

# AI, Machine Learning, & Automation

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## Textbook

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# AI, Machine Learning, & Automation



You might have heard of [artificial intelligence](#) (AI) as it's often portrayed as cool robots in movies. You might wonder, does this kind of technology exist? What have we created so far?

Certain aspects of AI have been developed and we use them every day in the form of machine learning and automation. We will examine the strong rippling effects these technologies have on society.

First, let's explore the differences between what is called strong and weak AI.

## Weak AI

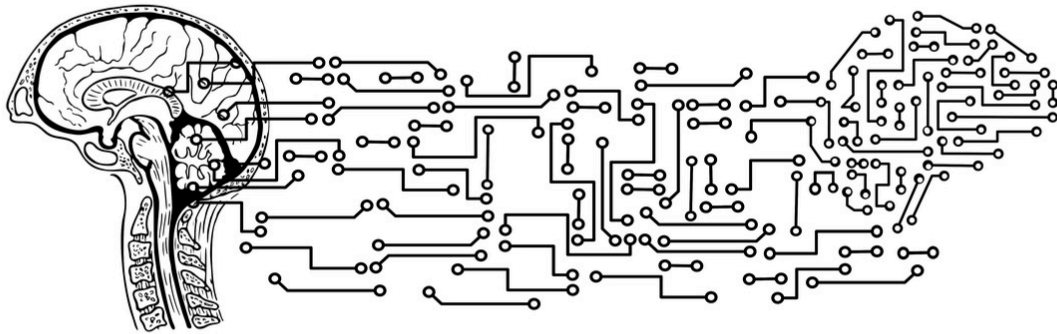
[Weak AI](#) is where the computer learns from **past** patterns to predict future behavior.

You may have experienced weak AI in your everyday life. Some examples of weak AI include google maps predicting the route you want to take based on the time of day. Another example is a smart thermostats predicting your temp preferences depending on the time of year. Have you ever started a message or text and it predicted what the word is that you wanted? These are examples of weak AI.

Weak AI is really just very observant programs. These programs analyze past information and uses it to make future predictions. These programs often have access to very large database of past information that the computer analyzes for patterns. It doesn't actually produce any new ideas or information but instead compiles and produces analyzes from the past.

Weak AI requires past information to make informed future predictions.

# Machine Learning



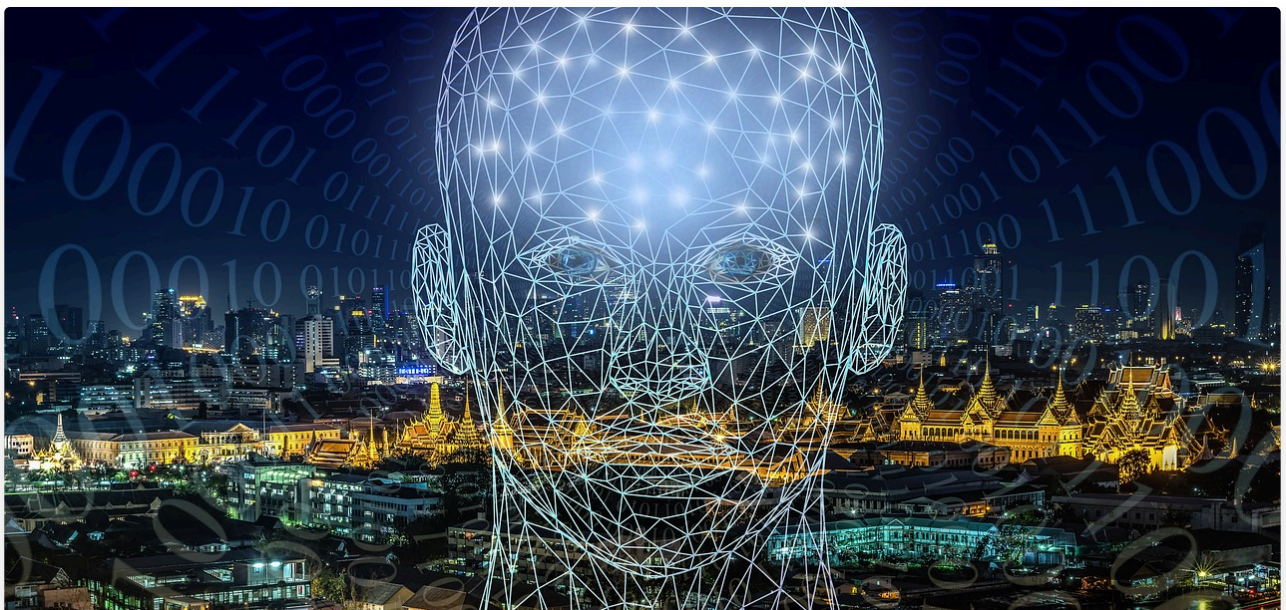
[Machine Learning](#) is when a machine evaluates past patterns to predict future patterns. Some people refer to machine learning as weak AI.

An example of machine learning is the Google browser "guessing" which website you will be looking for with only a few words typed in the search bar.

Another example is when you first start a voice activation assistant, they ask you to say a phrase several times for the machine to "learn" your voice pattern.

Discussion Question: How is machine learning useful in your life? Is there a time when it's more annoying or frustrating than useful?

## Strong AI



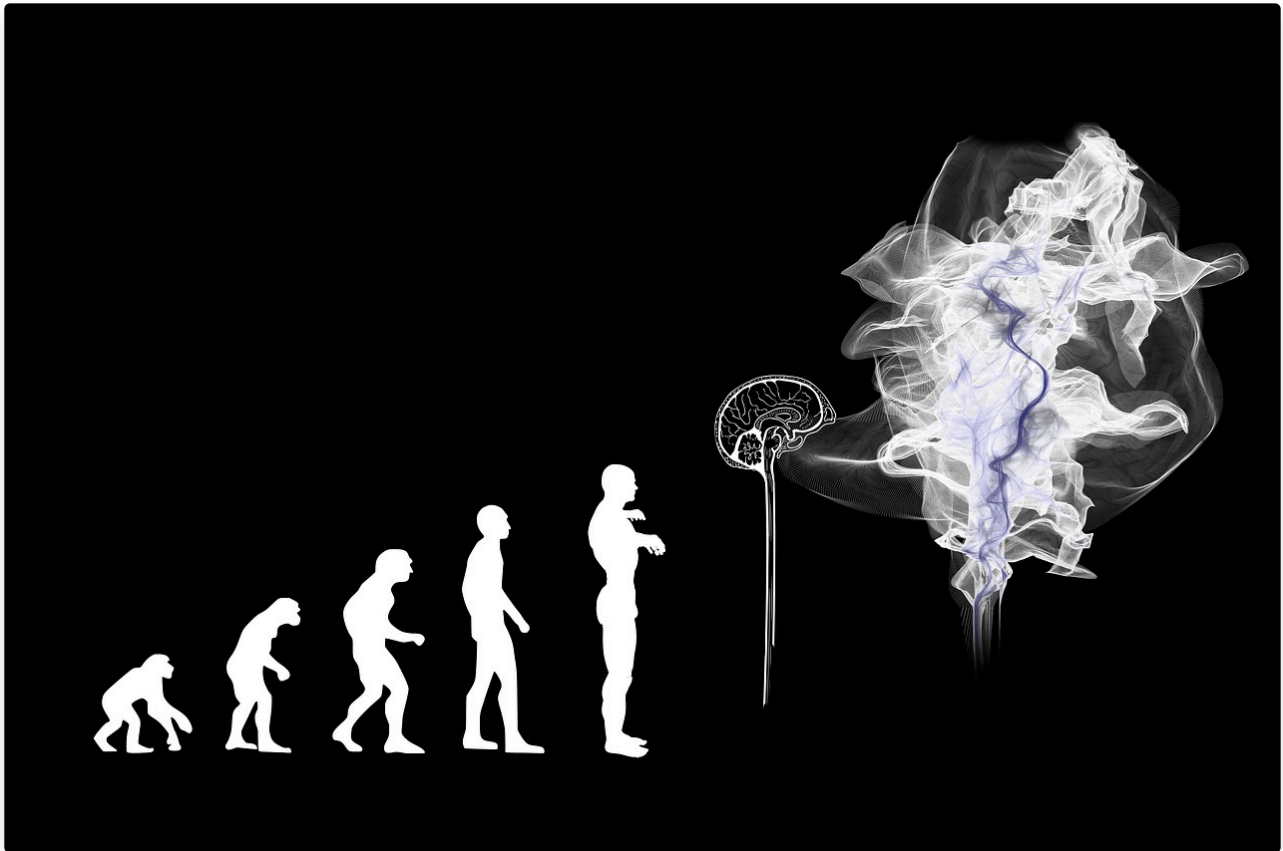


[Strong AI](#) is very different from weak AI in that it creates its own code. Where weak AI analyzes past information in order to predict future decisions, strong AI makes its own decisions. Weak AI can generate code within the structure that the programmer has dictated. Strong AI can generate code beyond the structure of what the programmer had in mind.

This kind of AI does not exist... yet.

This is different from weak AI in that it writes its own programming beyond what the programmers have decided for it to do. It starts to generate truly creative code.

## Strong AI is Controversial



Why might some people be concerned about creating a program that could write its own code? What are the implications?

Creating a code that can build its own code can be intimidating as people wonder how it could be controlled. Some people say to just create barriers that the strong AI could operate within. This would be a challenge because the barriers would also be made out of code and the computer could generate code to get around the barrier.

People get especially worried about a true strong AI program because a computer can think billions of times faster than a human can. Humans process information through the transfer of chemicals through tiny connections in the brain called synapses. The fastest synaptic transmission takes about 1 millisecond. This is 100 million times slower than a computer.

So if a programmer created a true strong AI, how long would it take the AI to think of clever ways to expand beyond its boundaries? People are concerned because they don't know what a strong AI might actually choose to do.

What do you think? Should we try to create strong AI?

## Differences Between People and Computers

What kinds of tasks are computers better suited for? What kinds of tasks might people be better suited for? In situations where large amounts of data need to be processed or compiled, computers are obviously the better choice. When it comes to deciding moral issues around what to DO with that information, that's when a human is best.

Creative approaches and finding unique solutions are often best done by a human with computer tools.

## Automation



Many things have become automatic because it's convenient.

What kinds of things in your life are automatic?

- The items at the store total up and compute tax
- Many documents autosave on the computer.
- The stop lights change on the road
- Doors automatically lock behind you
- Streetlights turn on and off
- Your laptop connects to the wifi
- The light in your fridge turns on when you open it

Discussion Question: how does the rise in automatic function affect job opportunities in society?

### Automation in Shopping

Shopping online has become commonplace. If you need a new jacket, you can search hundreds of stores online and find the perfect one and it can show up on your doorstep the next day.

What kind of jobs will we need more people doing? What kind of jobs will we need fewer people doing?

[Show answer/example](#)

### Automation in Delivery

What if self-driving cars became the norm? What about the trucking industry? Delivery industry? What kind of jobs will we need more people doing? What kind of jobs will we need fewer people doing?

[Show answer/example](#)

### Automation in the Medical Field

How does the rise in automations affect job opportunities in health care? What kind of processes are becoming automatic?

What kind of jobs will we need more people doing? What kind of jobs will we need fewer people doing?

[Show answer/example](#)

### Automation in Education

How does the rise in automatic function affect job opportunities in education? What is starting to become more automated in the learning experience?

What kind of jobs will we need more people doing? What kind of jobs will we need fewer people doing?

[Show answer/example](#)

## Takeaway

In short, automation generally increases the number of technical jobs (programming) and decreased the number of manual jobs.

Society needs more programmers!

## Summary

AI stands for [artificial intelligence](#) and it has a presence in society to day. Weak AI is also called machine learning and takes information from the past to generate predictions on future behavior. Strong AI are programs that truly generate their own unique code. Strong AI doesn't yet exist and pursuing it is a controversial topic. The rise in automation affects the job industry in that it generally increases the need for tech positions.

## CSTA Standards

3B-AP-08

## Questions (8)

**1. Which kind of AI draws from past information to make predictions about the future? Select 2 correct answers.**

**SELECT MULTIPLE**

**Select all that apply:**

- A. Machine Learning
- B. Weak AI
- C. Strong AI
- D. Super AI

## 2. Which type of AI creates its own code?

MULTIPLE CHOICE

Choose the correct answer:

- A. Strong AI
- B. Weak AI
- C. Machine Learning
- D. Extra Terrestrials

## 3. True or False: Strong AI has already been invented.

MULTIPLE CHOICE

Choose the correct answer:

- A. True
- B. False

## 4. Which of the following are examples of machine learning? Select all that apply.

SELECT MULTIPLE

Select all that apply:

- A. Your home thermostat starts to automatically set according to how you have been setting it over the past month.
- B. Your search bar automatically fills out once you start typing options similar to what you've searched recently.
- C. Your maps app suggests some routes for you according to the time of day it is.
- D. A homework app creates code to complete your chemistry homework for you.

## 5. True or False: The idea of inventing strong AI is controversial.

MULTIPLE CHOICE

Choose the correct answer:

- A. True
- B. False

## 6. True or False: Automation generally decreases the number of technical jobs (programming) and increases the number of manual jobs.

MULTIPLE CHOICE

Choose the correct answer:

- A. False
- B. True

**7. Which of the following is NOT an example of Weak AI mentioned in the passage?**

**Choose the correct answer:**

- A. Google Maps predicting your route.
- B. A smart thermostat adjusting the temperature.
- C. Creating a new computer program without background.
- D. Predictive text in messaging.

**8. What does Machine Learning primarily involve?**

**Choose the correct answer:**

- A. Writing new code from scratch.
- B. Analyzing past patterns to predict future ones.
- C. Operating without human input.
- D. Generating creative ideas.

## Answer Keys & Solutions

### Questions

1. Which kind of AI draws from past information to make predictions about the future? Select 2 correct answers.

SELECT MULTIPLE

Correct Answers:

A. Machine Learning ✓ Correct

B. Weak AI ✓ Correct

C. Strong AI ✗ Incorrect

D. Super AI ✗ Incorrect

**Explanation:**

This type of AI does not create new code.

2. Which type of AI creates its own code?

MULTIPLE CHOICE

Correct Answer:

A. Strong AI ✓ Correct

B. Weak AI ✗ Incorrect

C. Machine Learning ✗ Incorrect

D. Extra Terrestrials ✗ Incorrect

**Explanation:**

It's not extra terrestrials

3. True or False: Strong AI has already been invented.

MULTIPLE CHOICE

Correct Answer:



A. True

✗ Incorrect

B. False

✓ Correct

**Explanation:**

A true strong AI that can create its own code does not yet exist.

**4. Which of the following are examples of machine learning? Select all that apply.**

SELECT MULTIPLE

**Correct Answers:**

A. Your home thermostat starts to automatically set according to how you have been setting it over the past month.

✓ Correct

B. Your search bar automatically fills out once you start typing options similar to what you've searched recently.

✓ Correct

C. Your maps app suggests some routes for you according to the time of day it is.

✓ Correct

D. A homework app creates code to complete your chemistry homework for you.

✗ Incorrect

**Explanation:**

Weak AI or Machine learning need past patterns to make predictions about the future.

**5. True or False: The idea of inventing strong AI is controversial.**

MULTIPLE CHOICE

**Correct Answer:**

A. True

✓ Correct

B. False

✗ Incorrect

**Explanation:**

Some people are concerned that a true strong AI would be difficult to control.

**6. True or False: Automation generally decreases the number of technical jobs (programming) and increases the number of manual jobs.**

MULTIPLE CHOICE

**Correct Answer:**

A. False

✓ Correct

B. True

✗ Incorrect

**Explanation:**

More automation means more programming, which means more people are needed to navigate those computer programs.

**7. Which of the following is NOT an example of Weak AI mentioned in the passage?**

MULTIPLE CHOICE

**Correct Answer:**

A. Google Maps predicting your route.

✗ Incorrect

B. A smart thermostat adjusting the temperature.

✗ Incorrect

C. Creating a new computer program without background.

✓ Correct

D. Predictive text in messaging.

✗ Incorrect

**Explanation:**

Strong AI doesn't need a database to draw from.

**8. What does Machine Learning primarily involve?**

MULTIPLE CHOICE

**Correct Answer:**

A. Writing new code from scratch.

✗ Incorrect

B. Analyzing past patterns to predict future ones.

✓ Correct

C. Operating without human input.

✗ Incorrect

D. Generating creative ideas.

✗ Incorrect

**Explanation:**

Machines learn from sets of data

