Training AI Using Data

Lesson Video

Objective: *Students will be able to...*
- Understand and model how artificial intelligence is trained with data to make predictions.

Materials & Tools
- Ready-to-Go Slides or Teacher-led Slides (Spanish)

> **Computer Science Explanation**
> Artificial Intelligence (AI) refers to the development of computer systems that can perform tasks typically requiring human intelligence, such as learning, reasoning, problem-solving, and decision-making.

Lesson Preparation
- Share the Interactive AI Training Model and Interactive AI Chatbot activities with students if you would like them to complete them individually.
- This hour of code lesson provides multiple opportunities to explore AI. Decide if you would like to model the AI tools, which activities you would like students to use, or if you would like them to choose their own exploration activity.
- Print this Completion Certificate for students.

Vocabulary

Word	Definition
Artificial Intelligence	The simulation of human intelligence processes by machines, especially computer systems
Machine Learning	Part of AI focuses on the use of data and algorithms to imitate the way that humans learn, gradually improving its accuracy
Data	A collection of information gathered by observations, questions, or measurements

Lesson Agenda

- What is AI (10 mins)
- Training an AI Model (5 mins)
- Using a Chatbot (10 mins)
- Coding with Auto Draw (15 mins)
- Exploring AI Tools (15 mins)
- Closing (5 mins)

Lesson Details

What is AI (10 mins)

Explain to students that AI is all around us. Ask students if they have heard of AI. Have students discuss what AI is and share examples with a partner.

- List different real-world examples of AI such as an Alexa or Siri. AI is self-driving cars, cell phone face recognition, and movie recommendations on streaming services. Explain to students that doctors use AI to diagnose patients based on medical scans, like X-rays. Movies use AI while video games use AI to act as opponents or nonexistent players. Tell students that astronauts can use AI models to detect planets outside our Solar System.

Training an AI Model (5 mins)

This section explores how computers learn and make choices.

- Share the AI Training Model Interactive Activity with students to demonstrate how you can train a computer to predict and make assumptions about similar items in the future. Students will be sorting items into trash or recycling bins.
- Reflect on the activity explaining that the more examples we give the robot, the more accurate it will be.

Using a Chatbot (10 mins)

Describe what a chatbot is and ask if students have ever used a chatbot. Share this Chatbot Interactive Activity chatbot activity with students.

- As a class, discuss ways to safely use a chatbot and see if students would add anything else to the list.
- The program works by using lists to store what questions and answers Scout knows.
- If Scout knows the answer, Scout will respond. If not, Scout will ask how to respond next time. Type the response you want Scout to say and click the check mark.

Common Challenges and Questions

Question/Challenge	Answer
When I ask Scout a question Scout is asking how to respond.	If Scout doesn't have the prompt on the prompt list, Scout will ask how to respond in the future. Scout will add the prompt/response to the list. If you ask the same question again, Scout should answer correctly.
What can I ask Scout?	You can program Scout to respond to statements like a conversation or questions.

Coding with AutoDraw (15 mins)

- Share the Auto Draw link with students. Students will use Auto Draw to create their own image.
- Auto Draw uses machine learning to produce what you're drawing. Have students download or save their drawings.
- Add the drawing into Scratch, and let students animate their drawing.

Common Challenges and Questions

Question/Challenge	Answer
What if Auto Draw doesn't predict what I'm trying to draw?	I found that the more details I added, it got closer to predicting what I wanted to draw. You may have to scroll through the predictions to find the drawing you're trying to create.

Exploring AI Tools (15 mins)

There are 4 additional AI tools for students to explore. Decide if you want students to have access to all 4, or choose just one.

- Pre-Programmed Teachable Machine example: this AI model is trained to recognize the voices of CodeHS mascots. Make different sounds to test. Students may have to give permission to their microphone.
- Face Sensing- Scratch Lab: Make animated costumes and games that interact with your face. Students may have to give permission to use their camera.
- Teachable Machine: a fast and easy way to create machine learning models. You can train a computer to recognize your images, sounds, and poses.
- Quick Draw: Check out Quick Draw to help with machine learning research. See if the computer can guess your drawing!

Common Challenges and Questions

Question/Challenge	Answer
Can I upload my own Quick Draw prompts?	No, Quick Draw will provide 6 random drawing prompts. If you don't like the prompt, you can start over to get new prompts.

Closing (5 mins)

If time permits, give students time to showcase what they created during the exploring AI tools section with a partner. With a partner or as a class discuss what student's favorite AI tool they explored today is, and why.

Resources

- [Auto Draw](#)
- [Pre-Programmed Teachable Machine](#)
- [Face Sensing- Scratch Lab](#)
- [Teachable Machine](#)
- [Quick Draw](#)

Assessment Rubric

Category	4	3	2	1
	Advanced: demonstrates superior performance	Proficiency: demonstrates consistent performance	Moving toward proficiency/expectations	Experiencing significant difficulty
Understand and model how artificial intelligence is trained with data to make predictions.	Student successfully draws and animates a character. Student explores the chatbot, AI training model, and 1 additional exploration tool.	Student successfully draws and animates a character. Student explores the chatbot and an AI training model.	Student successfully draws and animates a character. Student explores the chatbot or an AI training model.	Student needs significant support to animate their auto draw character.

Scratch is developed by the Lifelong Kindergarten Group at the MIT Media Lab. See http://scratch.mit.edu.