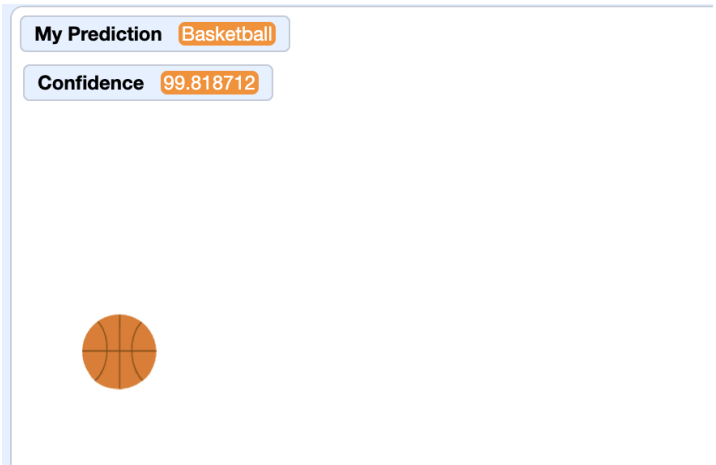


28. Repeat the steps 26 and 27 but instead of Soccer, set the **My Prediction** variable to **Basketball** by typing in the right circle.



Now, if our trained model thinks that the image does not represent Soccer, then it will think it is related to Basketball instead.

28. Now, click on your basketball. You now used your model to identify the image! Great job!



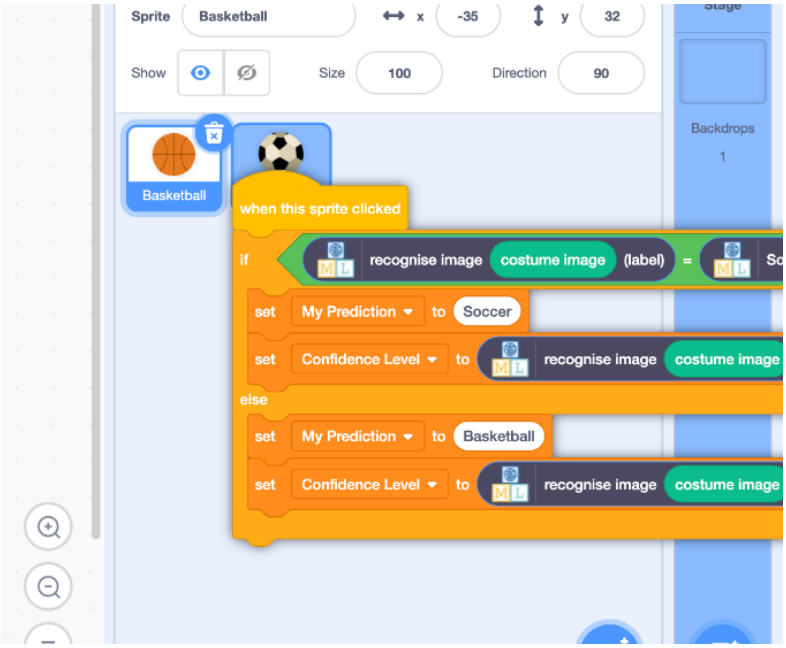
Ideas and Extensions

Now that you've finished, why not give one of these ideas a try? Or come up with one of your own?

Add some more sprites!

1. Add a new soccer sprite (repeat **Step 19**)
2. Grab the yellow "**When this sprite clicked**" and drag it onto the soccer ball
3. Click on your new sprite and see what the computer predicts.

Tip: You can also upload a picture from the internet as a sprite.



Python!

Go back to https://machinelearningforkids.co.uk/#!/projects.

Click on your project and click on Make > **Python**. If you are interested in this, ask an instructor!