

Digital Skill

Think Like A Computer!



Train a machine to understand images! Students will create a program that allows them to create a machine learning model that will make their sprite show what hand gesture it sees on the computer's camera in real-time.

Skills

- Machine learning

Materials

- Computer with webcam
- Internet

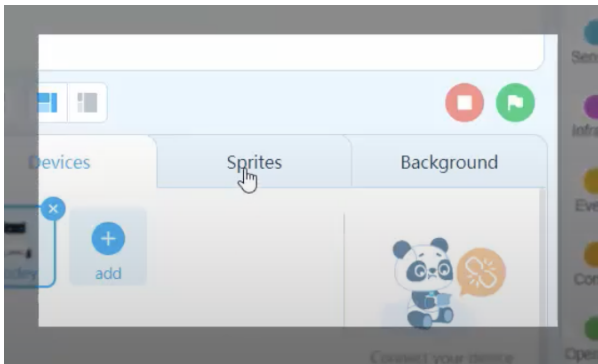
Setup

Have your laptop open to the mBlock website.

Content

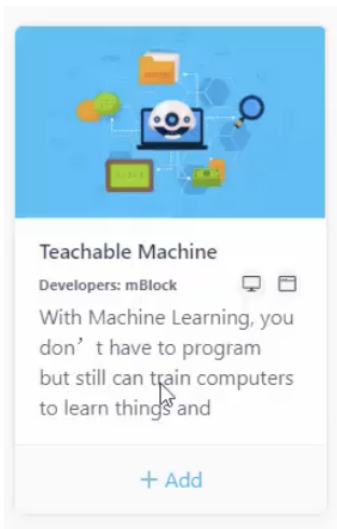
Step 1. In Google Chrome, I searched www.mblock.cc and I clicked “Create in the Browser”.


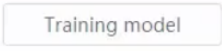
Step 2. This brought me to a new file, where I selected “Sprites” in the bottom left menu.



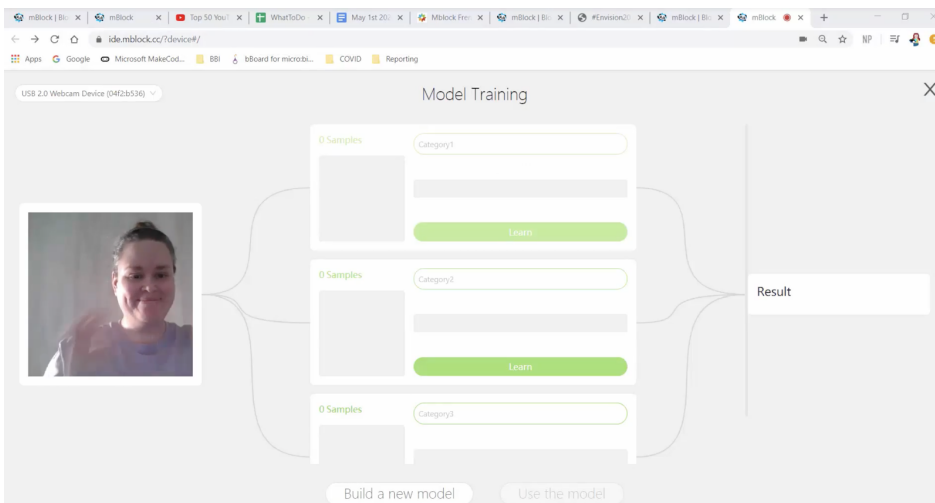
Step 4. Next, I selected ().

Step 5. I found the “Teachable Machine” extension and selected “+ Add”.



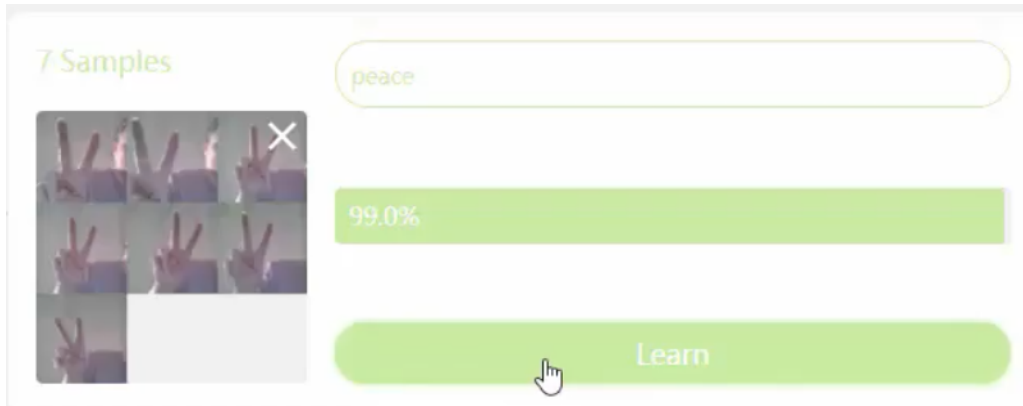
Step 6. Then I selected the new icon that appeared in the list of types of commands () and then selected ().

Step 7. This is where it gets interesting! My screen looked like this:



If this doesn't appear for you, check your Google Chrome settings and make sure that your computer "allows pop ups" and "allows camera". If these settings are set to "ask" then it won't work.

Step 8. Here I trained my computer to recognize a peace sign, a thumbs-up, and the heart sign.

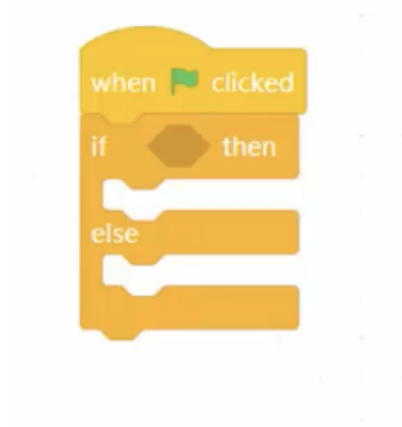


In the first category, I labelled it "peace" and clicked "learn" to take a picture of my hand making a peace sign and repeated that until I had at least 15 pictures of a peace sign. Each picture was slightly different. Slightly closer or farther, my hand slightly changing angles, etc.

Step 9. Next, I repeated step 8 for the other two categories " thumbs-up" and "heart".

Step 10. Once all three categories were labelled and had all of the pictures needed to train the machine, I clicked "Use the model". This brought me back to the regular mBlock screen.

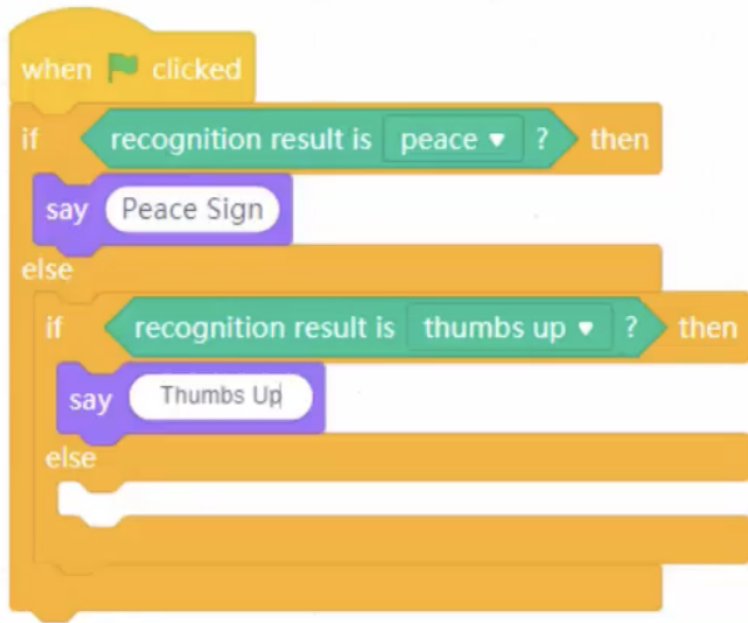
Step 11. This came time to start coding! I started with an event block and a “If...Then...Else” statement.



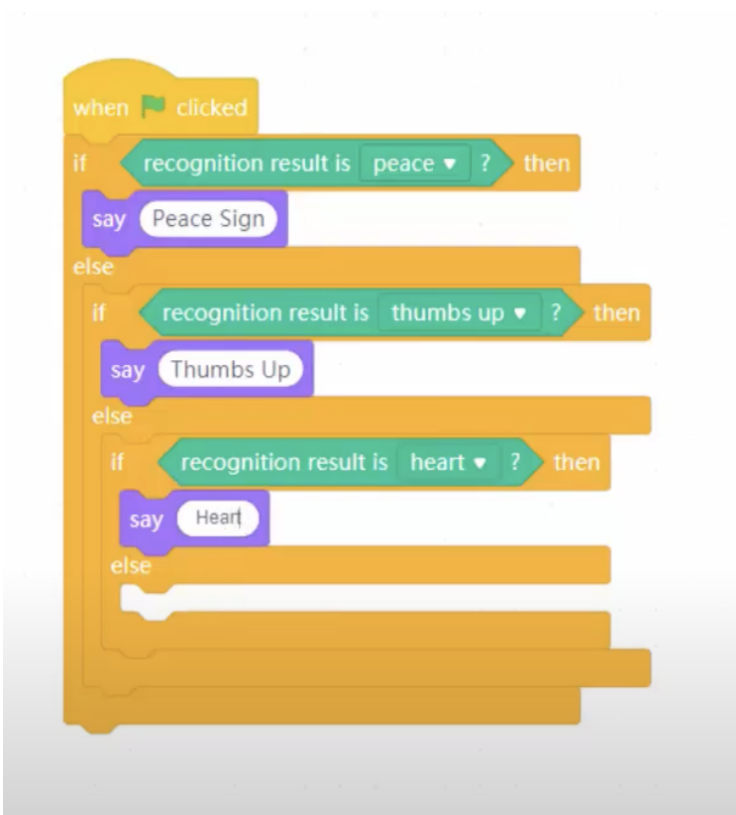
Step 12. Next, I used the “recognition result is [...]” block from the “TM” section and the “say [...]” block from “Appearances”. I made each blank space say “peace”.



Step 13. I dragged another “If...Then...Else” block into the else section of my code and repeated Step 12. This time I made the blank spaces say “thumbs up”.

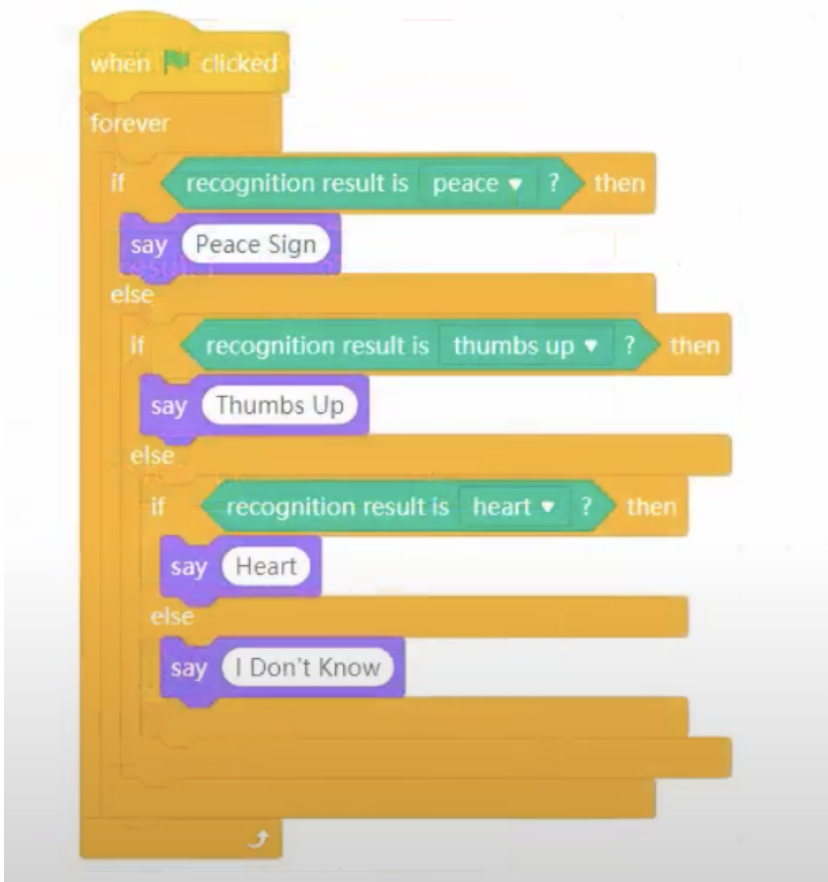


Step 14. I repeated Step 13, this time making it say “heart”.

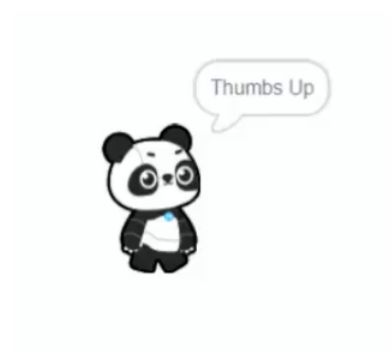
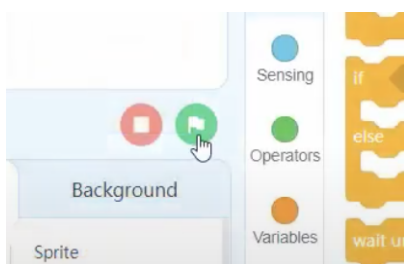


Step 14. For the last block of code, I put a “say [I don’t know]” block in the empty else section.

Step 15. For the last part of code, I put the entire block of code in a forever loop. This is my final code:



Step 16. To try out my code, I clicked the green and white icon of a flag and did a thumbs up to my computer camera.



Here's the final result:

Teachable Moments

Technology, Education, and Engineering

This activity is a great introduction to computer science as the students get to experience how our computers can 'learn' and distinguish traits.

Glossary

Machine Learning

An application of artificial intelligence (AI) that provides systems the ability to automatically learn and improve from experience.

Dichotomous Key

A tool that allows the user to determine the identity of items in the natural world, such as trees, wildflowers, mammals, reptiles, rocks, and fish.