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Tech Articles

AI for Oceans

Scheduled to be taught on 12/10

Standards

8.1A Grade 8 CPI 1, Demonstrate knowledge of a real world problem using digital tools.
8.1A Grade 8 CPI 3, Use and/or develop a simulation that provides an environment to solve a real world problem or theory.
8.2B Grade 8 CPI 1, Evaluate the history and impact of sustainability on the development of a designed product or system over time and present results to peers.

21st Century Themes

*Global Awareness

21st Century Skills

*Critical Thinking and Problem Solving
*Communication and Collaboration

Interdisciplinary Connections

Science, Language Arts

Technology Integration

code.org, AI, Coding

Goals and Objectives

Students will be able to:
Discuss the role artificial intelligence plays in their lives.
Train and test a machine learning model.
Reason about how human bias plays a role in machine learning.

Learning Activities or Instructional Strategies

Purpose: This tutorial is designed to quickly introduce students to machine learning, a type of artificial intelligence. Students will explore how training data is used to enable a machine learning model to classify new data. Students should have a positive experience during the tutorial and more importantly should be motivated to keep learning computer science.

Tutorial:First students classify objects as either "fish" or "not fish" to attempt to remove trash from the ocean. Then, students will need to expand their training data set to include other sea creatures that belong in the water. In the second part of the activity, students will choose their own labels to apply to images of randomly generated fish. This training data is used for a machine learning model that should then be able to label new images on its own.

Warm Up: Motivate: Explain to students the goals of today's activity. They are going to start using a new tool that will let them train a real machine learning model, a form of artificial intelligence.
Watch the first video together: It will give important context around artificial intelligence and machine learning. Watch it as a class and debrief afterwards to help students build connections to the content.

Activity: Tutorial
Level 1 - Machine Learning Video (we will watch this as a class and discuss the first question on their activity guide together)
Levels 2-4 - Train AI to Clean the Ocean. To program A.I., use the buttons to label an image as either "fish" or "not fish". Each image and label becomes part of the data used to train A.I. to do it on its own. Once trained, A.I. will attempt to label 100 new images on its own, then present a selection that it determined have the highest probability of being "fish" based on its training. Students who consistently label things correctly should see an ocean full of different types of sea creatures, without much (or any) other objects.
Level 5 - Training Data & Bias
Levels 6 - Using Training Data. Students will teach A.I. about a word of their choosing by showing it examples of that type of fish. As before, A.I. doesn't start with any training data about these labels. Even though the words in this level are fairly objective, it's possible that students will end up with different results based on their training data. Some students may even intentionally train A.I. incorrectly to see what happens. If students are

reflecting on how machine learning works, it should be encouraged!
Level 7 - Impacts on Society
Level 8 - Teach A.I. a new word. Students will use training data to teach A.I. to recognize different types of fish. The words in this list are intentionally more subjective than what students will have seen so far. Encourage students to decide for themselves what makes a fish look "angry" or "fun". Two students may choose the same label and get a very different set of results based on which fish traits were their focus. Encourage students to discuss their findings with each other or go back and choose new words. Each student will rely on their own opinions to train A.I. which means that A.I. will learn with the same biases held by the students. As students begin to see the role their opinion is playing, ask them to reflect on whether this is good or bad, and how it might be addressed.
(Lesson Plan based off of code.org curriculum)

Differentiation

This activity can be done in partners so that students who are lowered leveled can be helped by higher leveled students. Students can also work at their own pace or work in small groups with the teacher.

Resources Provided

https://code.org/oceans
Activity guide

Assessments

Students will be assessed on their participation throughout the activity. They will also be assessed through discussion and cooperation. Students will be filling out an activity guide that details questions that we as a class have discussed during the activity, this activity guide will help the teacher understand if the students understand what machine learning is, the big picture and the problems/ issues with machine learning and AI.