Teachable Machine Keyboard

WARNING:
Machine Learning is very technical and very powerful, but it is not difficult if you follow these steps exactly! So, take your time and make sure you read the steps thoroughly.

1. Go to https://teachablemachine.withgoogle.com/train and click on **Image Project**

2. Click **Standard image model**

3. On the left you see **Class 1**, **Class 2**, these are going to be the different keys for our keyboard. Click on the little pencil after **Class 1** and rename it to **neutral**, then press **enter.** Neutral is going to be for when we don't want any key to be pressed.

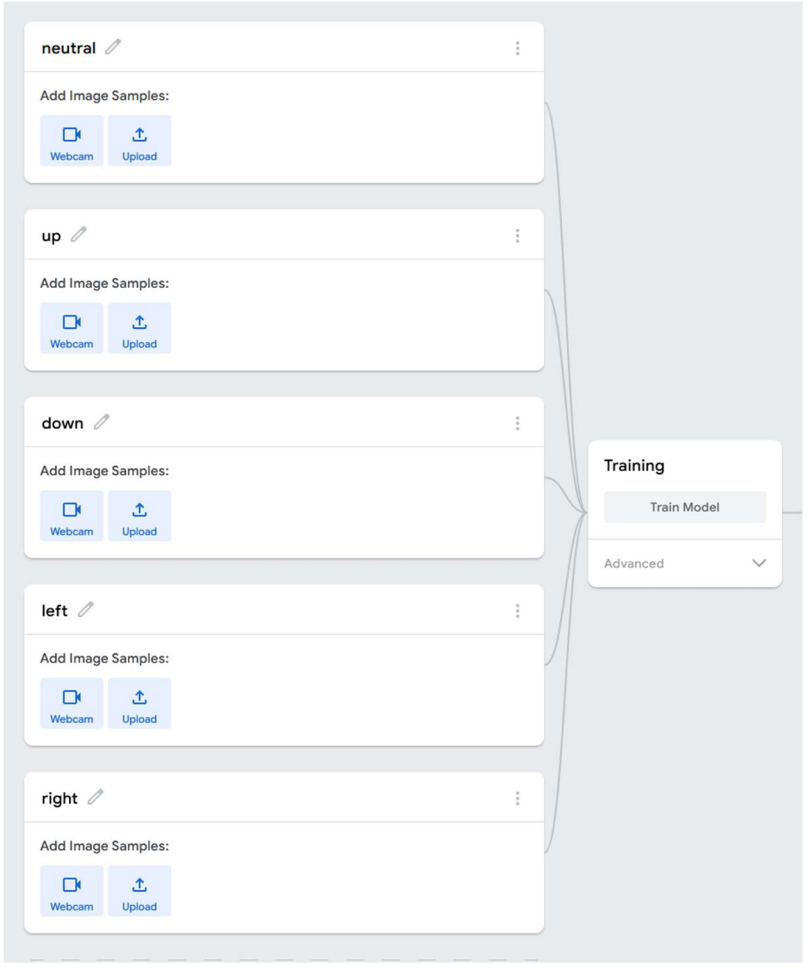
4. Rename **Class 2** to **up**

   NOTE: make sure you make the names exactly up and down, without capital letters, to prevent problems.

5. Click on **Add a class** at the bottom of the page. Rename **Class 3** to **down** and record your samples for the left key.

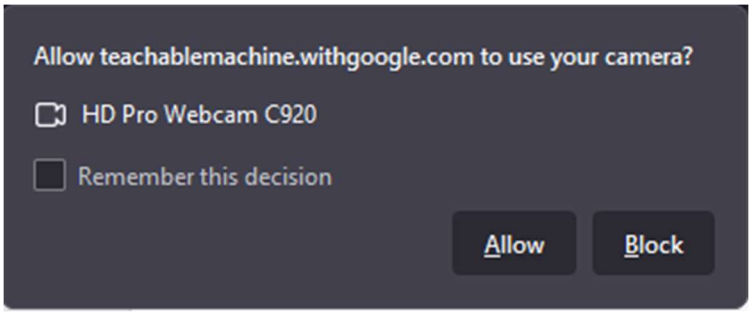
6. Do this twice more, but now for the **left and right** key.

7. The classes should now look exactly as in this picture



8. Below the **neutral** class, click on the **Webcam** button. A message will appear asking your permission to use the webcam, click on **Allow.**

   Note: the message might look different in your browser, but you must allow access to the webcam for this demo to work.



9. Once you see your webcam in the screen, you are ready to start recording for when you don't want any key to be pressed.
   Press and hold **Hold to Record** to record image samples. You should record around 100 samples, but a few more or less is no problem.

10. Now click on the **Webcam** button under the **up** class. Record your samples (again around a 100) for the down key. Make sure you choose something for this key that is very big and noticeably different from what you are going to use for the other keys. The bigger the difference, the better this will work!

11. Do the same for the other 3 keys.

Training

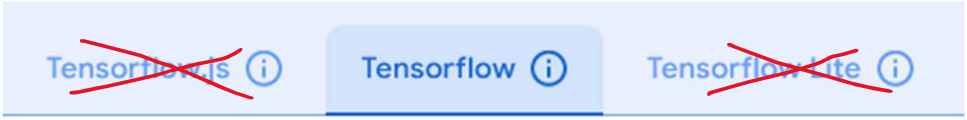
12. Now click on **Train Model**. This will take a few minutes, do not close the browser or go to another screen during this process.

13. In the **Preview** box, try out your model. If you are happy with the accuracy of the output, you can go on to the next step. If the prediction is not very good, you can either:
    a. Record more samples for one or more classes
    b. Remove all samples from a class by pressing the 3 dots next to a class name and record new samples
    c. Start over

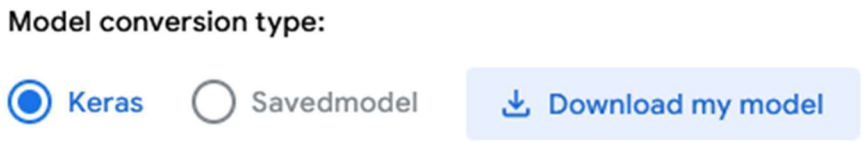
Only go on to the next step when the predictions are accurate!

Exporting

14. Click on **Export Model**, in the next screen click on **Tensorflow**.



15. Now click on **Download my model**



16. Again you will have to wait for a little bit while Teachable Machine does its magic. It might seem for a while like nothing is happening. After a few minutes the model will be downloaded to your hard drive.

17. Find the downloaded zip file on your computer and extract it. It will contain two files:
    keras_model.h5
    labels.txt

18. Copy these files into the folder that the teacher has prepared for you. The folder should already be open on your computer.

19. Close the **Export window** by pressing the X and turn off the Input in the **Preview** box. The little light next to your webcam should turn off.

Running

20. Double click the file called RUN, a command line window should now open and after a few seconds the webcam should turn on. Try to see if you can get all 5 words to appear: neutral, up, down, left, right.

21. In your browser, go to https://snake.onl . Go to **Settings**, scroll down, turn off **Border** and if you want you can turn down **Starting speed** as well. Scroll back up, return to main menu and click **New Game**. Hopefully you should now be able to play Snake with your own AI!

22. To stop the webcam running, go back to the small window that shows the webcam and press the Esc-key

23. If there is time left, you can also try to find other games online, like Pacman or Pong. You might have to re-train your AI to include different keys, if needed.

24. You can also try to create music! Sites like https://patatap.com/ or https://onlinesequencer.net allow you to play sounds with the keyboard, so they can also be used with our script!