

HOW DO COMPUTERS SEE AND UNDERSTAND VISUAL INFORMATION?



In this lesson, students explore AI “under the hood” by learning how sensory information is converted into data and used for mathematical operations that make an AI “intelligent”. Students will learn that visual data has features like brightness, distance between parts of a face, etc. and is used in applications like face recognition. Along the way, students will be able to connect these technical processes to social consequences such as bias, and learn to treat AI with skepticism.

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Duration 60 minutes ▾

Lesson Objectives

After this experience, students will be able to

- Explain how sensory information is converted into data.
- Explain how bias influences these processes.

Questions Explored

In this experience, students will consider

- How is sensory information converted into data?
- How does AI use that data to make decisions?
- How does bias influence these processes?

Key Terms & Concepts

- data
- algorithmic bias

Materials

- Explorable: [How computers see](#)
- Explorable: [Erase your Face](#)

Lesson Experience

5 min

Introduction

Students Write-Pair-Share on the prompt: *Imagine your friend wants to draw a portrait of you, but they aren't able to see you or use a photograph. Write a list of directions for them to follow to draw your face. Be as detailed as you can.*

Teacher framing: *Many of you gave directions that included a ton of important details about your skin tone or the size and shape of your facial features. Today we're going to explore how AI turns some of these details into data in applications like facial recognition. We're also going to learn what problems this can cause.*

10 min

Warm up: How computers see

Let students play with the [How computers see](#) simulation and toggle the “How computers see” checkbox. Allocate some time afterwards to discuss what the numbers mean (brightness), and patterns between the pixel numbers and a face.

40 min

Erase your Face

5 min Introduce the [Erase your Face](#) article. Read the first two paragraphs as a class, then use the interactive “How Facial Recognition Works” section to do direct instruction on how AI converts visual information into numeric data.

15 min Have students work in pairs. Together they can read the rest of the [Erase your Face](#) article and play with the interactive “Try it Yourself” widget.

10 min After they read, instruct them to discuss (and take notes on) the guiding questions:

- The article says, “Some of us are only now realizing the role that face-tracking apps play in our everyday lives because our features are suddenly hidden behind masks all the time. The state of being “unseen” is hardly new for communities that algorithms consistently fail to recognize.” What do you think they mean by this?

- In the interactive “Try it Yourself” widget, what features do you think Amazon Recognition looked for?
- The article mentions how facial recognition might be misused in law enforcement. In what other areas do you think facial recognition might be misused, and how?

10 min Whole class debrief

5 min

Exit Ticket

Quick write: In your own words:

1. How is sensory information converted into data?
2. How does bias influence these processes?