

First Steps Into AI

With [Trainers Name]

**Visit go.wisc.edu/ststoday
in your web browser**

Complete Step 1: Sign In

Complete Step 2: Canvas (Class Files)

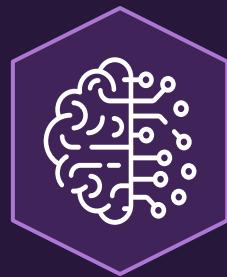
“Enroll in Course” → “Go To Course” → Modules →
[Workshop Topic]

Click on [classfile name]

SOFTWARE TRAINING FOR STUDENTS



**TECH
WORKSHOPS**



**TRAINER
APPOINTMENTS**



**ONLINE
TRAINING**



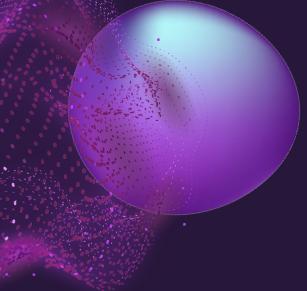
Land Acknowledgement

Before we begin the workshop, we want to recognize that the UW-Madison campus occupies the homeland of the indigenous Ho-Chunk tribe, whom the US government forced to sign a series of treaties that ultimately displaced them from the area in the 1830s.

It's important to remember that many opportunities students enjoy at UW-Madison, such as this workshop, are only available as a result of systemic and individual oppression that indigenous people of this area have faced and continue to experience today.

It is vital for the voices, messages, and stories of Indigenous people to be heard, understood, and amplified by non-Indigenous people. We can't change the past, but we must acknowledge it and learn from it so we can address the harms that may persist from it.

By examining U.S. history and reflecting on the ways we as individuals suffer and/or benefit from its effects, we can work towards a future that chooses help over harm, prioritizes awareness over ignorance, and seeks equity over injustice.



Land Acknowledgement

If you have any questions as to why STS has chosen to implement a land acknowledgement statement into our curriculum, please contact our supervisors at sts@doit.wisc.edu



Enroll in the STS Canvas Course:

go.wisc.edu/sts-enroll

x

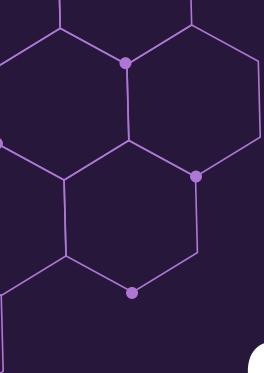
Then:

Modules >

[Module Name] >

[Workshop Topic]





x

What we will cover



01 WHAT IS AI?

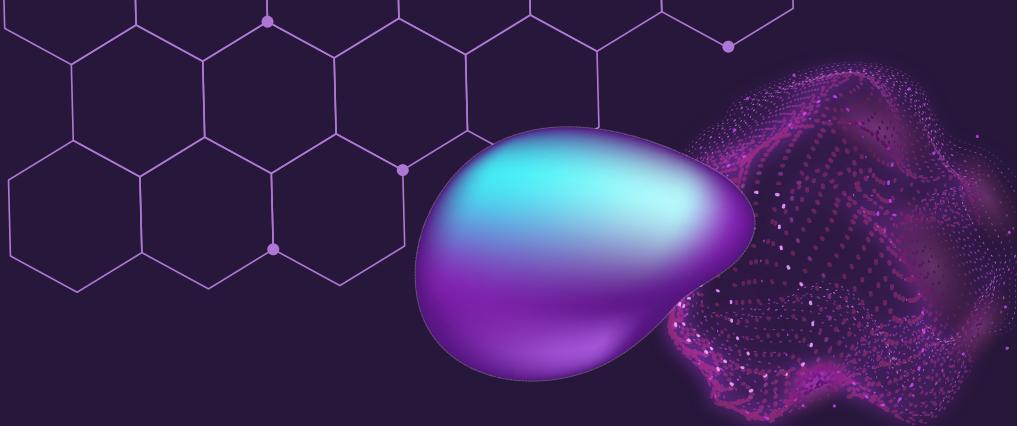
02 AI BEHIND THE SCENES

03 CHALLENGES OF AI

04 AI IN THE REAL WORLD

01

What is AI?

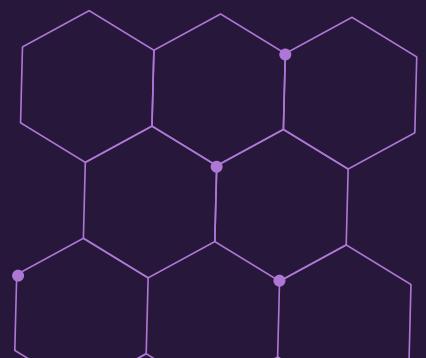
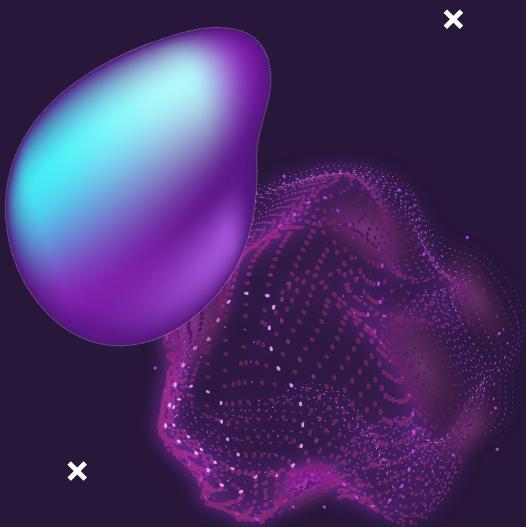


x



+

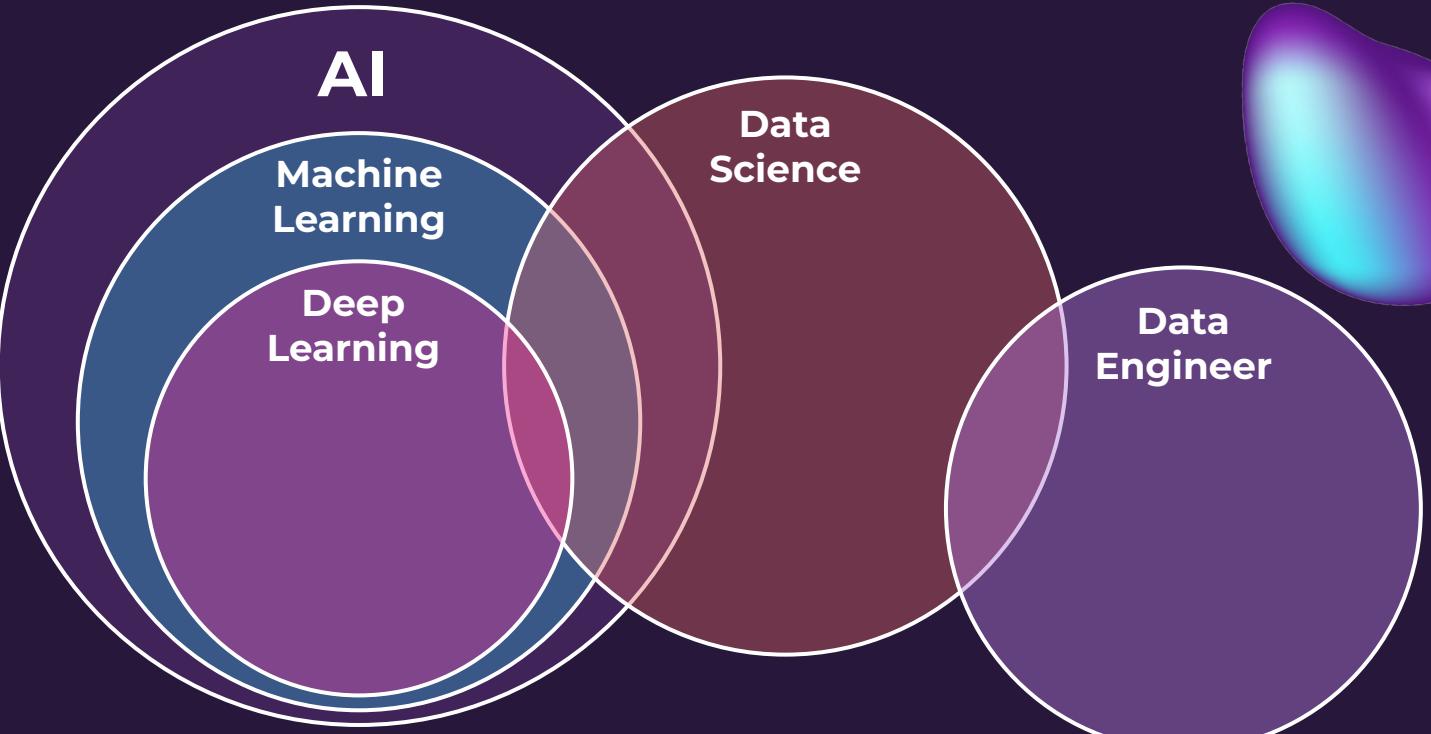




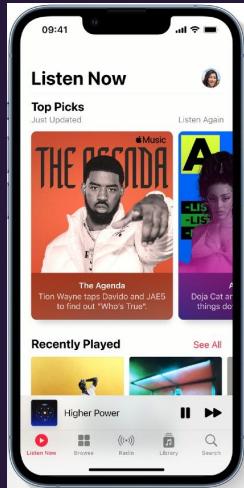
“Field of study that gives computers the ability to learn without being explicitly programmed”

—**Arthur Samuel
(1959)**

Difference Between AI & ML



AI IN EVERYDAY LIFE





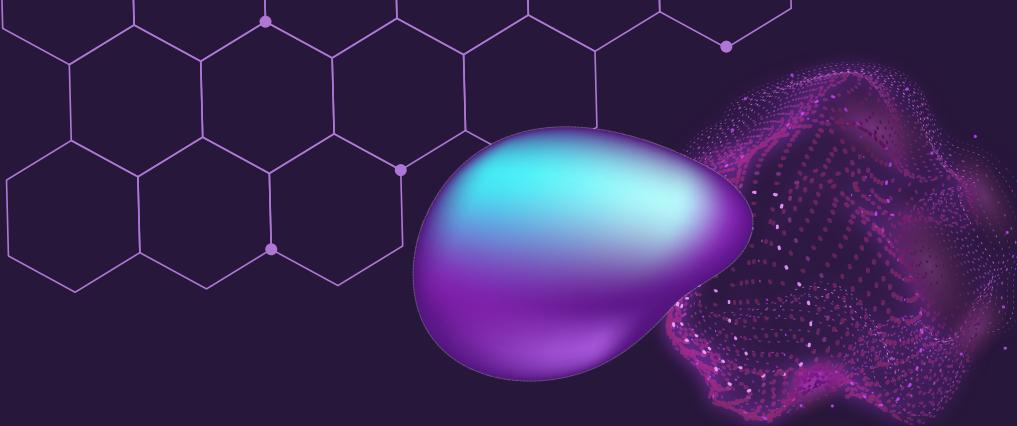
ACTIVITY 1: Let's Do Things Together

Try the following:

<https://teachablemachine.withgoogle.com/>

02

AI BEHIND THE SCENES



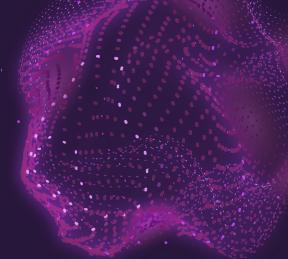
+



Types of Learning

Two Main Types of Learning:

1. Supervised Learning
2. Unsupervised Learning



* SUPERVISED LEARNING

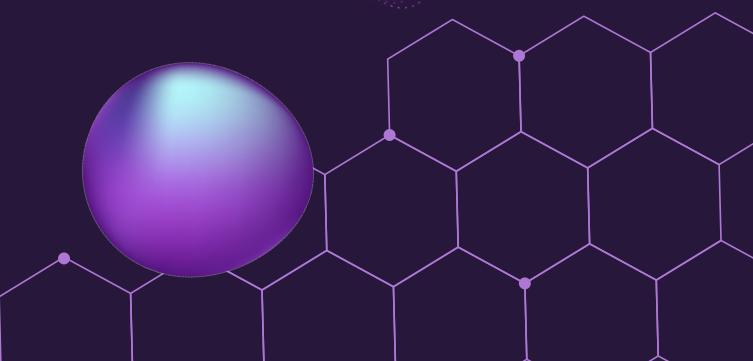
$X \rightarrow Y$

Maps input 'x' to output 'y' and learns from data **labeled** with the "right answers"

Examples:

- ◆ Spam filtering: email → spam? (yes/no)
- ◆ Speech recognition: audio → text transcripts
- ◆ Machine translation: English → French
- ◆ Online advertising: ad, user info → click? (yes/no)

*

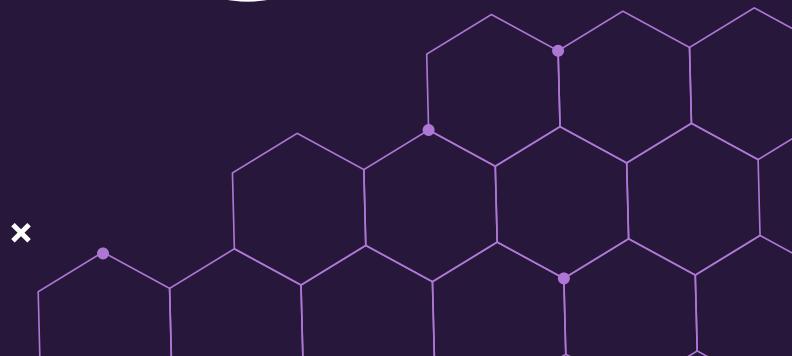
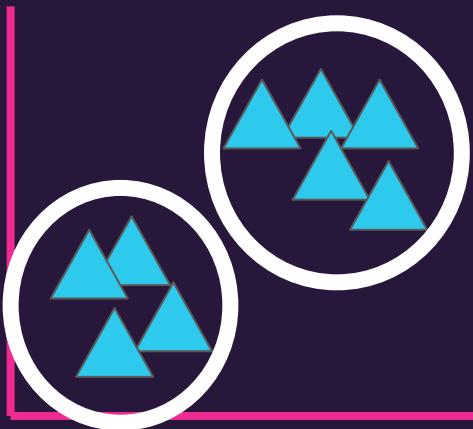


UNSUPERVISED LEARNING

Find some pattern or something interesting in **unlabeled** data, i.e. data only comes with input 'x', but not output labels 'y' and the algorithms has to find structure in the data

Examples:

- ◆ Google news → groups related stories together from different sources
- ◆ Grouping customers → group your audience into major categories





ACTIVITY 2: Let's Do Things Together

Try the following:

<https://ml-playground.com>



A thumbnail for a Huberman Lab podcast episode. The title "ALCOHOL & YOUR HEALTH" is displayed in large white letters on a black background. Below the title is the "HUBERMAN LAB" logo. To the right of the title is a black and white portrait of Andrew Huberman, a man with a beard. A timer at the bottom right shows 2:01:02. The video has 4.2M views and was posted 10 months ago.

What Alcohol Does to Your Body, Brain & Health | Huberman Lab Podcast #86

4.2M views • 10 months ago

 Andrew Huberman ✓

In this episode, I discuss the physiological effects that drinking alcohol has on the brain ...

CC



Effects of Alcohol Consumption | Momentous...

29 chapters ▾

Other Types of Learning



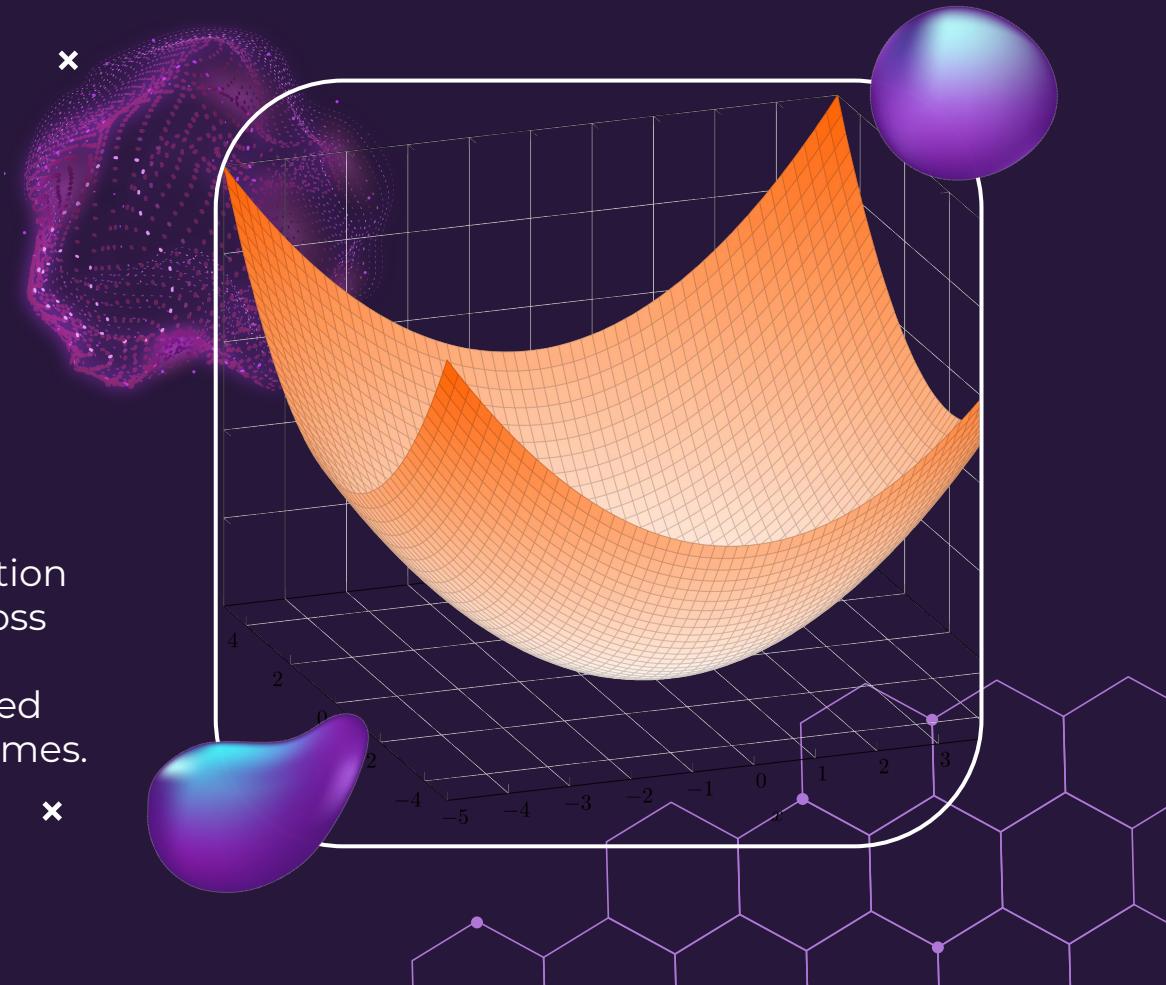
**Reinforcement
Learning**



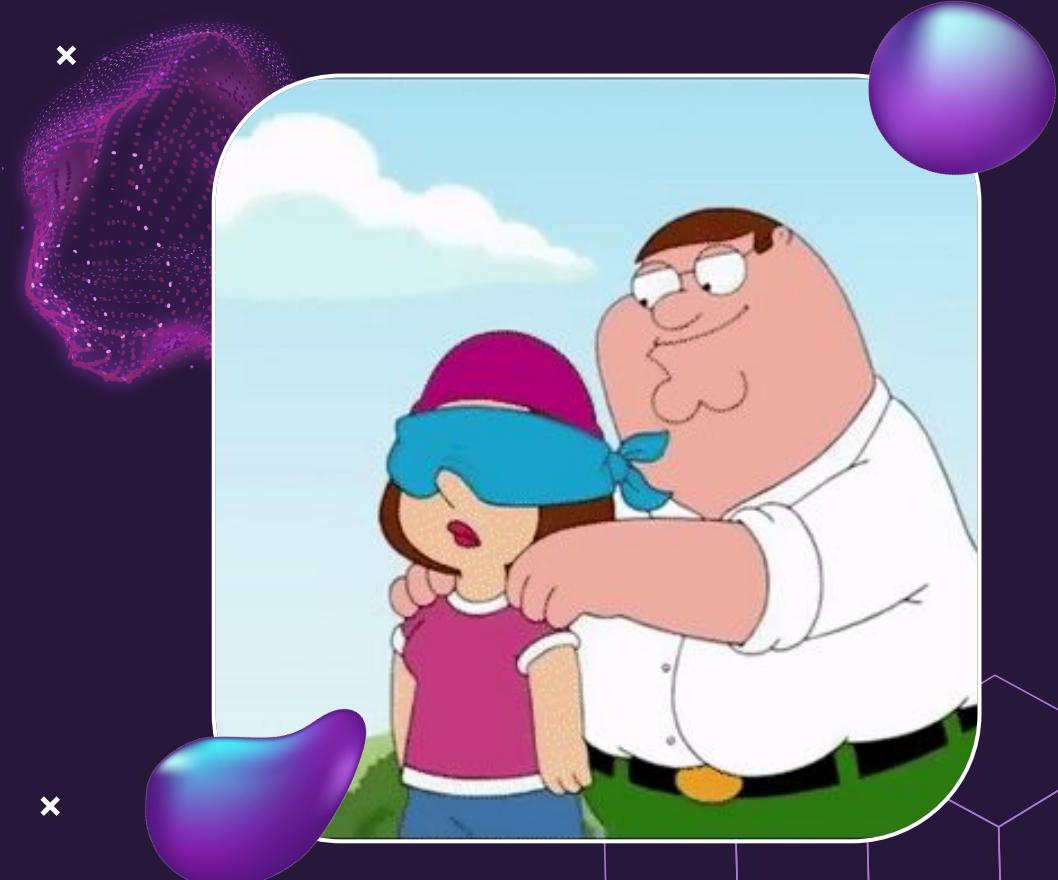
**Transfer
Learning**

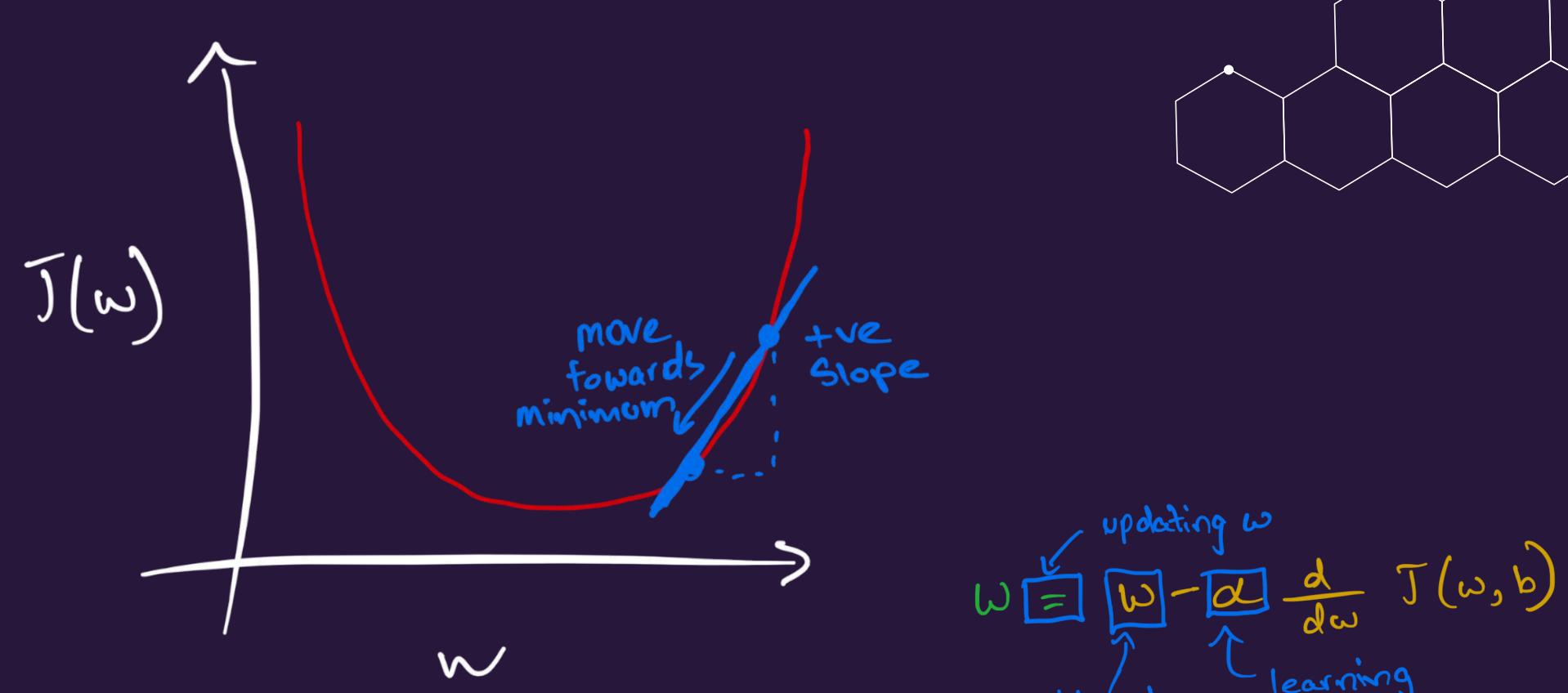
Gradient Descent

A supervised learning optimization algorithm used to minimize a loss function, which measures the difference between the predicted outcomes and the actual outcomes.



Gradient Descent





SIMPLE 2D VERSION

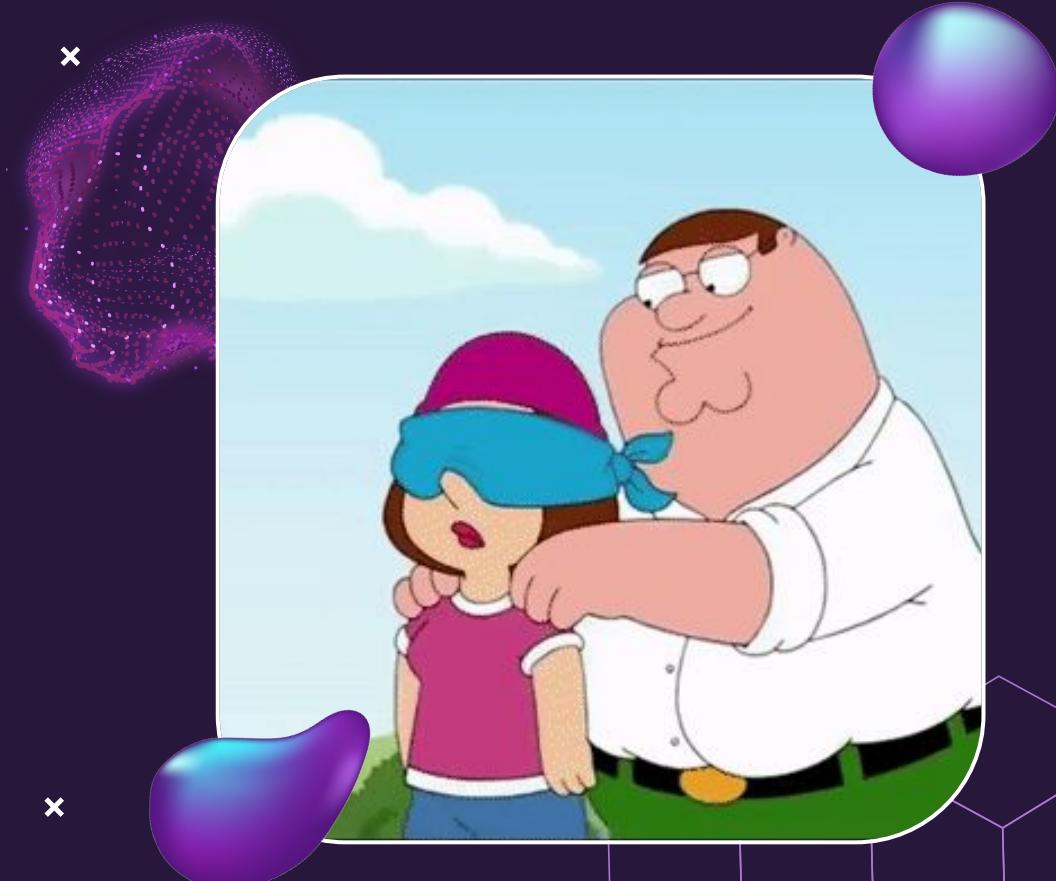
$$\text{updating } w = \boxed{w} - \alpha \boxed{\frac{d}{dw}} J(w, b)$$

old value

learning rate

$$b = \boxed{b} - \alpha \boxed{\frac{d}{db}} (w, b)$$

Learning Rate



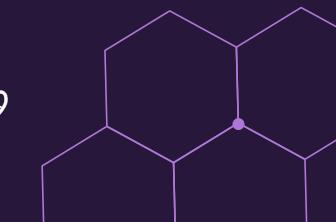
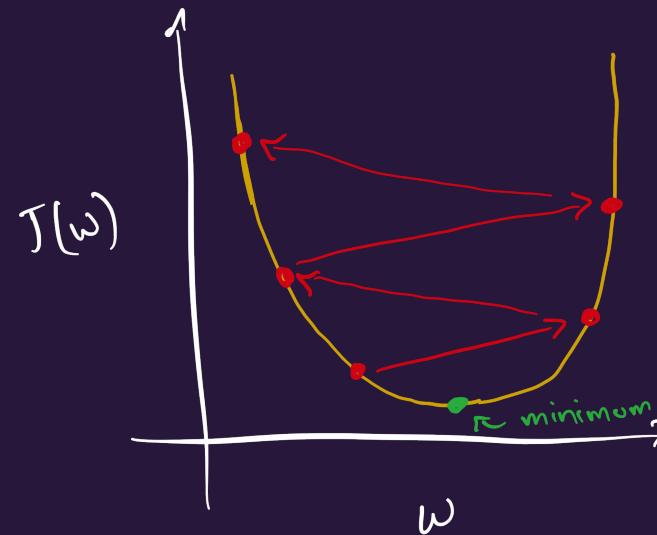
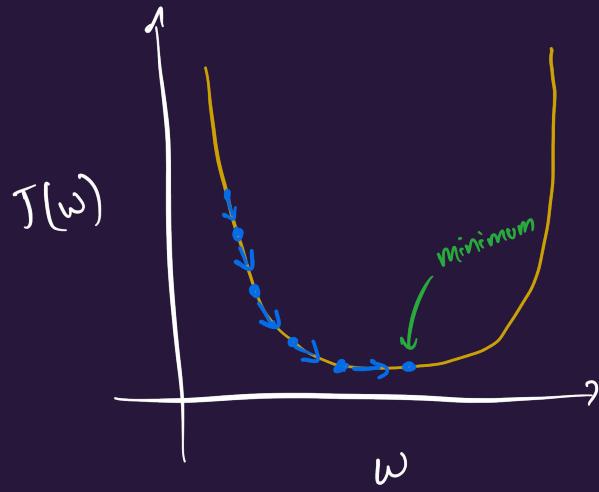


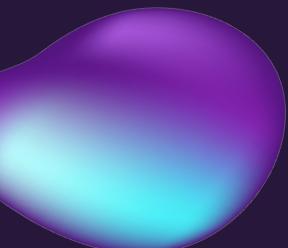
LEARNING RATE

x



If the learning rate is too small, gradient descent will be too slow, but if the learning rate is too big, then gradient descent may never reach the minimum, even worse it may also fail to converge and may diverge instead





ACTIVITY 3: Let's Do Things Together

Try the following:

<https://colab.research.google.com/drive/1NQOiqfLZweO3XAAAt62h6vPZFHVTPegQy?usp=sharing>

```
# Modify this value to experiment with different learning rates  
learning_rate = 0.001
```

```
# Modify the num_epochs number and see what happens  
num_epochs = 10
```

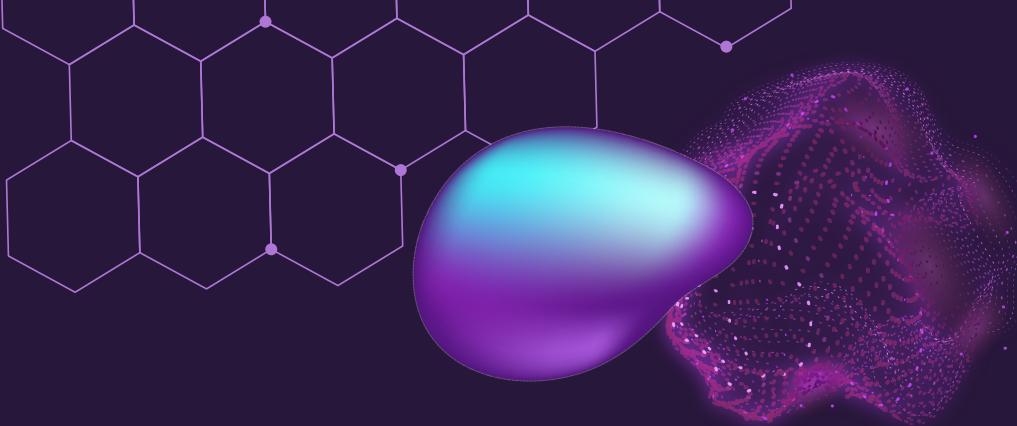
CODE EXPLANATION



x

03

CHALLENGES OF AI



+



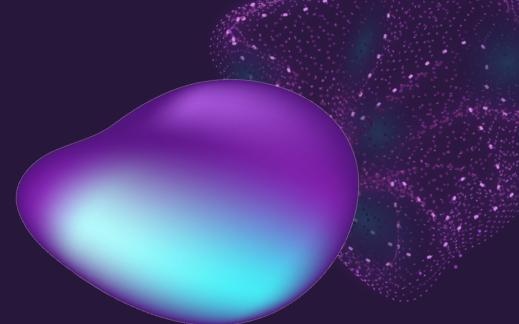


CHALLENGES



BIAS

AI algorithms can unintentionally learn and perpetuate existing biases present in the data used for training.



PRIVACY

The collection and use of personal data in AI applications raise concerns about privacy and data protection.

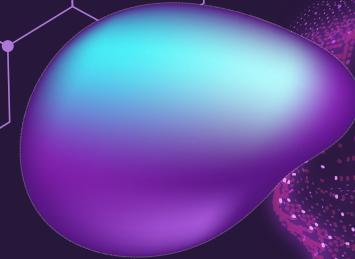
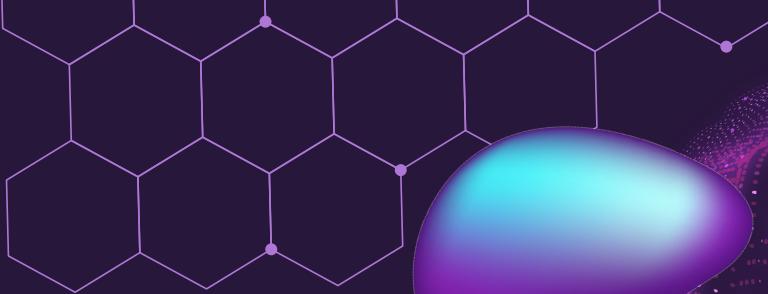


04

AI IN THE REAL WORLD



x



+



x

Career Paths

- 1. Data Engineer
- 2. Data Analyst
- 3. Data Scientist
- 4. Machine Learning Engineer (MLE)
- 5. AI/ML Researcher

REAL WORLD AI

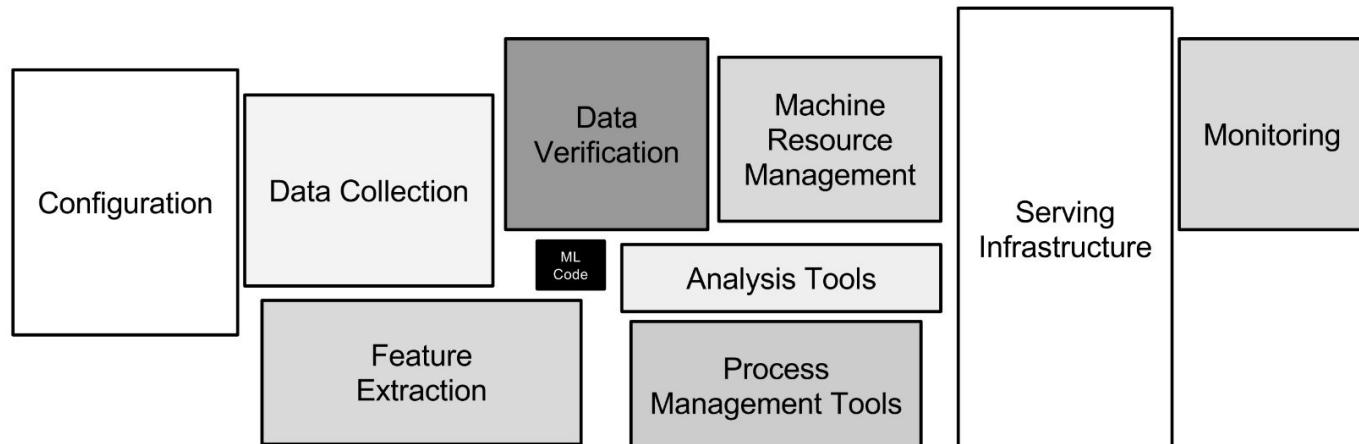


Figure 1: Only a small fraction of real-world ML systems is composed of the ML code, as shown by the small black box in the middle. The required surrounding infrastructure is vast and complex.

THE REAL WORLD PROCESS

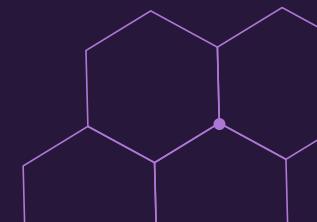


DATA MODELLING



EXAMPLE WORKFLOW PROJECT

x



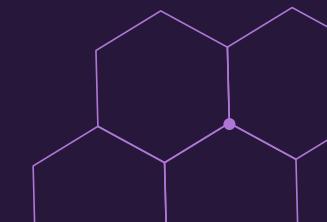


FURTHER READING + RESOURCES



x

<https://www.elementsofai.com/>





THANKS!

DO YOU HAVE ANY QUESTIONS?