



DUKE ENERGY SCIENCE NIGHT

Computer Vision

Big idea

Computers use data to find patterns which they can use to identify objects.

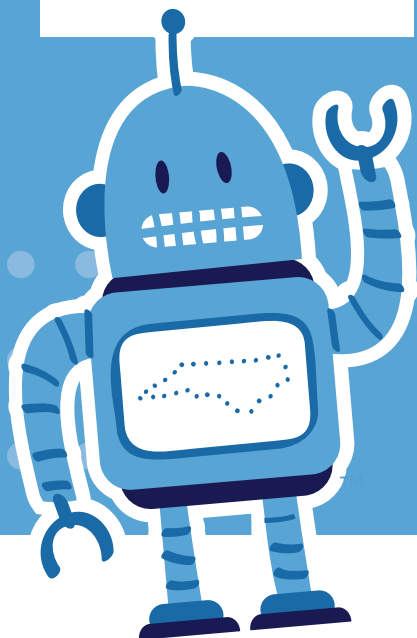
You will need

WHAT WE GAVE YOU:

- Computer Vision instruction sheet

STUFF YOU PROVIDE:

- a computer with internet access and a web cam
- 3-5 random objects such as pencils, pens, markers, cups, erasers - anything!
- different versions of the same object (e.g., pencils of different color and length)



Set it up

Place the Computer Vision instruction sheet next to the computer.

Sign in to the computer and use a web browser to navigate to this site: <https://teachablemachine.withgoogle.com/train/image>

Click the "webcam" button to ensure you can see an image; adjust computer settings as necessary. (Don't worry: recorded images are not sent to the internet!)

It's a good idea to go through the activity ahead of time in order to make sure you understand the instructions as well as anticipate any issues children may have.

It's showtime!

Encourage families to have fun training the "Teachable Machine" to recognize objects, faces, and hand gestures. Instructions are included for them to follow. The website has additional resources if families want to experiment with voice or pose recognition.

Families may have fun getting the computer to recognize different versions of the same thing - such as a yellow pencil versus a red one, or a short pencil versus a long one.

Can families train the computer to correctly identify three different groups of objects? What happens when you introduce a 4th item?

Fun options

HAND SIGNALS

Train the computer to recognize your hand making "rock, paper, and scissors".

EMOTION RECOGNITION

Train the computer to recognize your emotions by smiling, frowning, and looking excited.

Continued >



Computer Vision

If they love it

Challenge families to think broadly about how computers identify objects.

Could your program identify all kinds of dogs, for example?

How about different types of drink holders?

Try training the system to recognize sounds and poses as well!

Why is this science?

Computer Vision is a type of **Artificial Intelligence (or AI)** where people train a computer to recognize objects. Artificial Intelligence is a growing segment of Computer Science. These identification systems are used in law enforcement, at the grocery store, and as part of search programs, such as when you use Google to look for a picture.

North Carolina connection

North Carolina is home to many companies that use Artificial Intelligence in their everyday business. Did you see Watson the AI robot win at Jeopardy? That was built by IBM, which calls North Carolina home. Even our farmers are using AI to water and fertilize our crops more effectively. AI is part of our state's economic future!

This activity produced in partnership with:



North Carolina
School of Science
and Mathematics



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Computer Vision

Supplies:

- Computer with internet connection and webcam (you can also use your phone!)

Computer vision is a type of Artificial Intelligence where people train a computer to recognize objects. You can experiment with this!

What to do

1. Choose an object, such as a pencil, and hold it up so the camera can see it.
2. Click the Webcam button and HOLD to record many images. Be sure to move the object around so the computer can see it from many sides and angles.
3. Take at least 100 image samples, 200 is best!
4. Do this again for Class 2, use a different object like an eraser.
5. You can also add more classes by scrolling down the page and choosing Add a Class.
6. After you have at least two classes (3 or more is even more fun!), click Train Model.
7. Wait Patiently! The computer takes a minute to learn how to identify the objects you've taught it. Stay on the page.
8. When it says Model Trained, hold up one of your objects. Does it correctly identify your item? What happens when you try new items, like a different colored pencil?

Can you:

- Try hand signals and facial expressions?
- Have different people hold the objects?
- Move closer or further away?

Signed out?

- go to <https://teachablemachine.withgoogle.com/>
- choose Get Started, then Image Project.

