ReadyAI - Elementary School - Grades 4-6
Demonstration Lesson: Meet Cozmo

Essential Question

What can AI units recognize?

Summary of Lesson
The ReadyAI program focuses on learning AI through creating a project. So, it is important that students understand the AI capabilities of the tools. As a demonstration, this lesson allows the teacher and the students to explore and experiment with one key AI component: facial recognition. The teacher will explain how facial recognition works, show how it works with Cozmo, and allow students to program their faces into him. The lesson will conclude by asking students to imagine practical, real-life applications for facial recognition.

Objectives
Students will be able to
- Contrast AI vision from robotic vision
- Program Cozmo to recognize their faces
- Brainstorming applications for facial recognition

Agenda
- Warm-up (10 minutes)
- Teacher Presentation (15 minutes)
- Guided Practice (20 minutes)
- Student Production (10 minutes)
- Cool down (5 minutes)

Assessment
Demonstration of Learning
- Students can program basic functions of Cozmo

Classroom Discussion
- Student-generated ideas of AI applications

Oral Responses
- Student can explain how they might use AI facial recognition

Written Responses
- Students create a brainstorming map (see Handout 0.1)
- Students complete the formative worksheet (see Handbook 0.2 and 0.3)
- Students complete the summative mastery quiz (see Handout 0.4)

Tools and Materials
- Cozmo and connected device such as a tablet, laptop, or phone (2-3 students per device)
- Projector linked to device with Cozmo app or to a computer to share the PowerPoint Presentation
- Demonstration Lesson PowerPoint
- Pencils (1 per student)
- Handouts 0.1 - 0.4
  - Handout 0.1
  - Handout 0.2
  - Handout 0.3
  - Handout 0.4
    - Answer Key
- Teacher Resources 0.1 - 0.3

Connecting to Prior Knowledge
- What is a robot?

Support
If you have any question about the lesson plan, please contact info@ReadyAI.org

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Teaching Guide

Warm-up (10 minutes)

Teacher begins class by asking, "What is a robot?"

- Using Handout 0.1 or a whiteboard, if available, teacher may add student ideas to a mindmap such as
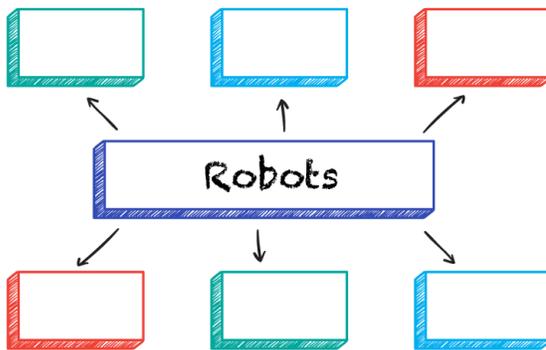
Teacher then uses the PowerPoint to show two contrasting videos to encourage student enthusiasm:

Car Factory - Kia Sportage factory production line (Video 0.1, 1:48)
Teacher asks students what students saw in the video.
Teacher may choose to write down ideas visually for students.

Teacher then shows second video.
Waymo's fully self-driving cars are here (Video 0.2, 2:47)
Teacher asks students what students saw in the video.
Teacher also asks how what students saw was different.

Teacher may differentiate between robots seeing and AI recognizing.

Teacher Presentation (15 minutes)

1. Teacher introduces Cozmo
   - Teacher identifies Cozmo's parts
     - Treads
     - Lift
     - Camera and Head

Teacher resources:
Teacher may use Handout 0.1 if no whiteboard is readily available.

For an explanation as to the differences between AI and robots, see Teacher Resources 0.1

Demonstration Lesson PowerPoint

Check for understanding:
What did the AI in the car so that the factory robots producing cars could not do?

Transition:
What makes Cozmo more than just a robot?

Teacher resources:
For walkthroughs on programming the facial recognition software in the Cozmo App, see the Demonstration Lesson PowerPoint.

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2. Teacher then states, "Many technologies can 'see,' including webcams and the camera on cell phones. But what makes AI special?"

3. Teacher introduces shares Cozmo app through connected projector or using Demonstration Lesson PowerPoint for visuals. Teacher shows students the "Meet Cozmo" function within the Cozmo app.

4. Using the Cozmo app, the teacher shows the students how to scan their faces in Cozmo.

5. After Cozmo "recognizes" the teacher's face, the teacher shows what can be done using that recognition function of AI. (See Teacher Resource 0.2 for ideas.)

6. After communicating how to program facial recognition and sharing some possible tools to use such AI technology, the teacher asks, "Do you want to program Cozmo to recognize you?"

For other functions that use facial recognition technology that a teacher may share with the class, see Teacher Resource 0.2.

Check for understanding:
What is one function that separates an AI robot from any other piece of technology?

Transition:
Do you want to program Cozmo to recognize you?

Guided Practice (20 minutes)

Teacher distributes Cozmos and connected devices to the class. Teacher also distributes Handout 0.2. Teacher asks students to check off items they can complete from the list.
Alternatively, teacher may orally prompt students to complete tasks.

Teacher also prompts students to add new items to Handout 0.2 in the blank spaces, indicating what further applications, including in CodeLab, they attempted with Cozmo.
Alternatively, teacher may ask students at the end of the guided practice to indicate what further applications they attempted with Cozmo.

After approximately 15 minutes, or as needed, teacher asks students to pack up Cozmo and connected devices.

Lesson Extension:
1. (15-20 Minutes) As an additional activity, the teacher may prompt students to drive Cozmo using the Explore function on the app. For resources on this functionality, please see Teacher Resources 0.3.

2. (5 Minutes) Teacher may use videos from Ready AI's YouTube page to demonstrate recognition functionality:
   a. AI-in-a-Box Tutorial 1: Visual Recognition of objects & custom markers (WAICY 2018)

Teacher resources:
Handout 0.2 provides a guided walkthrough of how to program facial recognition and other key features students can test out during the guided practice phase of the lesson.

Reference Teacher Resources 0.3 for ideas to teach the "Explore" mode. Students will get a greater sense of what Cozmo "sees" and what he "recognizes."

Check for understanding:
Who can walk me through the steps for programming facial recognition?

Transition:
Now that you have identified one function of AI, we are going to think big picture and imagine real world uses for these functions.

Student Production (10 minutes)

Teacher begins by saying, "Imagine if I did not have to take attendance. Instead, an AI unit recognized everyone who came in to class and when they arrived. It would save me a lot of time each day that I could use to teach you more. Here is one usage of AI facial recognition."

Teacher then prompts students to think of other practical applications of AI facial recognition.

Teacher provides approximately 8 minutes for students to brainstorm their ideas and document them using Handout 0.3.

Optional activities & materials:
1. (10-15 Minutes) With multiple Cozmo and connected device sets, teacher can encourage competition to recognize faces before other students. See Teacher Resource 0.4 for pictures of famous people and seeing which group of students can program the AI unit to recognize the faces most quickly.

    Teacher says that the first group to set up kit and complete survey to completion will win a prize. (Teacher may determine an appropriate prize for motivation, i.e. stickers, badges on the AI Passport bonus points, candy, etc.)

2. Teacher may test AI units by holding pictures in front of each unit to see if it recognizes the individuals.

3. After the brainstorming session, the teacher may provide the following videos as examples of projects that students produced. If teacher chooses to apply Lesson Extension #2, teacher may ask students what they need in order to produce said project idea(s). WAICY 2018 Winning Team Project - Team 25C "Baking Companion"

4. Teacher may highlight how the winning project not only recognized faces but also emotions.

5. If further time is needed, teacher may prompt students to brainstorm ideas for emotion recognition instead of just facial recognition.

Lesson Extension:
1. Students present all their ideas to the class.
2. For longer classes, teacher may present students with arts and crafts objects and encourage students to begin crafting their best project ideas for facial and/or emotional recognition.

Teacher resources:
Handout 0.3 provides a mind map for students to fill out with practical ideas for facial recognition in day to day life. The example of using AI to take attendance in the classroom is preloaded.

Check for understanding:
Students can generate 3-5 AI applications and (if teacher chooses) orally present them.

Transition:
What uses are there in the world for facial (and emotional) recognition?

Closure (5 minutes)

Teacher may assign summative assessment ([Handout 0.4](#), [Answer key](#)) or ask students to submit brainstorming work.

Alternatively, teacher may pose some of these questions:
- What did you learn?
- What would you like to learn?
- What uses are there for facial recognition?
- What uses are there for emotional recognition?
- What other abilities do you think Cozmo has?

Check for understanding:
Have students share their thoughts on AI approachability and functionality.