Empowering Teachers to Discover Artificial Intelligence (AI)
in STEM/STEAM in a Pandemic Era

Presented by
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School of Education
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- Teaching & Learning in Era of Pandemic

- What challenges ?

- Is STEM/STEAM better or worse off?

- Web-based /Online activities

Impact of COVID-19 On AI Use in K-12

As a result of the shifts to remote learning during coronavirus closures, I predict that the role of artificial intelligence (technology that can perform tasks that normally require human intelligence) in our school district will:

- Decrease a lot
- Decrease a little
- Stay the same
- Increase a little
- Increase a lot

2%
3%
12%
37%
46%
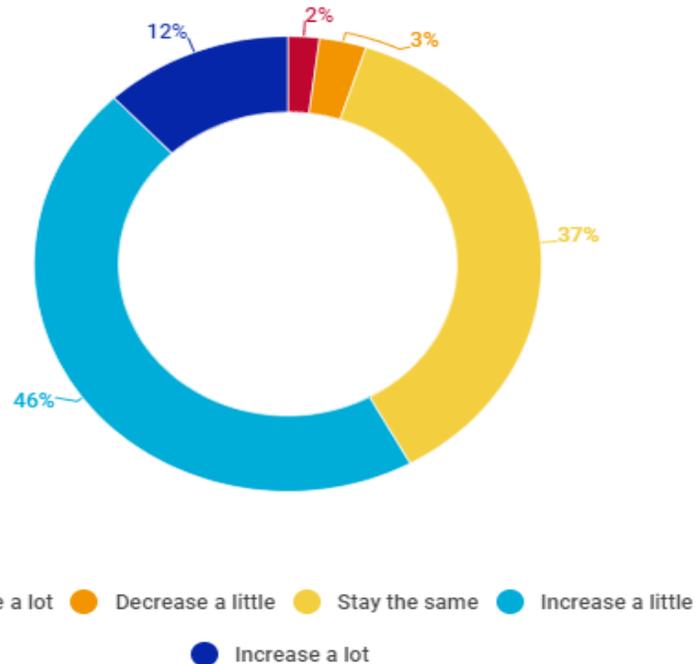
⬇ Download data

Results show responses from teachers and district leaders.

- Role of Artificial Intelligence (AI) in K-12

- Really?

- What is AI about?

Artificial Intelligence

Machine Learning

We are gathered here not as computer scientists, rather as primarily education professionals learning to think computationally and apply computation to one's passion whether that be art, dance, biology, social justice, fashion and more.

No algorithms to memorize, only creative projects to make and the sole requirement is to simply give it a try; find ways to make Artificial Intelligence (AI) / Machine Learning (ML) more accessible and inclusive, something that everyone can learn, understand, and explore freely and creatively.

(paraphrased from Interactive Telecommunications Program (ITP), NYU mission statement)

What is Artificial Intelligence (AI) / Machine Learning (ML)?

- ❑ Is this what comes to mind?

- ❑ How does it work?

- ❑ Computer Science degree?

- ❑ Educator, how relevant to me?

- ❑ Core competencies in K-12?

Many unanswered questions?

That's what brought us here
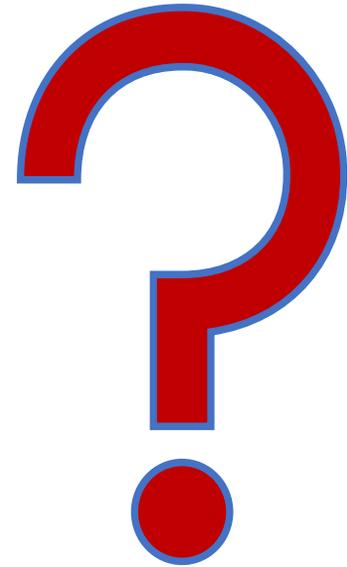
Artificial Intelligence (AI) / Machine Learning (ML) Explained

AI

ML

Understanding the Jargon

CS
- Computer Science

AI
- Artificial Intelligence

ML
- Machine Learning

DL
- Deep Learning

DS
Data Science

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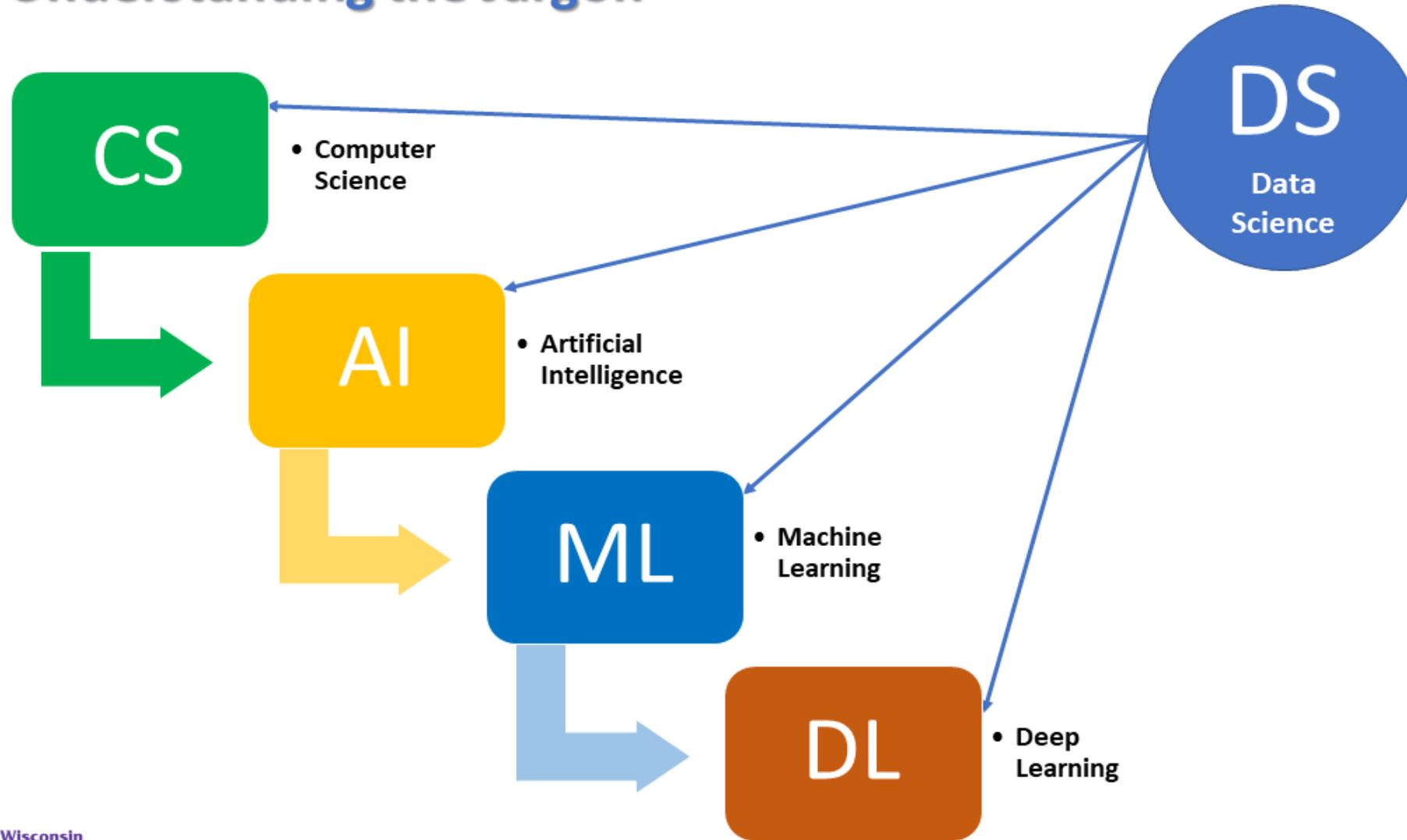
Machine Learning Tools

TENSORFLOW

```
import tensorflow as tf
import numpy as np

# Create 100 phony x, y data points in NumPy, y = x * 0.1 + 0.3
x_data = np.random.rand(100).astype(np.float32)
y_data = x_data * 0.1 + 0.3

# Try to find values for W and b that compute y_data = W * x_data + b
# (We know that W should be 0.1 and b 0.3, but TensorFlow will
# figure that out for us.)
W = tf.Variable(tf.random_uniform([1], -1.0, 1.0))
b = tf.Variable(tf.zeros([1]))
y = W * x_data + b

# Minimize the mean squared errors.
loss = tf.reduce_mean(tf.square(y - y_data))
optimizer = tf.train.GradientDescentOptimizer(0.5)
train = optimizer.minimize(loss)

# Before starting, initialize the variables.  We will 'run' this first.
init = tf.global_variables_initializer()

# Launch the graph.
sess = tf.Session()
sess.run(init)
```

No Coding- Believe me!

Data is KING, where do I get my data/datasets

Dataset sources for machine Learning

Machine Learning Tools

Datasets – Building Units of ML
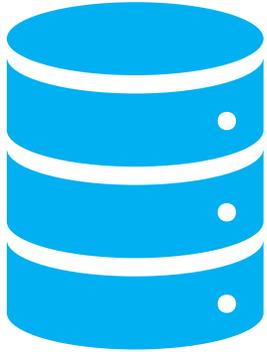
❑You need data

❑What is a dataset

❑Why do I need them for ML

❑How do I source them

Machine Learning Tools
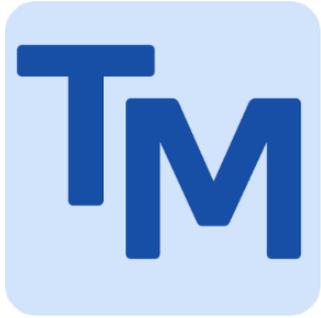
Web-based
Google Teachable Machine

Desktop – based
Microsoft Lobe

lobe

Teach Computer to Learn - Three Steps Process

1. Label

2. Train

3. Play

Images
Import images from your computer.

Camera
Capture images with your webcam.

Dataset
Import a structured folder of images.

Label

Train

Play

All Images — 80 %
Fern — 75 %
Madrone — 85 %
Toyon — 78 %
Manzanita — 82 %

Correct 80%

Fern ✓

Incorrect 20%

Export
Choose the format you would like to use when running your model in your app.

ML CoreML
Used for iOS and macOS apps.

TensorFlow
Used for cross-platform apps.

TensorFlow Lite
Used for mobile apps.

Local API
Used to host your model locally.

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Hands-on Activities – Teachable Machine

- **Data source (images)**
  - Identify objects for your data source (three objects for data classification)
  - Use your laptop webcam to capture your images(Data) OR
  - Extract your data from the web 5 – 10 images are ok (see resource folder)
- **Classify your images**
  - Class 1 – rename
  - Class 2 – rename
  - Class 3 – rename
- **Training your model**
  - The more images the more time it takes to train.
  - What's happening during the Training?

- **Preview /Export model**
  - Test confidence level of your model prediction

Hands-on Activities – Lobe

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Deploy Trained Model

1. Deploy Model
   a) Preview
   b) Export model
2. Get Sharable Link
3. Copy link to browser

Export your model:

(●) Upload (shareable link)   (○) Download   [☁ Update my cloud model]

Your sharable link:

| https://teachablemachine.withgoogle.com/models/8vBHEBmEc/ | Copy ⧉ |

1. Click Side Navigation(top left)
2. Export
3. Choose Format (five choices)
4. Requires some Coding (not here)

≡

New Project...

Import...

Export...

Export
Choose the format you would like to use when running your model in your app.

TensorFlow Lite
Used for universal mobile apps.

TensorFlow.js
Used for browser web apps.

TensorFlow
Used for general Python apps.

ONNX
Used for cross platform apps.

Local API
Used to host your model locally.
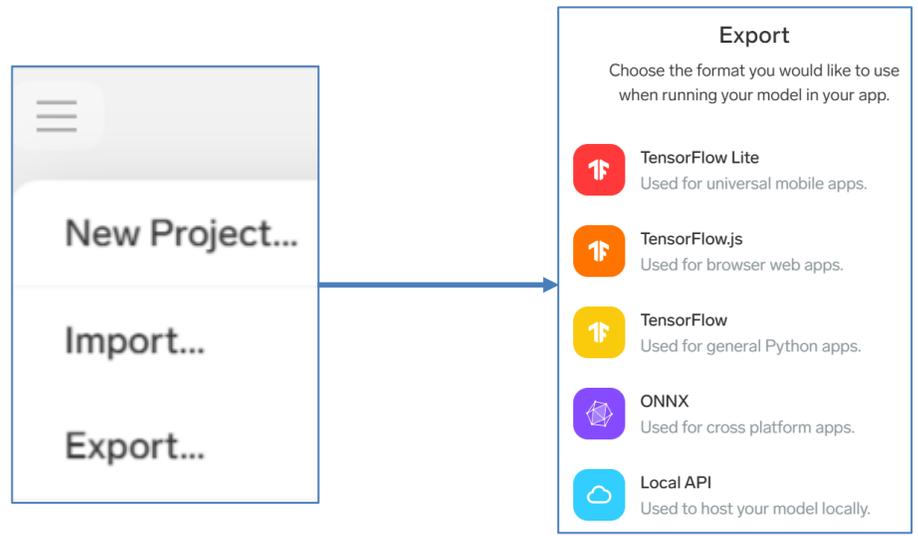
ML Integration in Classrooms

Now What?

❑ What does ML understanding mean to Educators?

❑ What sense-making activities of ML would you offer your students?

❑ What ways are students experiencing ML in real life?

Interactive Audience Participation (Breakroom & Main Room)

Resources

Presentation & Hands-on Activity Resource Folder

1. https://drive.google.com/drive/folders/14iDk8p_VR9xsMWJGcmsIKiQVobAztP-0?usp=sharing

Resource Links

1. Machine learning for Kids - https://machinelearningforkids.co.uk/#!/about
2. IBM Machine Learning for Kids - https://www.ibm.org/activities/machine-learning-for-kids
3. Learn About Artificial Intelligence - https://code.org/ai
4. How AI Works Machine Learning - https://youtu.be/KHbwOetbmbs
5. Artificial Intelligence in Education - https://aipodcast.education/
6. Code.org/ai - https://code.org/ai#ai-videos
7. Elements of AI - https://www.elementsofai.com/
8. Google Teachable Machines - https://teachablemachine.withgoogle.com/
9. Microsoft Lobe - https://lobe.ai/

Q & A

"If we teach today as we taught yesterday.
We rob our children
of tomorrow."

John Dewey

Thank You for Participating

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