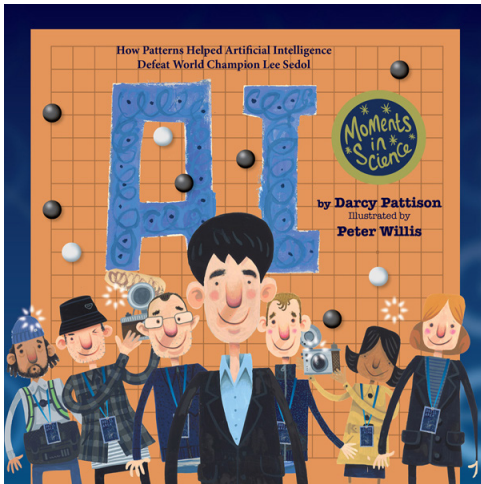# Understanding the Power
and Promise of Artificial Intelligence
By Darcy Pattison

Welcome to today's smackdown! It's man versus machine.

In a 2016 exciting five-game match the world champion Go player Lee Sedol went up against AlphaGo, an artificial intelligence program. The world-wide excitement about the match shattered into confusion when AlphaGo won the first game. How could humans lose to machines? People stumbled over the idea that a computer program could be better than the best of humans.

What is artificial intelligence or A.I.? If humans have natural intelligence, then any intelligence created by humans would be A.I.

How does A.I. work? The basis of A.I. is complicated mathematics, but the ideas behind A.I. are simple. Early attempts at A.I. focused on tasks such as recognizing a photo of a cat. There were two basic ways to determine if a cat was in a photo.

First, you could give the program a set of rules. For example: If there's a circle shape with two triangles, it's a cat's face. The rules quickly become complex! What if a cat is chasing a rat? What if it's curled up asleep? The cat's position would mean a different set of rules.

Second, you could program an A.I. with pattern recognition. Then provide the program with thousands of photos, each labeled CAT or NOT CAT. Such programs could analyze the photos and develop a mathematical model of CAT. This method requires powerful computing and lots of data. But in the end, it's more accurate.

Activity #1: Study the game GO.

GO is an ancient board game popular worldwide. The rules are simple and easy to learn; but the game can take years to master. Either buy a GO board game or download one of the many apps to learn to play the game.

Read *A.I. How Patterns Helped Artificial Intelligence Defeat World Champion Lee Sedol.*

- Why are games used to test A.I. programs?
- Why was GO chosen as the game for this competition? Learn to play GO. Many apps teach the basics of GO.
- Discuss how pattern recognition can help players become stronger in games such as chess, checkers, or GO.
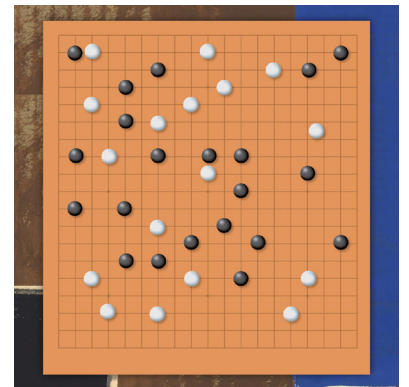
Activity #2: Watch the documentary.
During and after the historic showdown between AlphaGo and Lee Sedol, a documentary film team interviewed the principal people on each side, filmed the event, and added context. The 1.5 hour film is available free on YouTube: https://youtu.be/WXuK6gekU1Y

Discuss the movie and compare it to the book.
- Does the movie make you want to learn to play Go?
- Does the movie make you want to learn more about A.I.?

Activity #3: Writing rules.
Next, ask students to write rules for recognizing a photo of a cat.

- Divide into groups. Each group is given a different photo of a cat engaged in a different activity: napping, eating, sitting, running, etc. Each group must write rules on how to recognize that the photo includes a cat.
- Compare the rules. Are there rules in common for the groups? How do the rules change when the cat's position changes?
- Combine all the rules, omitting duplicates. How many rules did you write? Are they enough to recognize a cat in any photo? Or would there need to be more rules?
- Discuss the advantages of A.I. based on pattern recognition over writing rules.

Activity #4: A.I. in Your Daily Life
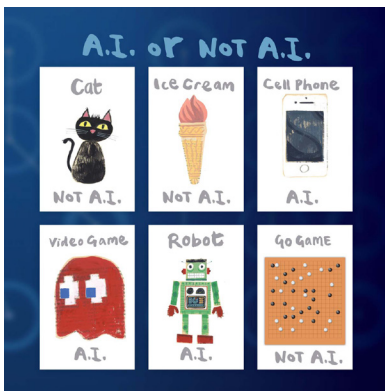
Determine what items in a student's daily life use A.I. As A.I. becomes more common, many aspects of daily life are powered by A.I.
- Explore medical uses of A.I., for example, how a program can analyze a photograph of a skin mole to determine if it's cancerous.
- Explore business uses of A.I., for example, how they deliver packages efficiently.
- Explore navigation uses of A.I., for example, mapping programs on smart phones. Discuss if A.I. will help in developing self-driving cars.
- Explore law enforcement used of A.I., for example, facial recognition to catch criminals.

Activity #5: Write
Write an informative piece about A.I. Explain how A.I. works and how it powers many daily activities. Predict how A.I. will be used to power new technologies in the next five years.

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Hardcover: 9781629441818
Paperback: 9781629441849
eBook: 9781629441825
Audio: 9781629441832

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