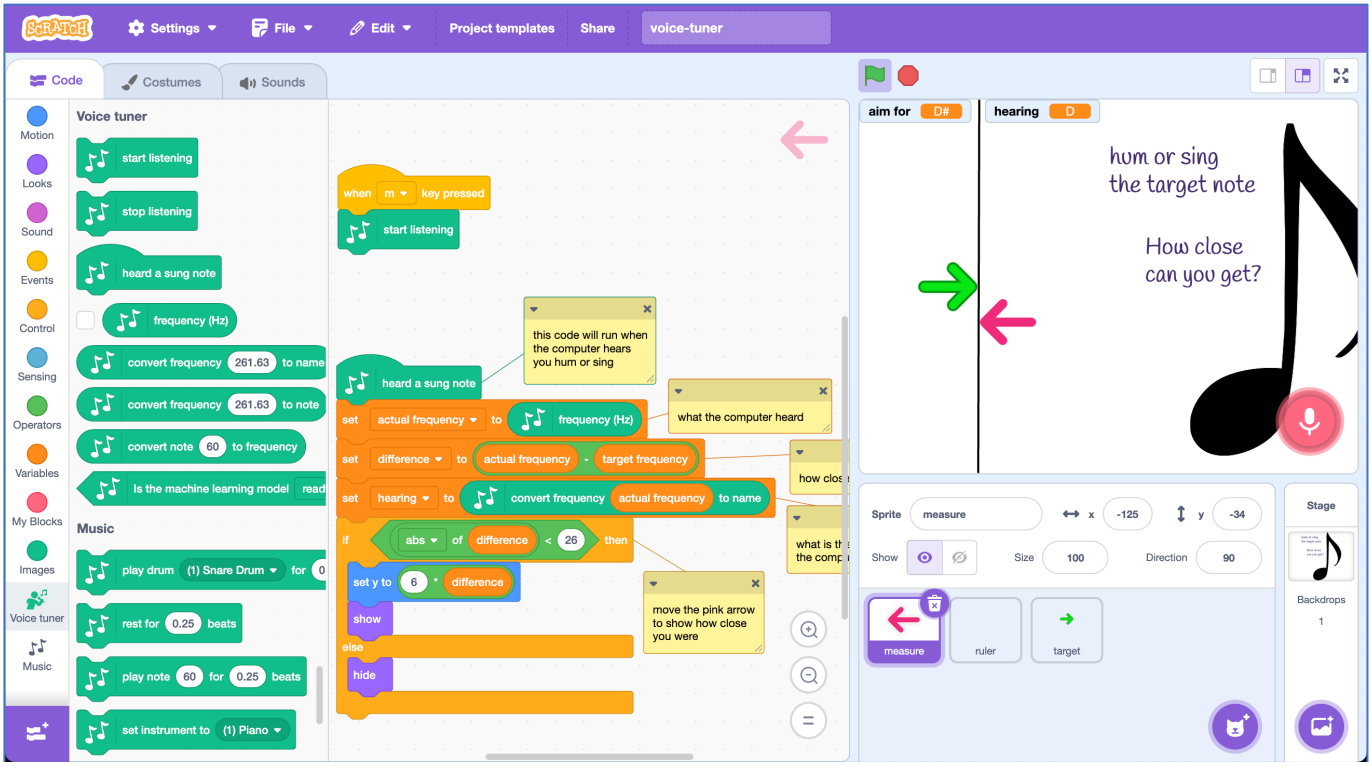
Voice Tuner

In this project you will use a machine learning model to recognise what note you are singing.



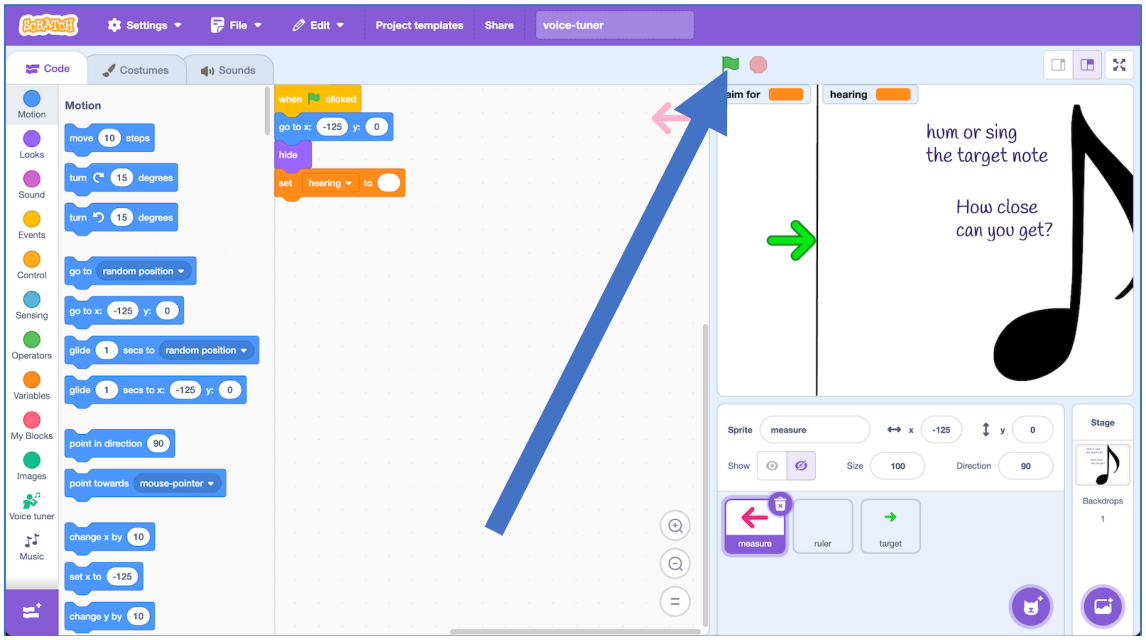
1. Go to https://machinelearningforkids.co.uk/scratch

2. Click on "**Project templates**"

3. Click on "**Voice Tuner**" and wait for the project to download

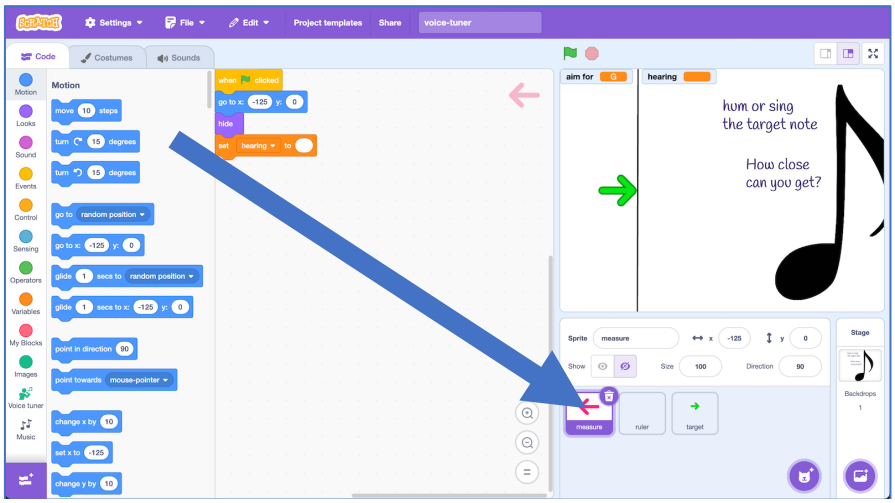
4. Click on the **Green Flag**

Scratch will choose a random musical note and play it to you. Your goal will be to hum or sing that note.



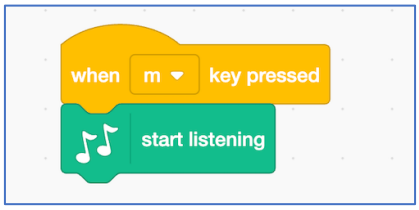
5. *If you want to see how the random note is being chosen and played, look at the code in the* **target** *sprite*

6. Click on the **measure** sprite



7. Create this code, so Scratch will start listening to your humming and singing when you press the **M** key on your keyboard

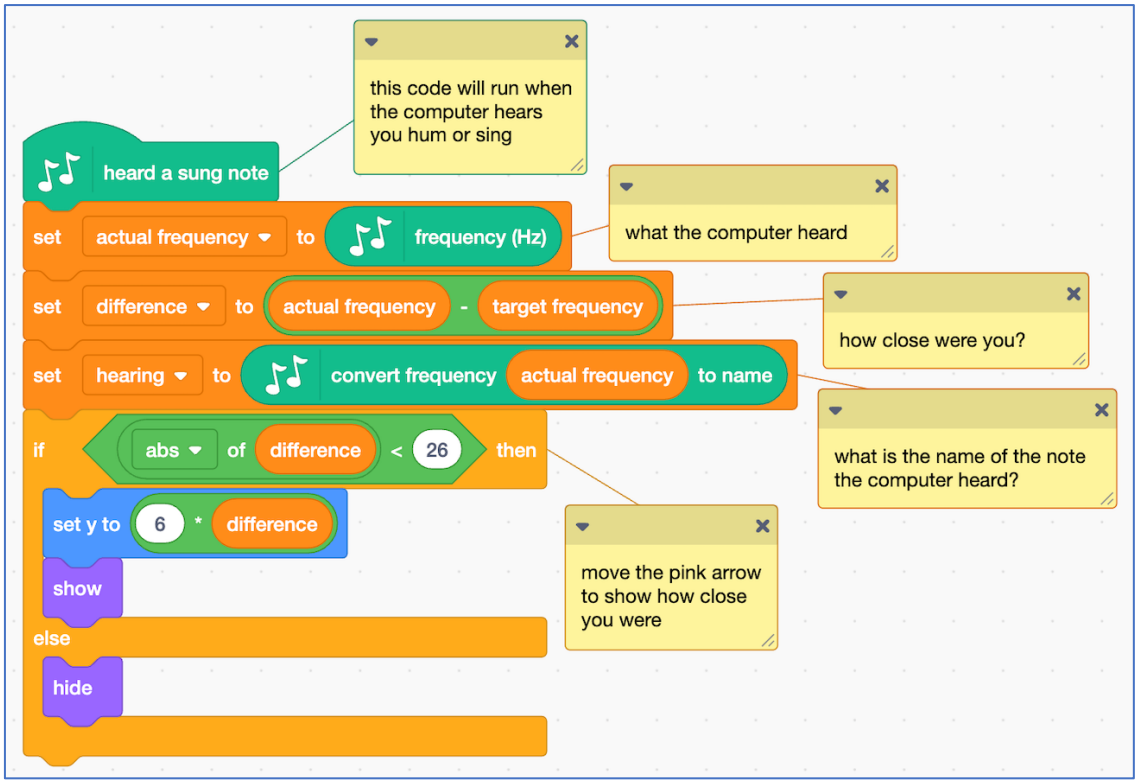
You can pick a different key if you like. I chose "M" for "Music".



8. Create this code

You don't need to add the comments.

The comments are in the screenshot to help you understand the code.



9. Give it a try!

Click the Green Flag to choose a new note and hear what it sounds like.

Press the **M** *key to start Scratch listening. Try to hum or sing the note.*

10. **How many** recordings of people's voices do you think were collected to train this model?

How do you think the recordings were collected?

Try to guess before you move on to the next step.

Write down your guesses to help you remember.

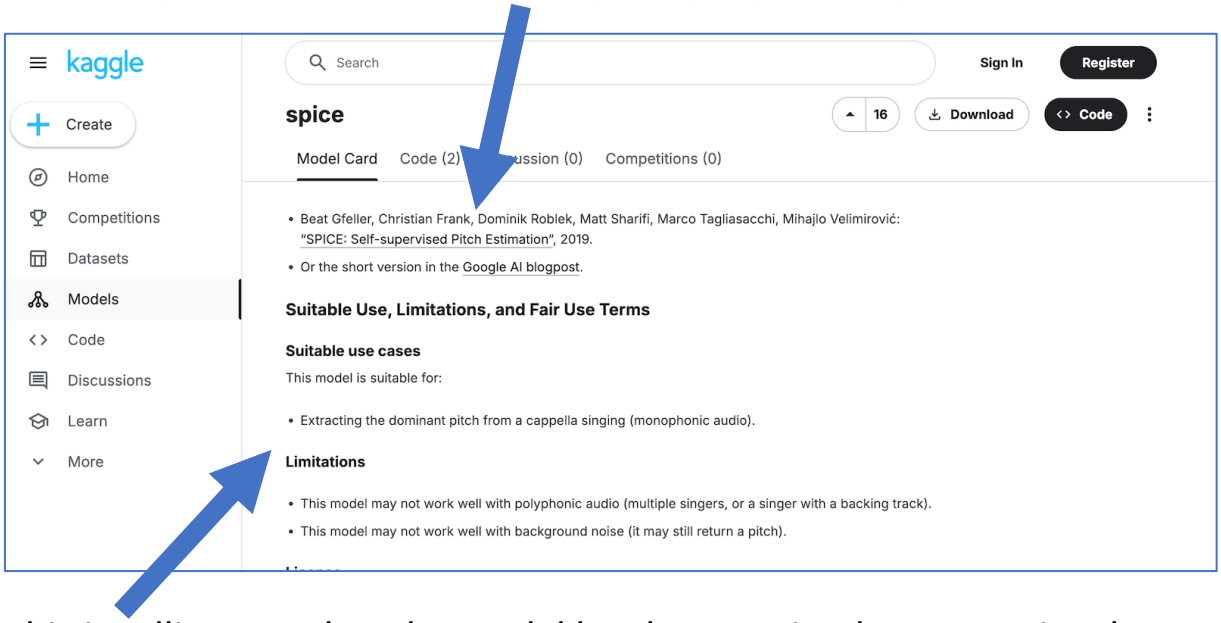
11. In a new web browser window, go to **https://ibm.biz/spiceml**

When we use a machine learning system, it is helpful if the creators of the system publish the "Model card" – where they tell you how it was created.
*The model you have been using is **SPICE**.*
This web page has the model card for this machine learning model.

12. Have a look at the model card

Model cards are complicated, so don't worry that you won't understand all of it. But there are some interesting things to find here.

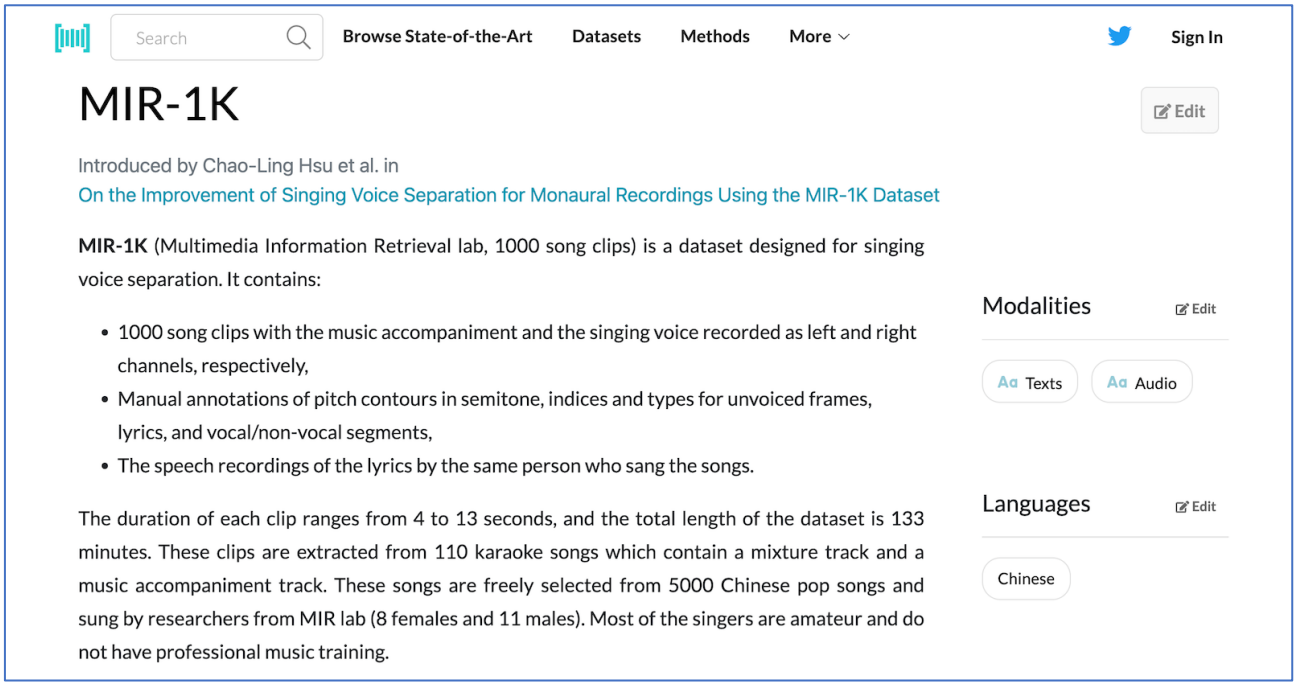
For example, here are the names of the people who first created it.



This is telling you that the model has been trained to recognise the note from the sound of a single voice, without background music.

This says how the model was trained, and what training data was used.

You can find information about the MIR-1k training set at https://paperswithcode.com/dataset/mir-1k



*This tells you that MIR-1k contains **one thousand recordings** of computing researchers singing Chinese songs in a karaoke!*

Compare that with your guess. Were you close?

What have you done?

You've been using a machine learning model to estimate the pitch of a human voice.

You've learned what a "model card" is. Not all artificial intelligence systems publish a model card, but it is a good practice that encourages transparency.

You have seen one way that the training sets needed to create real-world machine learning models are collected.

What else could you make with this machine learning model?