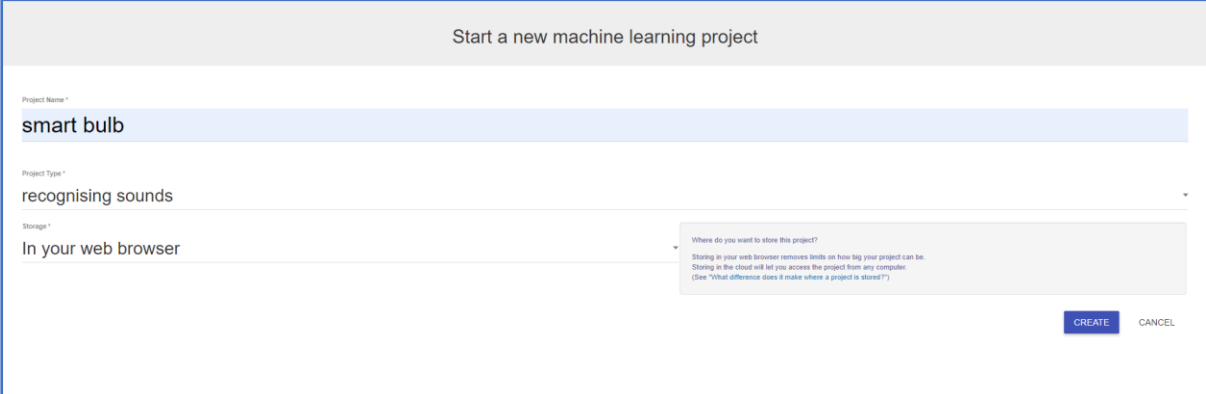


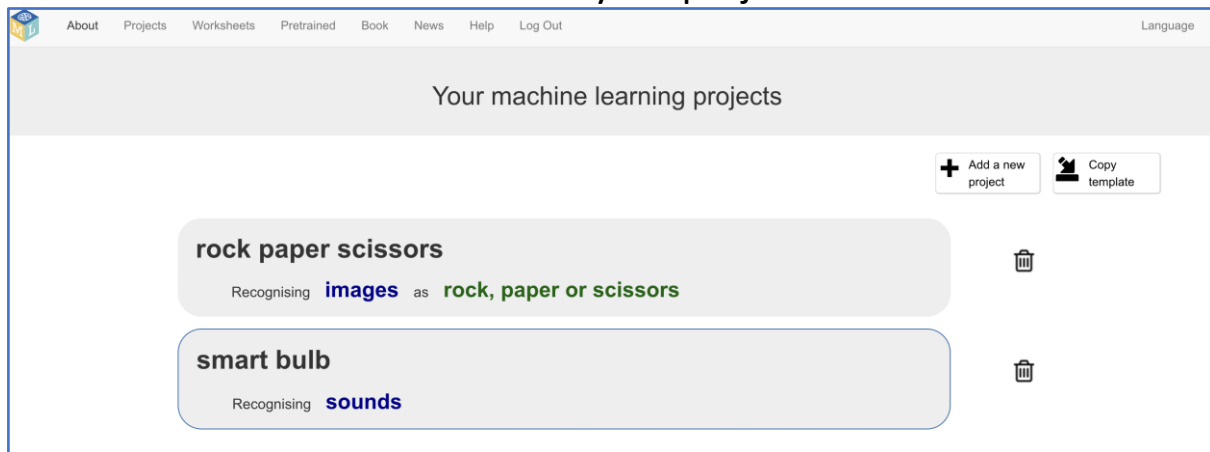
# Smart bulb

1. Go to **<https://machinelearningforkids.co.uk/>** in a web browser
2. Click on “**Get started**”
3. Click on “**Log In**” and type in your **username** and password  
If you can’t remember your username or password, ask your teacher or group leader to reset it for you.
4. Click on “**Projects**” on the top menu bar
5. Click the “**+ Add a new project**” button.
6. Name your project “**smart bulb**” and set it to learn how to recognise “**sounds**”. Click **Create**

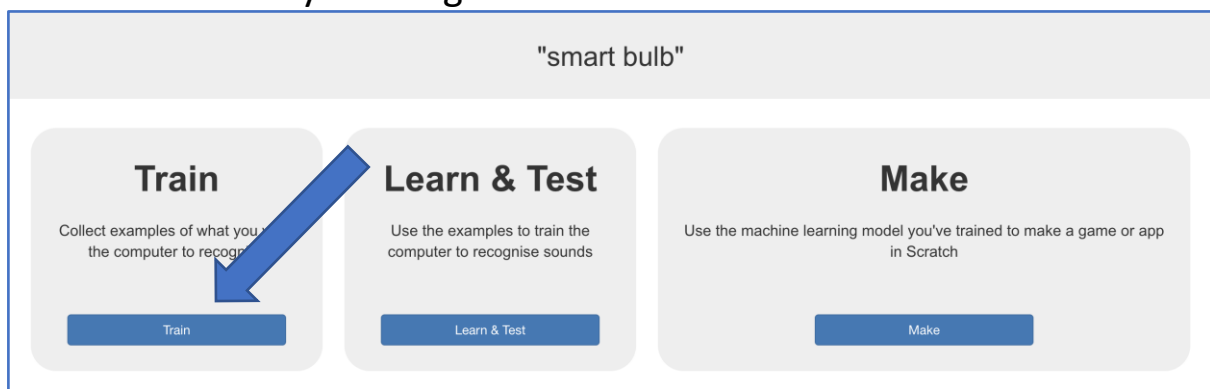


The screenshot shows a web form titled "Start a new machine learning project". It contains three main input fields: "Project Name" with the value "smart bulb", "Project Type" with the value "recognising sounds", and "Storage" with the value "In your web browser". To the right of the "Storage" field is a tooltip box with the text: "Where do you want to store this project? Storing in your web browser removes limits on how big your project can be. Storing in the cloud will let you access the project from any computer. (See 'What difference does it make where a project is stored?')". At the bottom right of the form are two buttons: "CREATE" and "CANCEL".

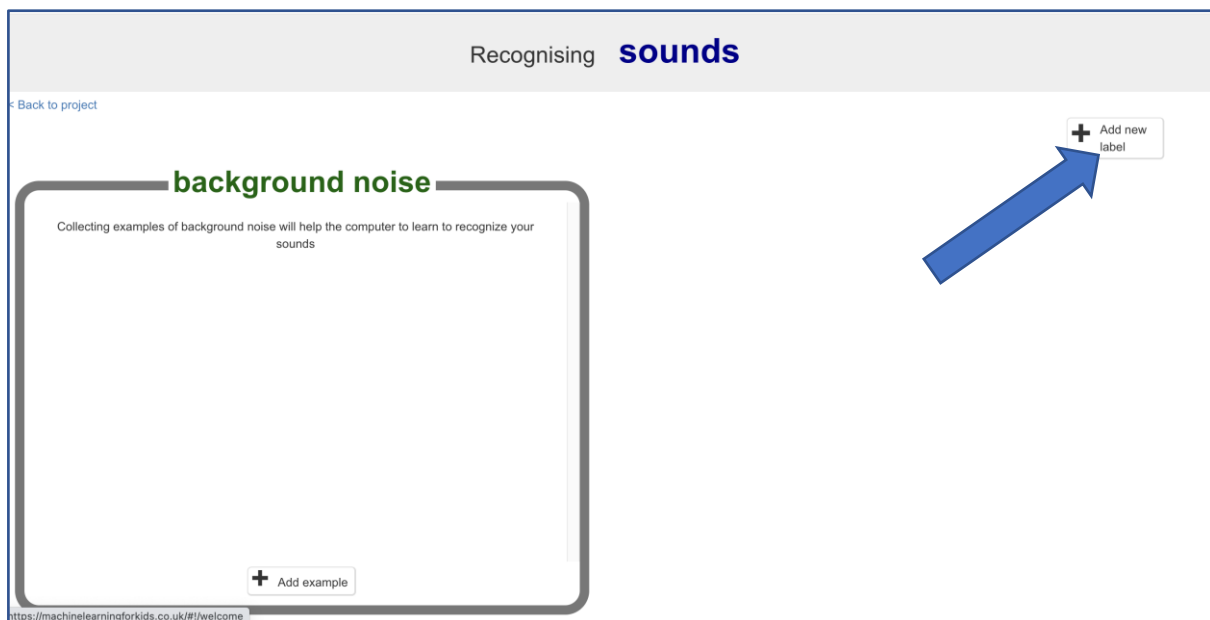
7. You should see “smart bulb” in your project list. Click it.



8. We will start by training the voice model. Click “Train”

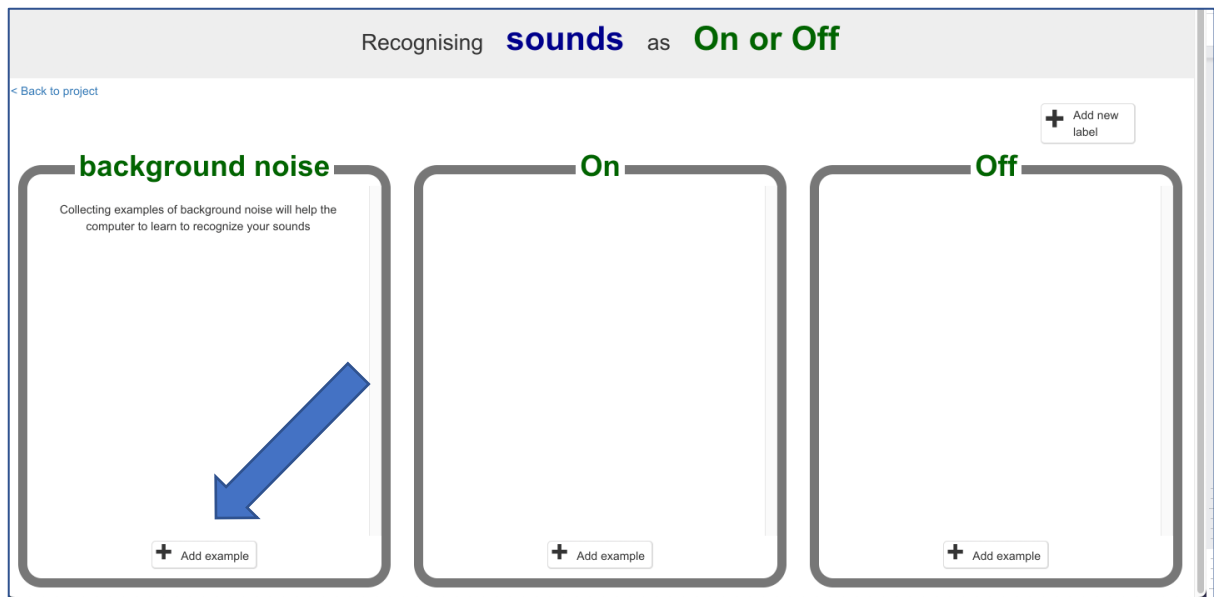


9. Click on “ + Add new label”

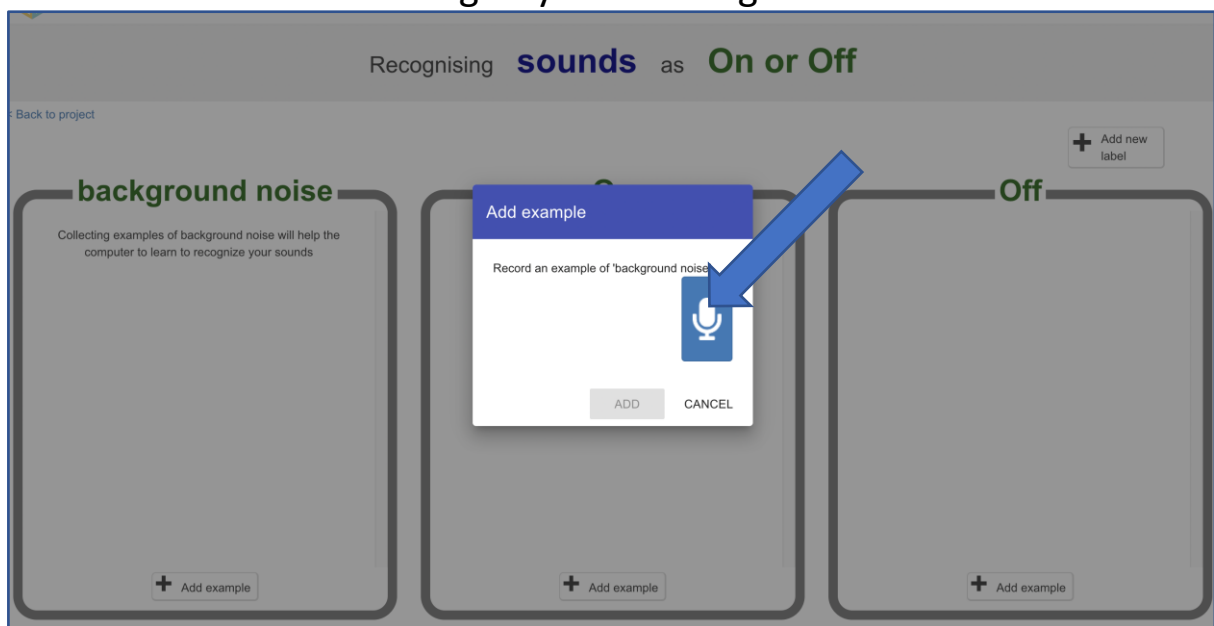


10. Enter “On” and create another label “ Off”

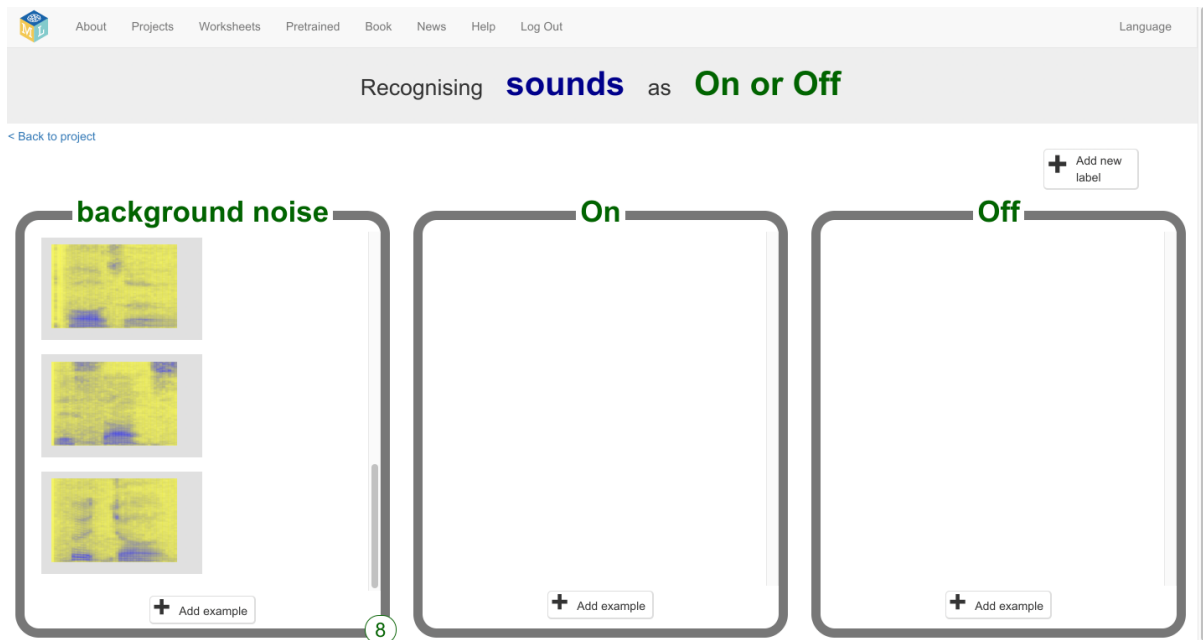
11. Click on “+Add Example” in the “background noise” bucket”



12. Click on the **microphone button** to record a sound clip, then click **“Add”** to add the recording to your training bucket

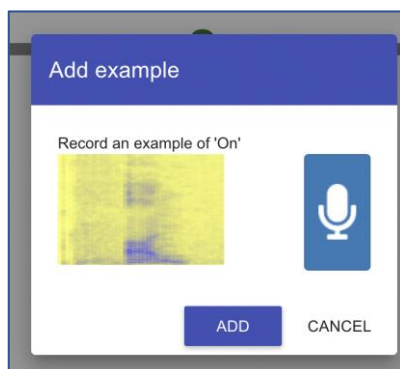


13. Repeat until you’ve got at least eight examples of background noise. Try and include a mixture of recordings of quiet, and recordings of you saying anything apart from “on” and “off”

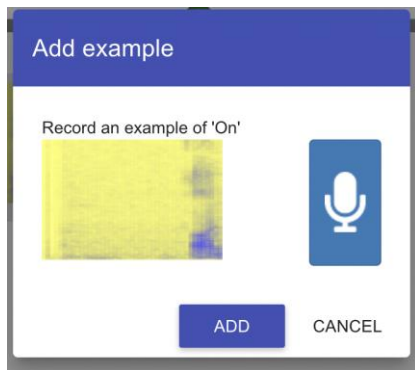


14. Click the “+ Add example” button in the “On” bucket.

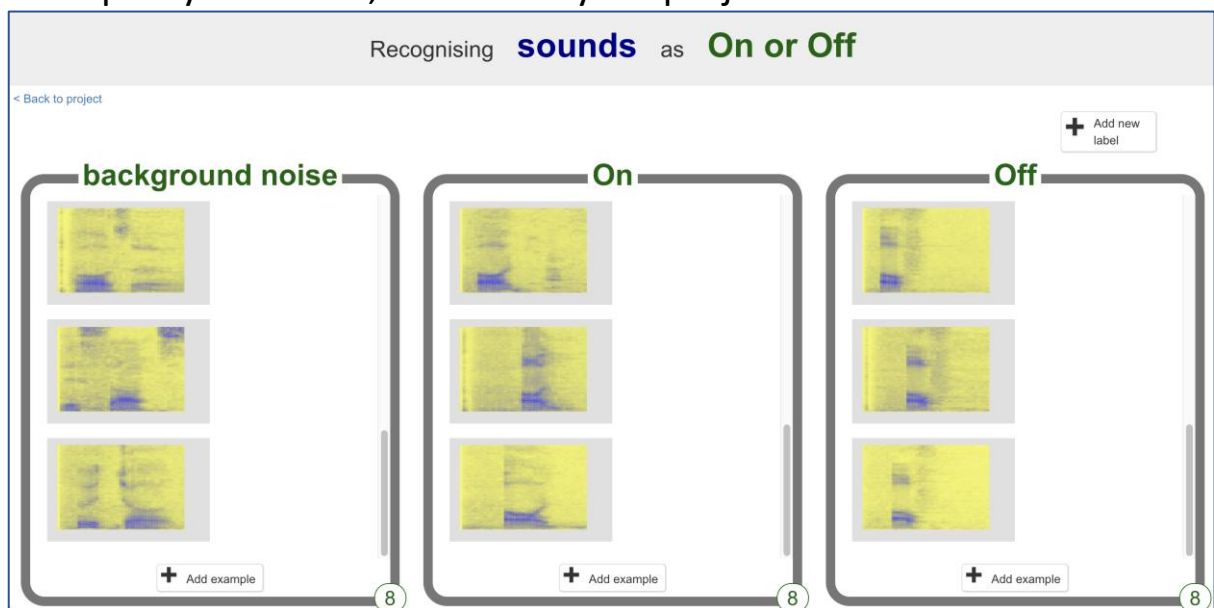
15. Click on the microphone and record yourself saying “On”  
Use the graphic of your recording to check that you’ve recorded all of it. If you look very carefully, you can sometimes tell where the word is.



Use the graphic of your recording to check that you’ve recorded all of it. An empty section at the start might mean you waited too long to start talking after clicking the microphone. Try to avoid that!

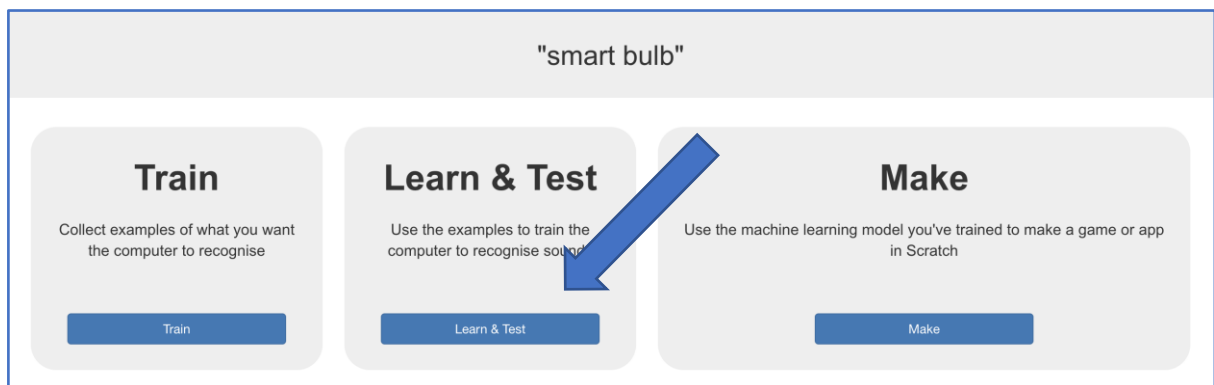


16. Collect at least eight examples in each buckets. The more examples you collect, the better your project should work.

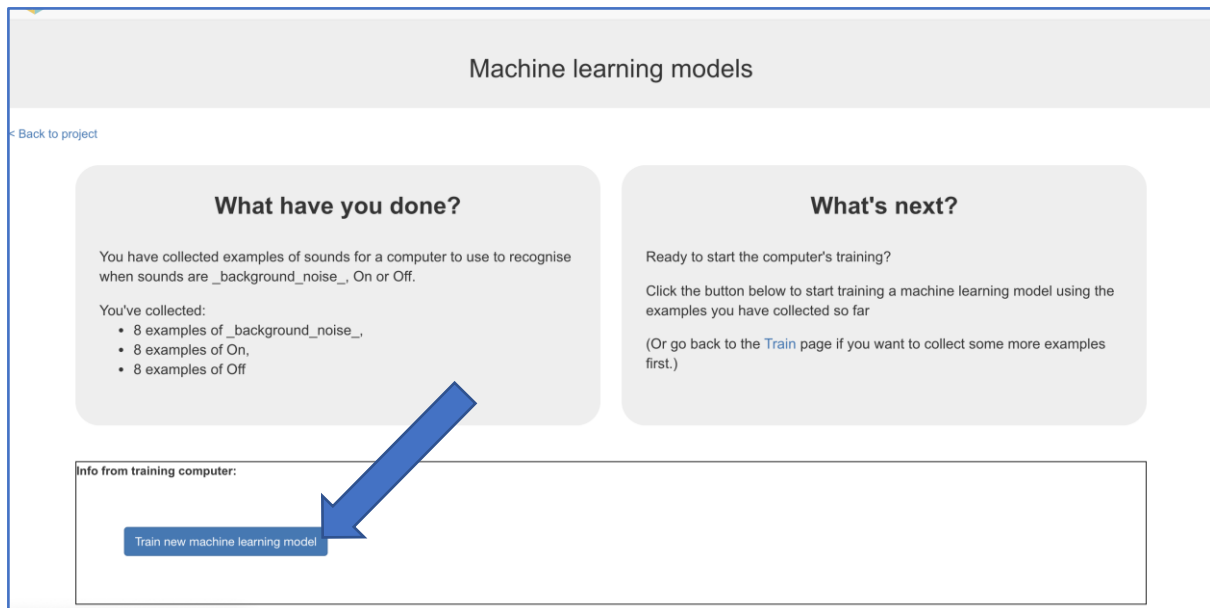


17. Click the “< Back to project” link in the top left.

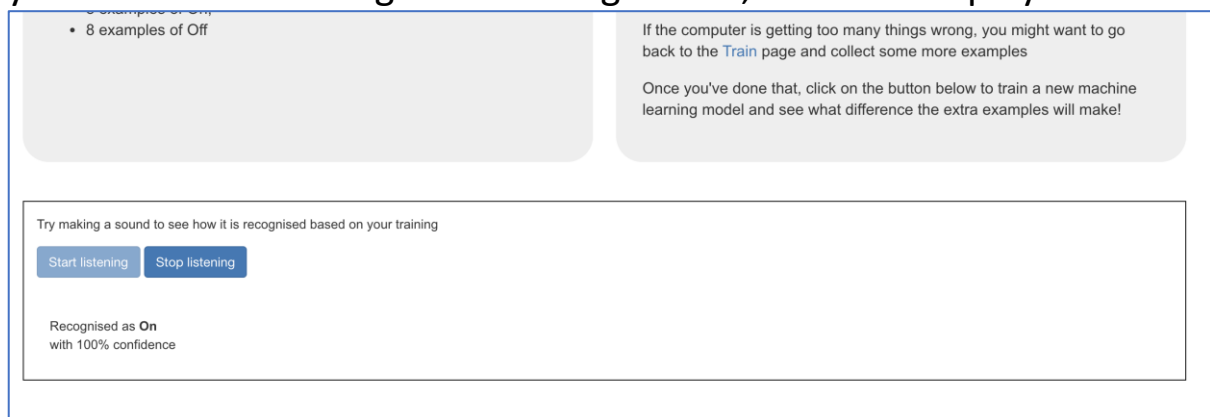
18. Click the “Learn & Test” button



19. Click on the “Train new machine learning model” button



20. Click on the “Start Listening” button. Try saying “On” and “Off”. If your machine learning model recognises it, it will be displayed below.



21. Decide if you need to do more training.

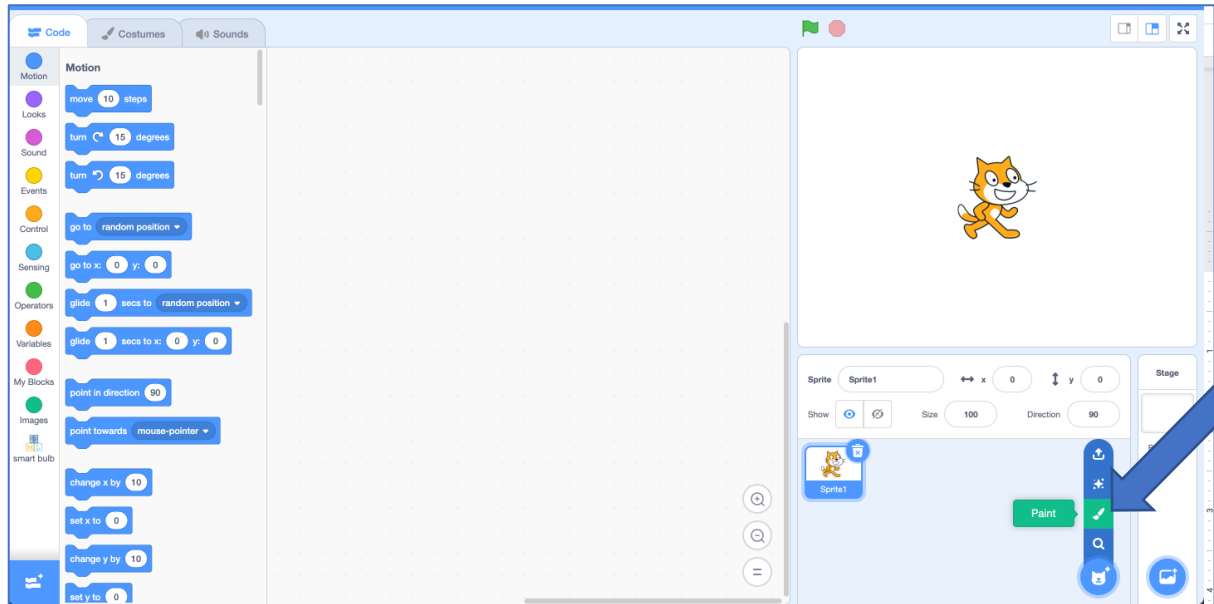
If your machine learning model thinks you’ve said “laser eyes” when you didn’t say it, that’s called a “false positive”. If your machine learning model doesn’t recognize when you say “laser eyes”, that’s called a “false negative”. If you see either of those problems, go back to the “Train” page and collect more training examples in both buckets. I found that my model worked okay after 15 examples in each bucket, and really well after 30 examples. Your results will be different! Test and see! When you think it’s working well enough, carry on to step 22.

22. Click on “<Back to Project” and click on the “Make” button.

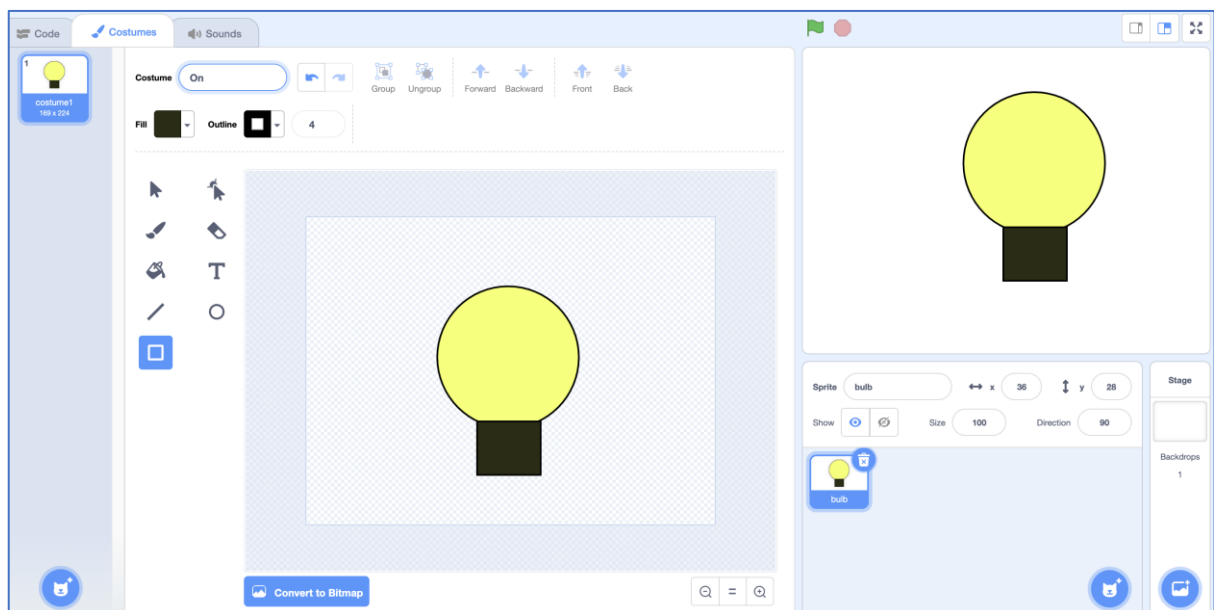
23. Click the “Scratch 3” button

24. Click the “Open in Scratch” button

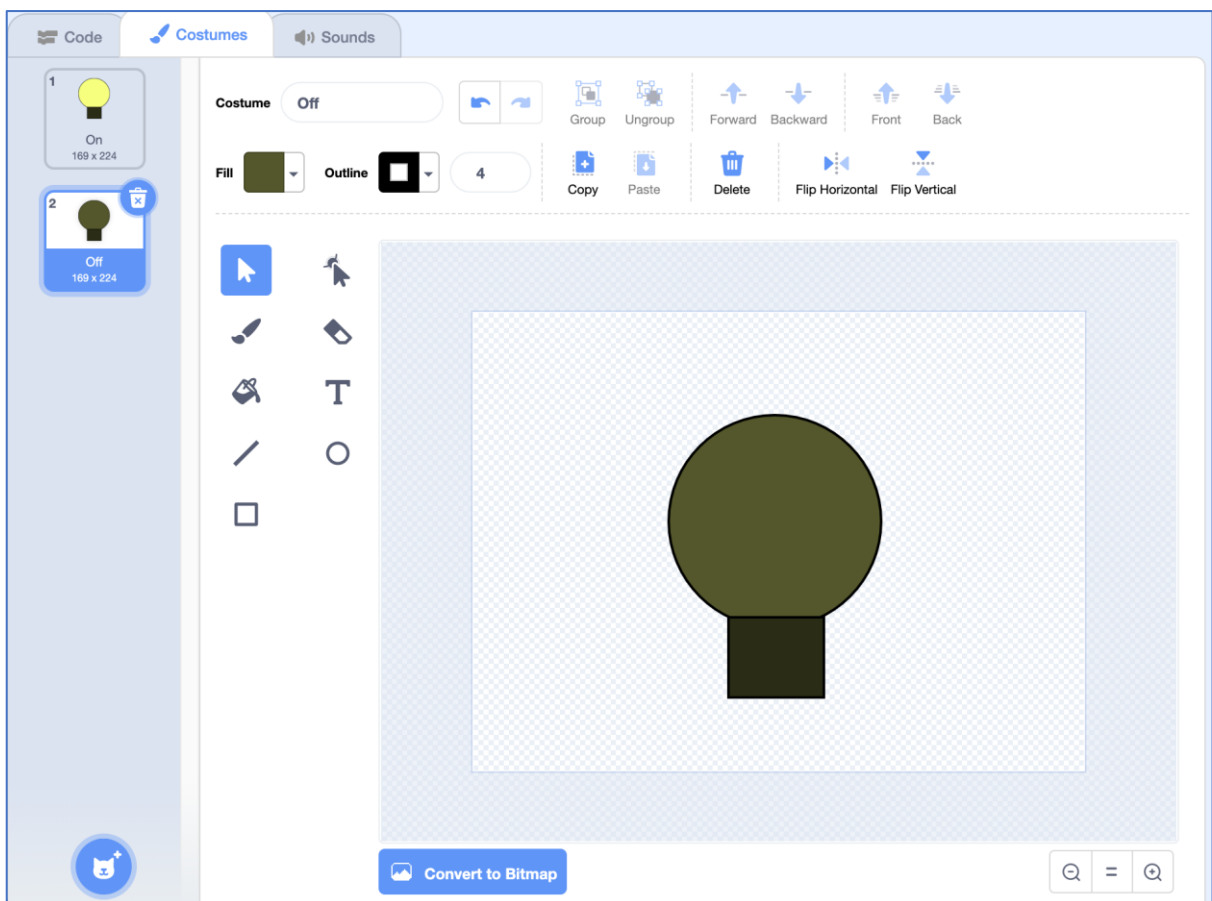
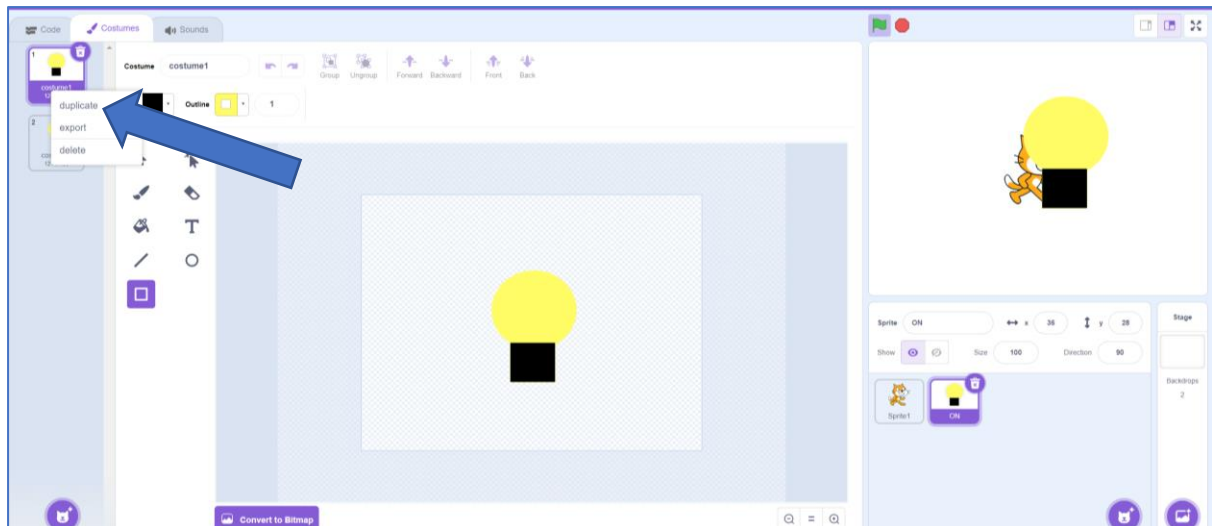
25. Click on the “paint” button to create a new Sprite name “bulb”



26 Create a new costume for the bulb named “On”

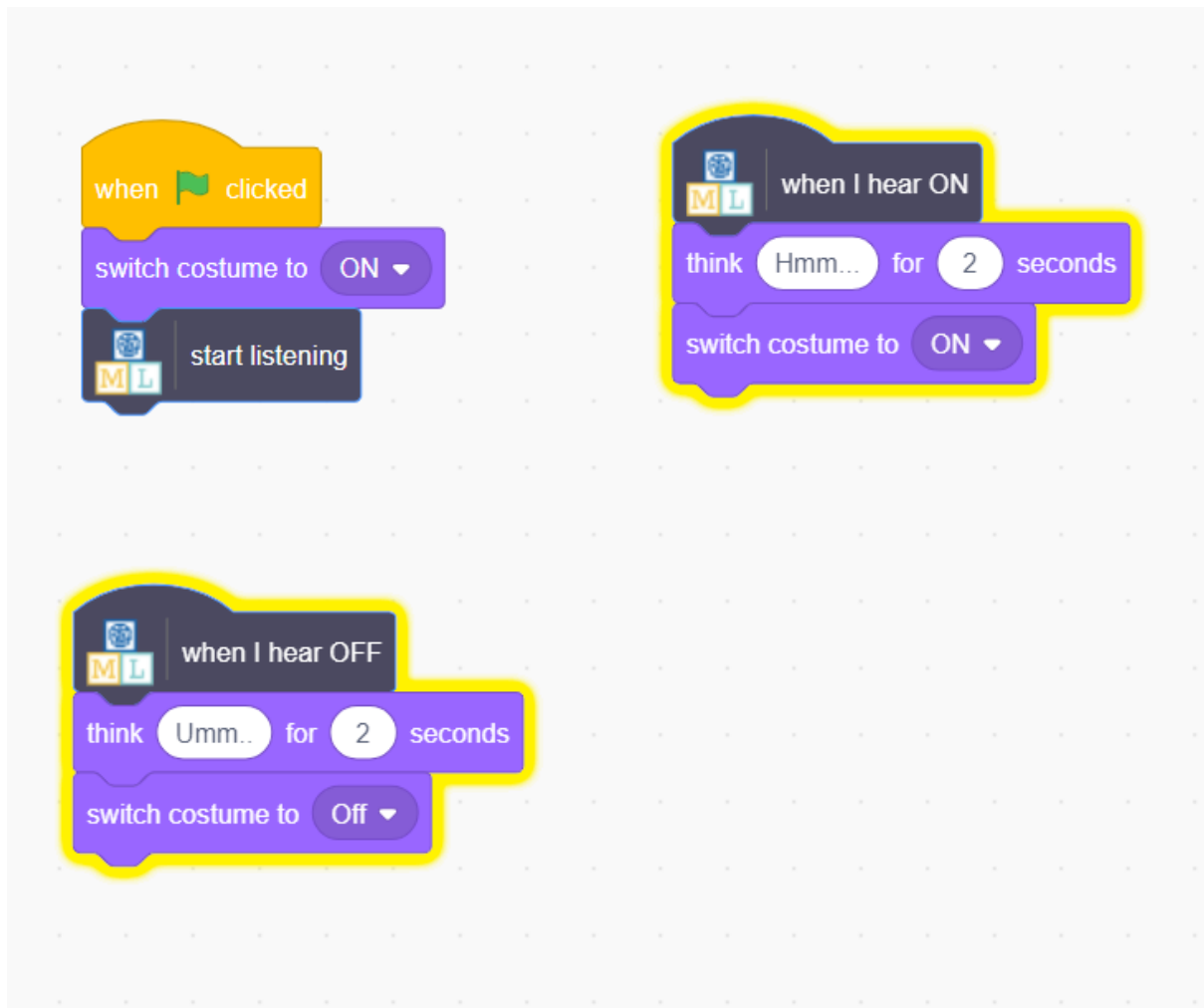


27. Create a second costume of a dark bulb name “ off”. You can duplicate “On” and rename it “Off”



28. Once the costume are done, build the following Script.





29. You have a simple working smart bulb.

## Advanced Session:

30. Now challenge your self to build a smart bulb that is has 3 brightness setting, and is dimmable by voice! Open to all creative ideas using NLP on *Scratch 3*.