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New Jersey CSPDWeek

This material is based upon work supported by the National Science Foundation under Award No. 2607763.

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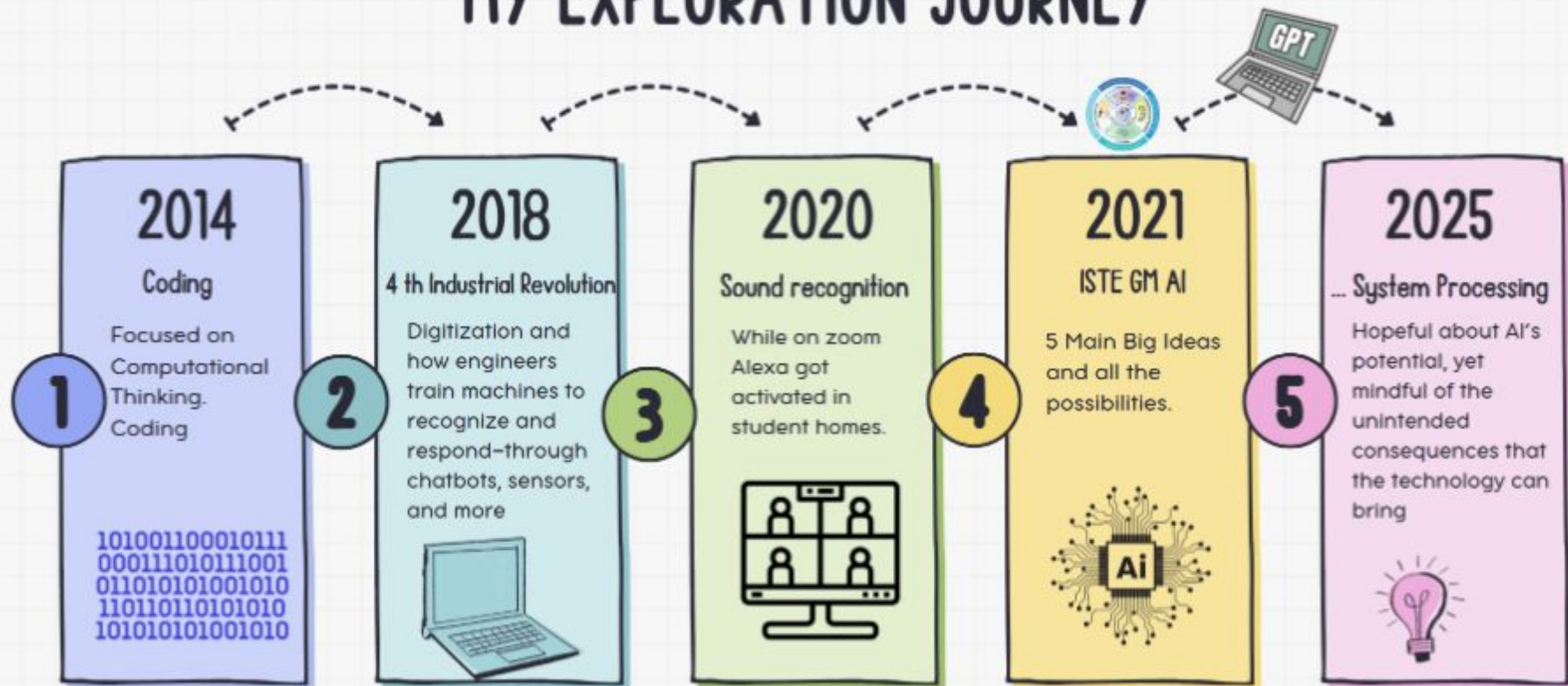
AI Literacy in Elementary and Middle School

By Michelle Velho

New Jersey CSPDWeek

This material is based upon work supported by the National Science Foundation under Award No. 2607763.

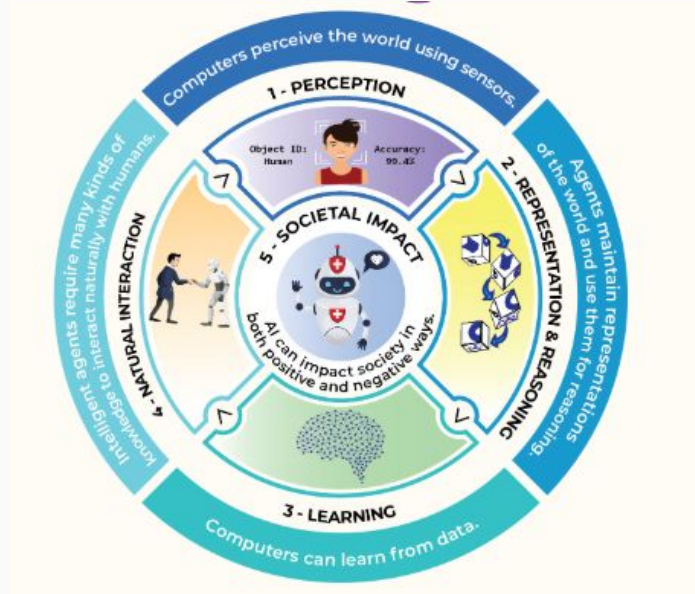
MY EXPLORATION JOURNEY



<https://tinyurl.com/yedhkvhn>



AI4K12: Five Big Ideas in AI

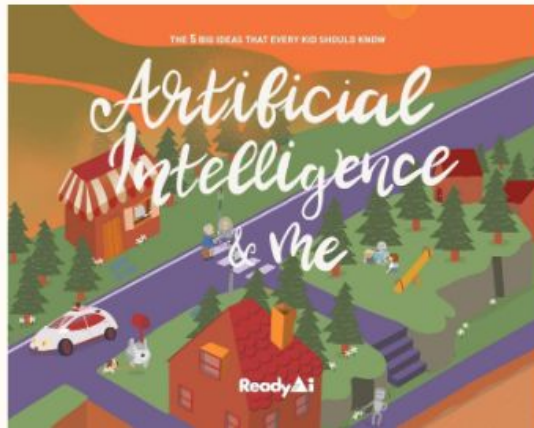


<https://ai4k12.org/>

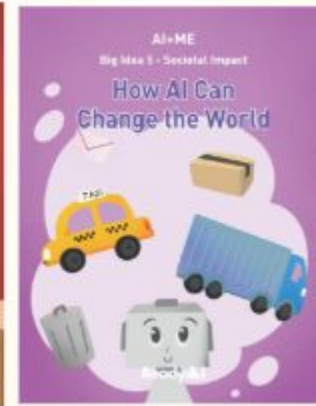
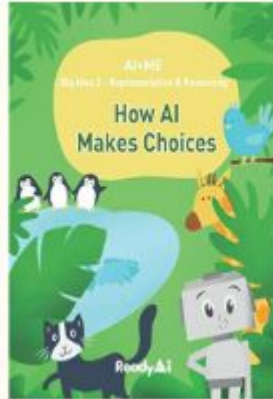
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AI & Emerging Technologies



Human-Centered Design



Inclusive Collaboration



History of Computing



Career Exploration





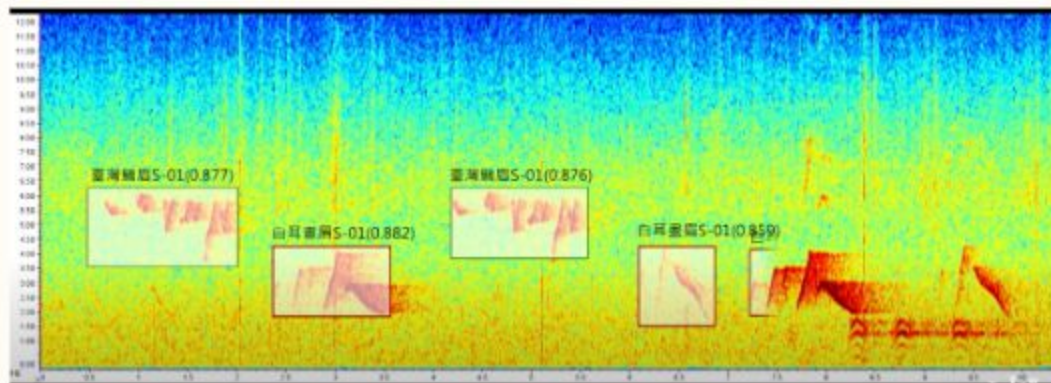
Exploring our Senses

What Are Senses?

Senses help us understand the world around us.



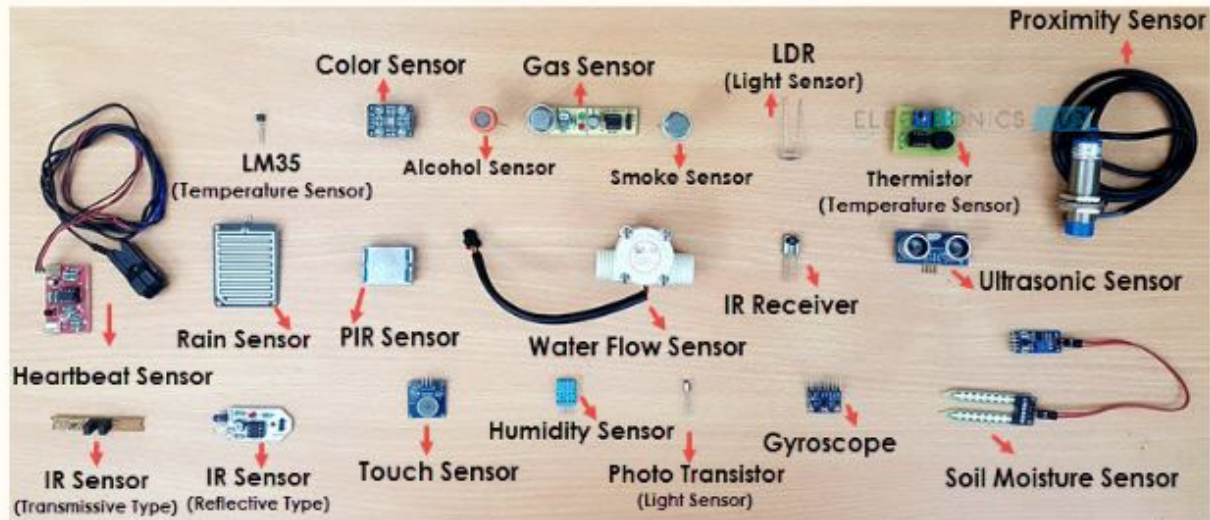
Cilic - AI sound detection tool





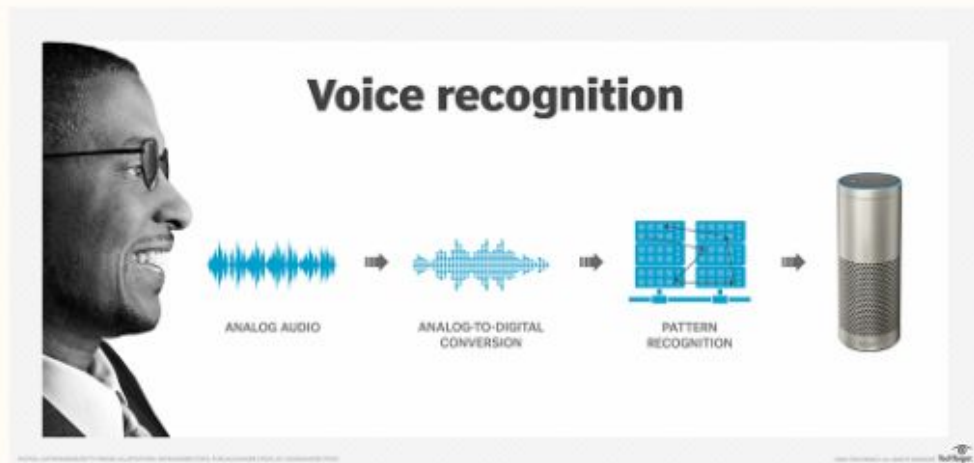
Big Idea #1

Computers perceive the world using sensors.



What is Sound Recognition?

- Technology that identifies and processes sounds using algorithms and machine learning models.
- Example: Voice assistants like Siri or Alexa use sound recognition to understand commands.



"Voice Recognition and Speaker Recognition." *TechTarget*,
www.techtarget.com/searchcustomerexperience/definition/voice-recognition-speaker-recognition.

Healthy Or Ill?

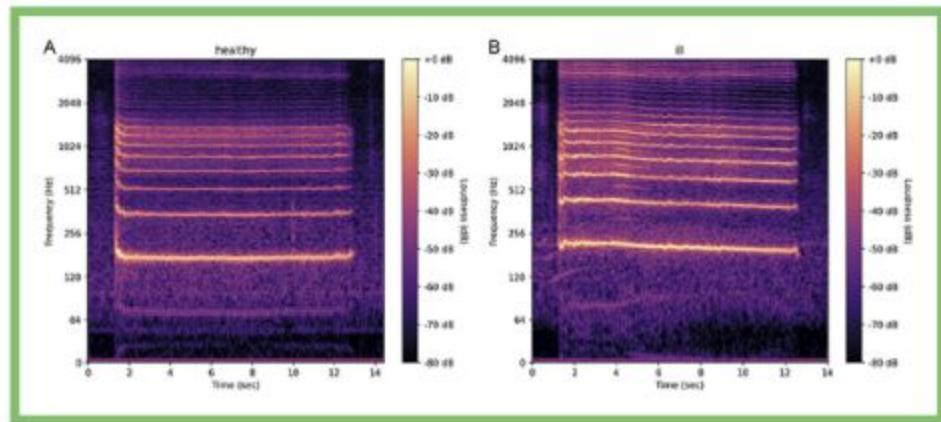


Figure 2 - Spectrograms from (A) a healthy person and (B) an ill person show the loudness (measured in decibels; dB) for each frequency (measured in Hertz; Hz) present in the voice over time. Both spectrograms illustrate the production of the vowel *a* for about 12 s. The produced vowel is represented by the light parallel lines. The more the lines are blurred/distorted, or the more additional light components exist in between the parallel lines, the rougher the vowel sounds. Can you see the differences?

The Voice of the Body: Why AI Should Listen to It ?

Should it?

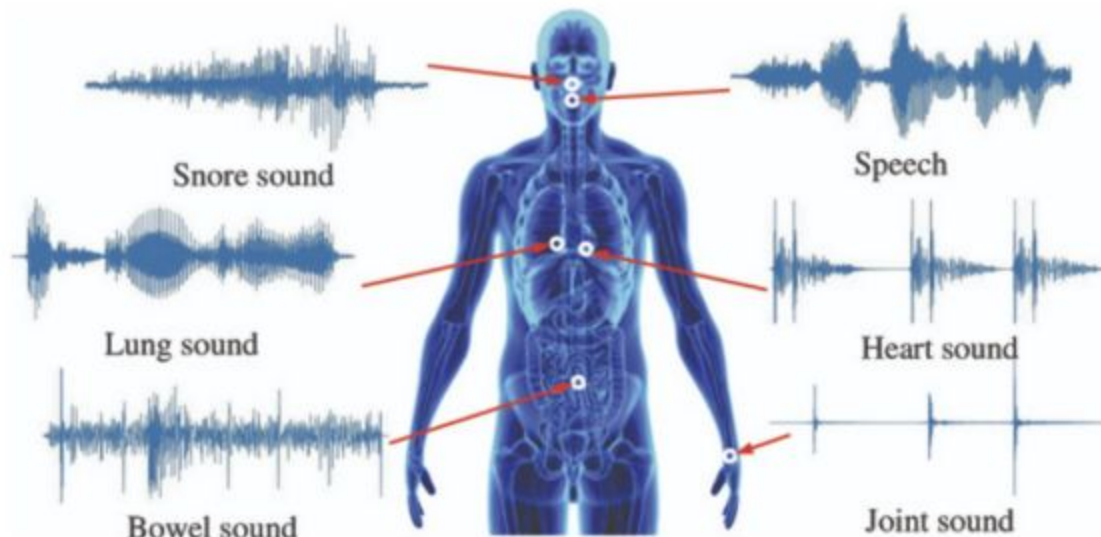
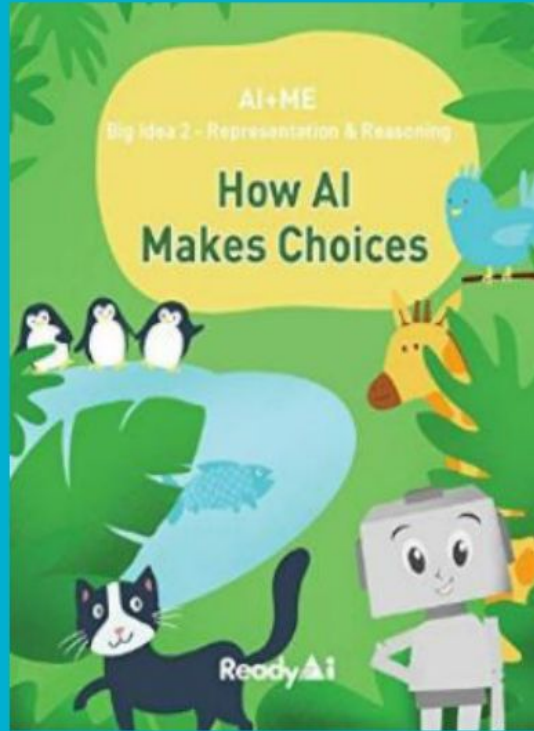
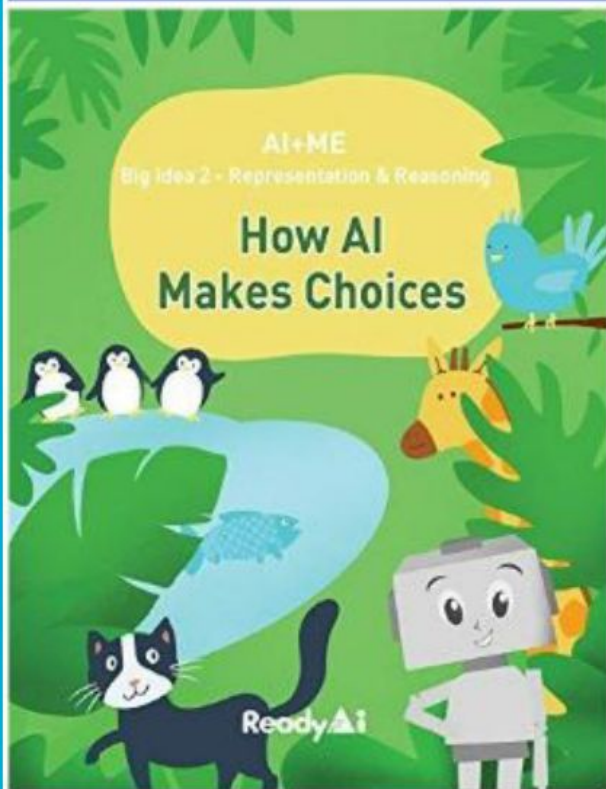


Fig. 1. An overview of the body sound analysis. Speech data are studied widely for measuring the human health status, whereas the body sound data are not thoroughly studied for healthcare applications. The different characteristics of various body sounds can be summarized as follows: First, the vibration mechanism is unique between each kind of body sound. Second, the acoustic features (e.g., the main energy distribution of the spectrum) are varied. These body sounds can be collected via the prevalent microphone equipment and/or wearable devices. The sounds generated by our human body can reveal the health status in both physical and mental terms.



How AI Makes Choices

Classification of Living Organisms



Big Idea #2

Intelligent agents maintain representations of the world and use them for reasoning.

- Recognize, classify, sort, organize,
- Make inferences, decisions
- Flowcharts and algorithms

100



Capt. = Captivity All. = Alluvial E. = Eurypterus D. = Deciduous

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AI Makes Choices

Take a look at the following species:



Echidna



Penguin



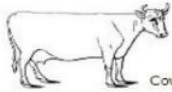
Puffer fish



Platypus



Kangaroo



Cow

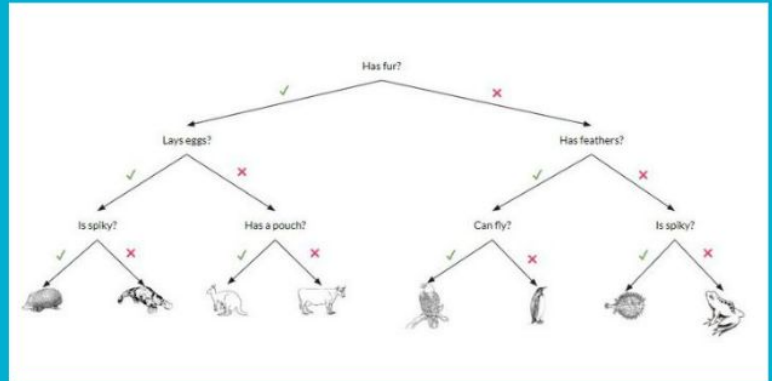


Frog

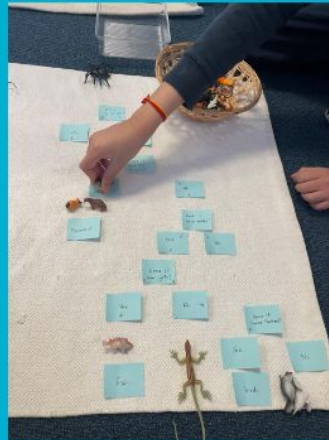


Eagle

Species	Fur?	Feathers?	Spiky?	Fly?	Pouch?	Lay eggs?
Echidna	✓	✗	✓	✗	✓	✓
Kangaroo	✓	✗	✗	✗	✓	✗
Penguin	✗	✓	✗	✗	✗	✓
Cow	✓	✗	✗	✗	✗	✗
Puffer fish	✗	✗	✓	✗	✗	✓
Frog	✗	✗	✗	✗	✗	✓
Platypus	✓	✗	✗	✗	✗	✓
Eagle	✗	✓	✗	✓	✗	✓



Flowchart to classify animals



How we work with AI



 Stop Modules

main.py

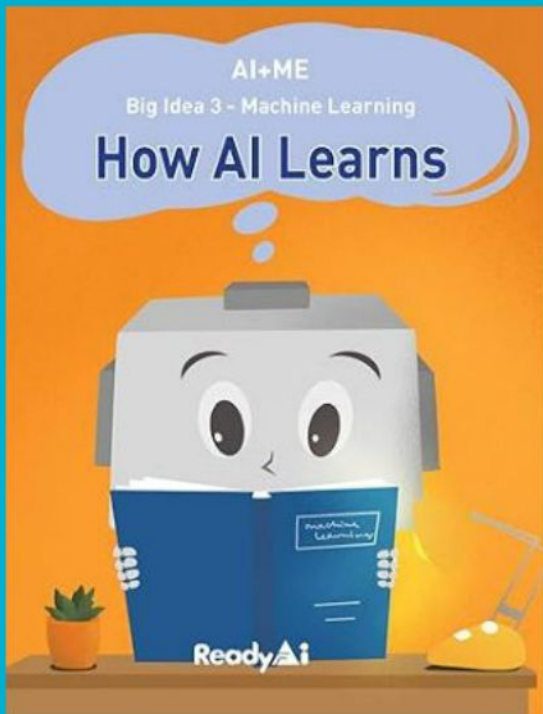
```
1
2 while True:
3     student = input("Hi there! How are you feeling? Would you like to chat (Yes or No)")
4
5     if(student == "Yes" or student == "yes"):
6         print("Awesome! I am here for you.")
7
8     while True:
9         tip = input("How are you feeling? Happy, Sad, Confused, Scared, Tired")
10
11         #Happy Code
12         if(tip == "Happy" or tip == "happy"):
13             print("That's great spread your happiness by calling a friend")
14             secondhappy = input("Do you know someone who might be feeling low (Yes or No)")
15             if(secondhappy == "Yes" or secondhappy == "yes"):
16                 print("Call a them and see how you can spread your joy.")
17                 thirdhappy = input("I usually like to rememberhappy moments. Do you? (Yes or No)")
18                 if(thirdhappy == "Yes" or thirdhappy == "yes"):
19                     print("Journal it in a diary so you can remember it when you are sad.")
20                 else:
21                     print("Would you like to hear a")
22             else:
23                 print("Okav.")
```

Result

Instructions

Powered by  trinket

Hi there! How are you feeling? Would you like to chat (Yes or No) **yes**
Awesome! I am here for you.
How are you feeling? Happy, Sad, Confused, Scared, Tired



Objectives:

- Understand that data is a building block of artificial intelligence.
- Identify what AI can do based on the data it is trained on.



Data



Key Vocabulary

Data

any type of information that can be collected, categorized, and analyzed.



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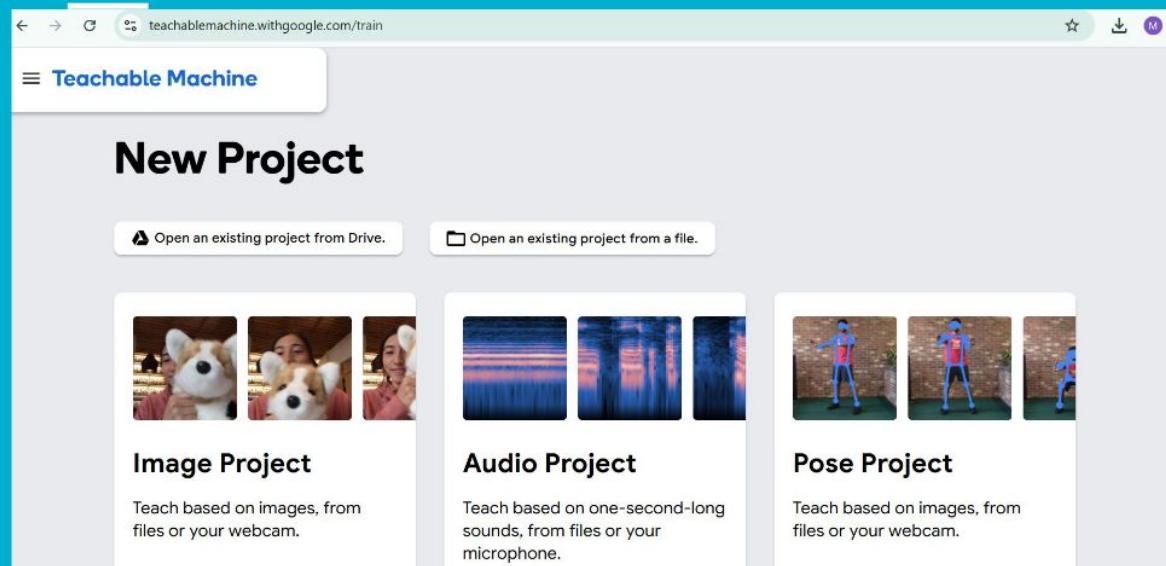
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AI learns from the data it is trained on, called **inputs**

When AI make smart guesses or predictions about what it can do it is called **outputs**.

On screen



Machine Learning.

Google Teachable
Machine



Fill in the Blanks

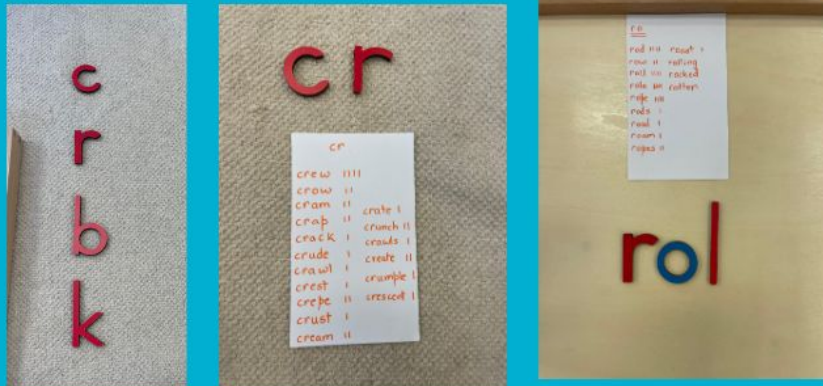
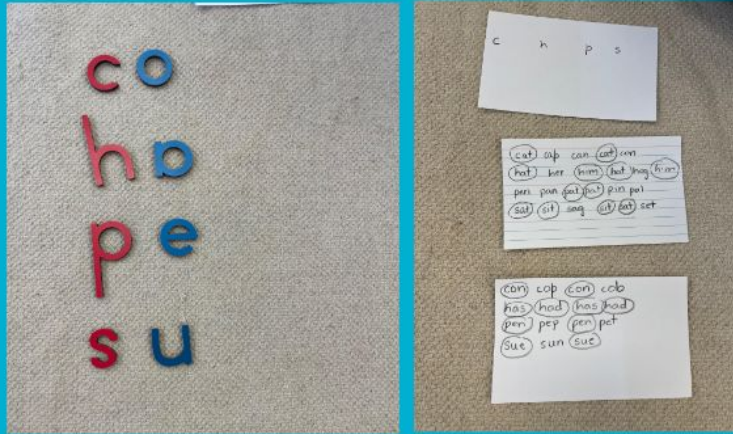
Summer _____

Sun _____

Rain _____

Jack _____

Predictive Word Building



1. Start with a letter.
2. Add one letter at a time
3. Ask students to predict words they can form
4. Record & tally common words

What They Notice:

- Patterns in letter combinations
- Common vs. uncommon words

Sentence Prediction (9-12)



1. ^{Mary} had a little lamb.

2. Mary had a little lamb

3. Mary had a little lamb



1. Mary went to school with her lamb.

2. Mary had a cat that was blue.

3. Mary had a little lamb.

1. walk around with

① Mary read a story of a cat who went to jail and ate a cookie.

② Mary had 12,000,000 cookies that the cat stole so that's why he went to jail

③ Mary had a little cat that stole 12,000,000 cookies



1. Mary had a little lamb

2. Mary had a little lamb.

3. Mary had a little lamb.

~~I like myself.~~

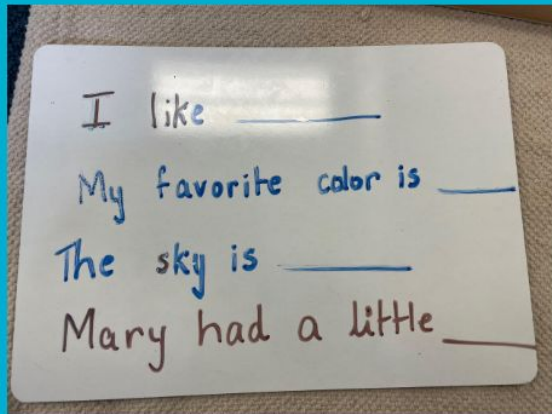
1. Give students a sentence prompt (remind not right or wrong answer)
2. Start with one word and ask them to complete it
3. Add a word and ask students to write a new sentence.
4. Tally and compare results



What They Notice:

- Common phrases emerge
- Some predictions are unexpected
- Similar to how AI models generate text

How LLMs Use Prediction (12-18)



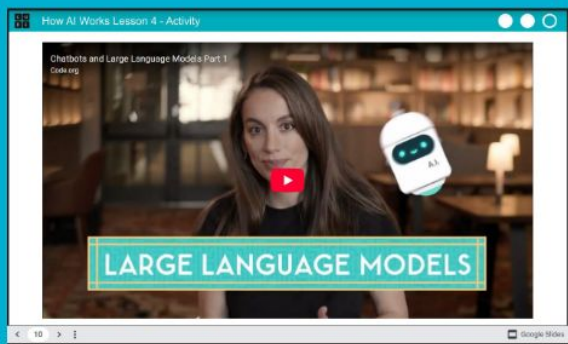
Large Language Models (LLMs)

- Predict the next word based on patterns
- Trained on massive amounts of text
- Similar to how students predict words & sentences



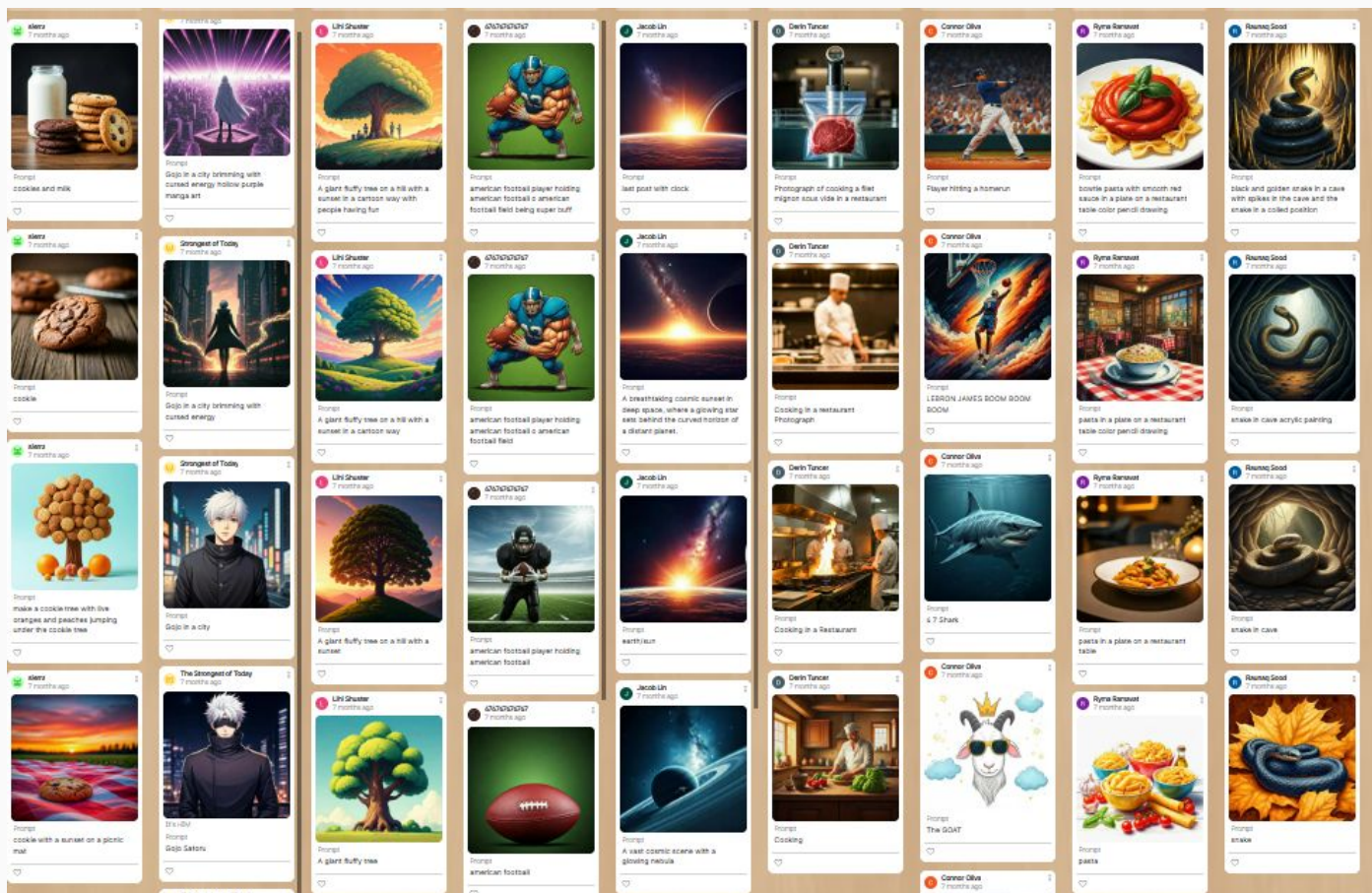
Computational Thinking Connection:

- Predicting letters → Pattern recognition
- Sentence completion → How LLMs generate text



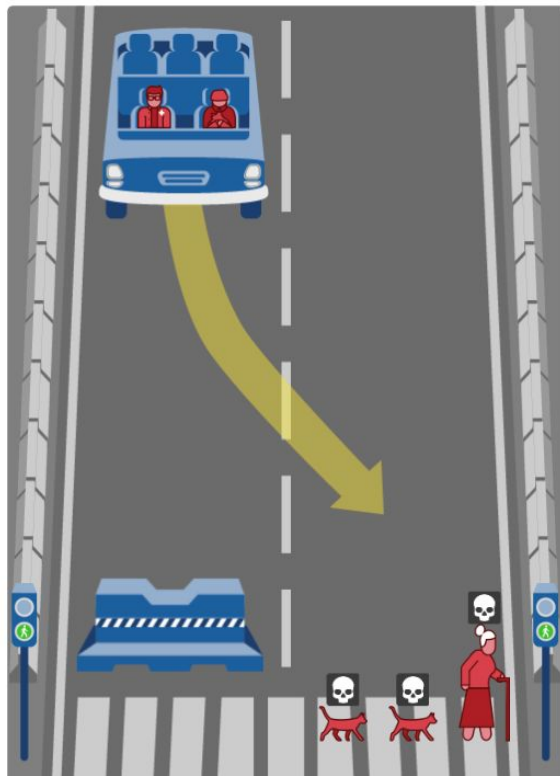
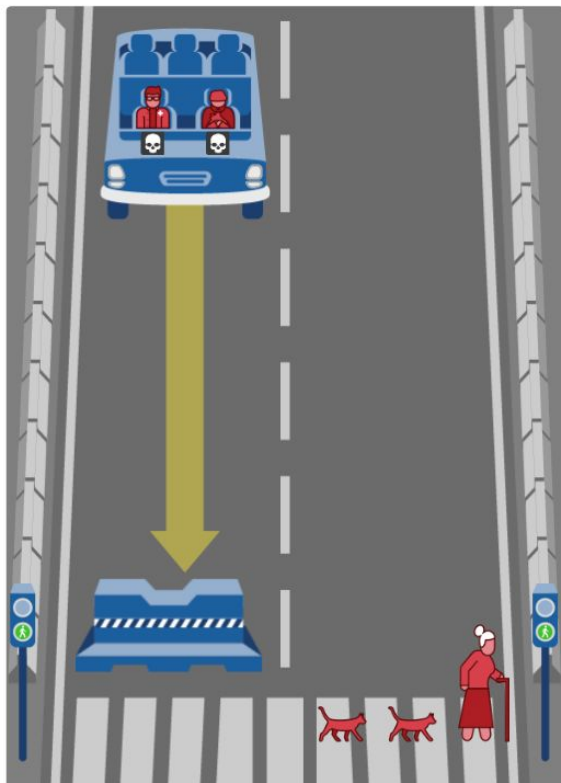
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Prompting and Image Generation on Padlet with Middle School

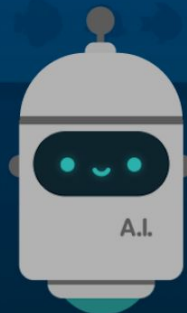
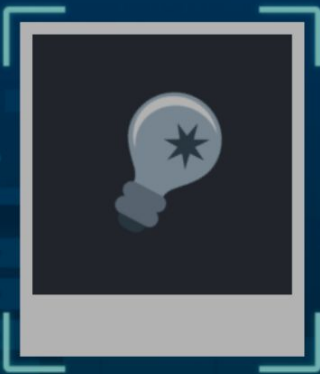
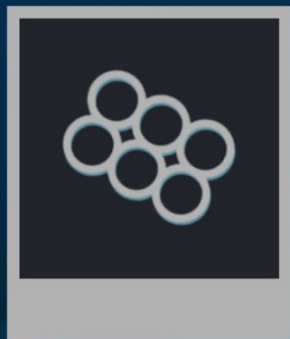


What should the self-driving car do?

1 / 13



Is this a fish?



A.I. does not know if an object is a fish or trash, but it can process images and identify patterns.

[Continue](#)