ARTIFICAL INTELLIGENCE

Machine Learning & Image Recognition: A Powerful Duo, Part 2

Intended Audience: Grades 4-7

Lesson Objectives

- Understand how AI and image recognition are used in real-world application
- Brainstorm and design creative AI solutions for real-world problems by applying machine learning concepts to identify challenges in their community or daily life

Standards

MS-ETS1-4: Engineering Design

- Standard: "Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem."

Time Needed: 45-60 minutes

Equipment and Supplies

1 Pencil (per group)

1 Station Worksheet (per group)

1 Set of Printed Station Cards (or the ability to project them).

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Background

Artificial Intelligence (AI) is transforming the way we interact with the world, from recognizing faces in photos to recommending videos online. Two of the key components of AI are image recognition and machine learning.

What to Do

After learning about how AI works with image recognition and machine learning in Part 1, students will explore real-world applications of this technology and brainstorm their own ideas to solve problems using AI in in this lesson.

Part 1 – Introducing the Activity (5 minutes)

Today, we're going to explore how image recognition and machine learning can help make our world a better place. First, let's review.

What do you know about AI? How does it learn?

AI learns by analyzing large amounts of data, identifying patterns, and refining its predictions over time. The more examples it encounters, the more accurately it can perform specific tasks. AI is only as accurate as the data it's given. If the information is incorrect or incomplete, the AI's results might be, too.

What is machine learning? Machine Learning allows the app to improve over time by learning from labeled images. It gets better as it sees more examples and refines its ability to classify new images.

What is image recognition? Image Recognition is the process where the app analyzes an image, looking for patterns, shapes, colors, and textures to identify what's in the picture.

Part 2 – AI Stations (25 minutes)

Preparation
Divide the group into small groups of 2-4 youth. Print one AI Station Worksheet for each group and gather pencils.

Now that participants have explored what image recognition and machine learning are, they will explore applications of this type of technology before developing their own idea for an AI powered tool.

Explain: There are 6 stations around the room with examples of how machine learning and image recognition work together to solve a problem. Visit each station and read the real-world application of this type of AI. As a group, complete the task and answer the question on your worksheet.

NOTE ABOUT LESSON DRAFT – THESE STATIONS WERE WRITTEN TO INCLUDE VARIOUS EXAMPLES BUT CAN BE WRITTEN WITH AG ONLY APPLICATIONS.

Part 3 – Imagine AI (20 minutes)

Explain*: Now that you've learned how AI helps in security, healthcare, farming, and more, it's time to be creative. What problem in your life or community could AI solve using image recognition? Brainstorm your own AI solution for a problem you care about in your community.* Record your idea on your worksheet. *Think big!*

Allow time for each group to share.

Wrap Up & Discussion (10 minutes)

Great job, everyone! Over the course of the scavenger hunt, you explored how AI—especially image recognition and machine learning—is being used in a variety of industries to solve real-world problems. From recognizing faces on smartphones to detecting diseases in crops, AI helps make our lives easier, safer, and more efficient.

Key Takeaways:

- **AI is everywhere**: You've seen how AI impacts industries like healthcare, agriculture, security, and social media. It's not just an idea; it's real and making a difference.However, it must be used responsibly.
- **AI can help people**: Whether it's detecting early signs of disease in crops, helping doctors read X-rays, or keeping animals healthy, AI is a tool that helps people work faster, smarter, and more accurately.
- **You imagined AI**: Each of you brainstormed ways AI could help solve problems, from improving farming practices to making healthcare more efficient. This kind of thinking is how new AI solutions are created!
- **What's Next?** Whether you're interested in helping to create the next big tech innovation or solving problems in your own community, AI offers endless opportunities. Keep thinking about how you can use and even develop AI technology to "**Make the Best Better**!"

Talk it Over

SHARE

- What did you learn today about AI?
- What was the most surprising or interesting AI application you discovered?

PROCESS

- What was difficult about identifying AI applications, and how did you overcome it?

GENERALIZE

- How do you think AI could change the way we live and work in the next 10 years?

APPLY

- How could you use the knowledge of AI in your own life or future career?
- What problem in your community could you solve using AI, based on what you learned today?

Career Connection

1) AI Engineer – Designs and trains AI systems to recognize patterns and make decisions.
2) Data Scientist – Analyzes large amounts of data to improve AI learning and predictions.
3) Precision Agriculture Specialist - Uses AI and technology to improve farming practices and crop yields.
4) Ag-Tech Entrepreneur – Creates AI-powered solutions and applications to solve agricultural problems.
5) Healthcare AI Specialist – Applies AI to medical imaging and diagnostics, helping doctors detect diseases earlier and more accurately.
6) Robotics Engineer – Designs robots that use AI to automate tasks, such as harvesting crops or assisting in healthcare, improving efficiency and reducing labor costs.

AI Stations

Station 1: Facial Recognition (Security)
Clue: "Have you ever unlocked your phone by looking at it? Some smartphones use facial recognition to make sure only you can access your device. The AI analyzes your face and compares it to a stored image to confirm it's really you."

- **Task**: Identify this famous person. (Albert Einstein)

- **Challenge**: Discuss how facial recognition might be used to keep schools safe. Record your answer on your worksheet. Record your answers on your worksheet.

Station 2: Healthcare (Medical Imaging)
Clue Card:
"Doctors use images like X-rays or MRIs to look inside our bodies and find problems like broken bones or diseases. AI helps them analyze these images quickly and accurately.

- **Task**: Look at the X-ray of a tibia. Can you see the fracture?

- **Challenge**: Discuss how social media platforms use AI to automatically tag faces in photos? Record your answer on your worksheet.

Station 3: Social Media (Tagging Faces)
Clue Card:
"Have you ever uploaded a photo to Facebook? AI helps tag faces in your photos by recognizing their features.
- **Task**: Show students a set of photos with faces blurred. They need to match each face to a celebrity or someone they know.
- **Question**: How do social media platforms use AI to automatically tag faces in photos? Record your answer on your worksheet.

Station 4: Agriculture (Crop Disease Detection)
Clue Card:
"Farmers need to catch crop diseases early to save their harvest. AI helps by analyzing images of plants to spot problems before they spread."

- **Task**: Can you identify the plant that has a disease?

- **Question**: Discuss how AI could be used in farming to help detect diseases and what would happen if they couldn't spot the disease in time. Record your answer(s) on your worksheet.

Station 5: Precision Agriculture (Drones)
Clue Card:
"In farming, drones can fly over fields and gather information using sensors and cameras. They help farmers know exactly where to water or apply pesticides.

- **Task**: Can you identify areas that might need irrigation, fertilizer, or pesticide based on your understanding?
- **Challenge**: Discuss how drones could help farmers save time and resources by using AI to monitor fields. Record your answer on your worksheet.

Station 6: Livestock Management
Clue Card:
"Farmers can use AI to monitor their animals, like cows, sheep, and chickens. AI can track their movements, eating habits, and even listen for signs of illness. By observing patterns in behavior, AI can alert farmers if something is wrong, like if an animal is sick or stressed.

- **Task**: Can you identify the animal who may need assistance?
- **Question**: If you were a farmer, what kind of signs would you want AI to detect in your animals? Record your answers on your worksheet.