

# Let's Learn Some Machines

Josh Myers-Dean, Robin Cosbey

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Josh Myers-Dean, Robin Cosbey

- > Name, pronouns
- > Year in school
- > Experience with machine learning

> Navigate to <https://github.com/wwu-mentors/MachineLearning-Workshop>

The screenshot shows the GitHub repository page for `wwu-mentors / MachineLearning-Workshop`. The repository has 2 unwatchers, 1 star, and 1 fork. The `Code` tab is selected, showing a list of files and their commit history. The files include `workshop_tex`, `.gitignore`, `LICENSE`, `README.md`, `decision.tree.png`, `dt.png`, and `iris.csv`. The commit history for each file is as follows:

File	Commit Message	Time Ago
<code>workshop_tex</code>	more small fixes for deployment	4 days ago
<code>.gitignore</code>	Added gitignore	3 months ago
<code>LICENSE</code>	Initial commit	15 months ago
<code>README.md</code>	More updates	3 months ago
<code>decision.tree.png</code>	Final updates	3 months ago
<code>dt.png</code>	Some more details	3 months ago
<code>iris.csv</code>	Initial material	3 months ago

The repository also shows 36 commits, 1 branch, 0 packages, 0 releases, and 3 contributors. The MIT license is also indicated.

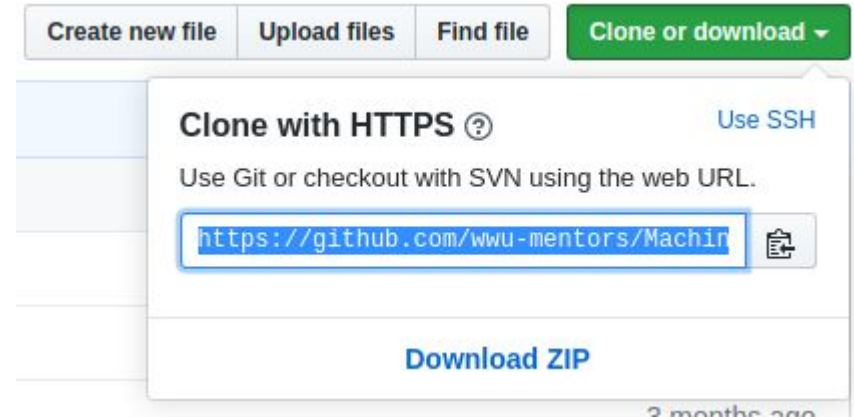
> Navigate to <https://github.com/wwu-mentors/MachineLearning-Workshop>

> Clone the repository

```
git clone <paste url here>
```

> Go into the repository directory

```
cd MachineLearning-Workshop
```



> Navigate to <https://github.com/wwu-mentors/MachineLearning-Workshop>

> Clone the repository

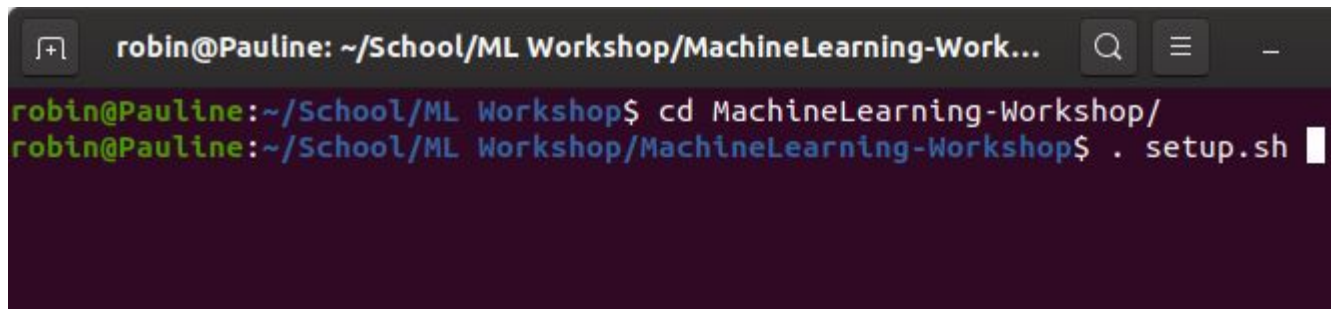
**git clone <paste url here>**

> Go into the repository

**cd MachineLearning-Workshop**

> Run the setup.sh bash script

**. setup.sh**

A terminal window with a dark background. The title bar shows 'robin@Pauline: ~/School/ML Workshop/MachineLearning-Work...'. The terminal content shows two lines of commands and their prompts: 'robin@Pauline:~/School/ML Workshop\$ cd MachineLearning-Workshop/' and 'robin@Pauline:~/School/ML Workshop/MachineLearning-Workshop\$ . setup.sh'. The cursor is at the end of the second line.

```
robin@Pauline: ~/School/ML Workshop/MachineLearning-Work...
robin@Pauline:~/School/ML Workshop$ cd MachineLearning-Workshop/
robin@Pauline:~/School/ML Workshop/MachineLearning-Workshop$ . setup.sh
```

> Navigate to <https://github.com/wwu-mentors/MachineLearning-Workshop>

> Clone the repository

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> Go into the repository

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> Run the setup.sh bash script

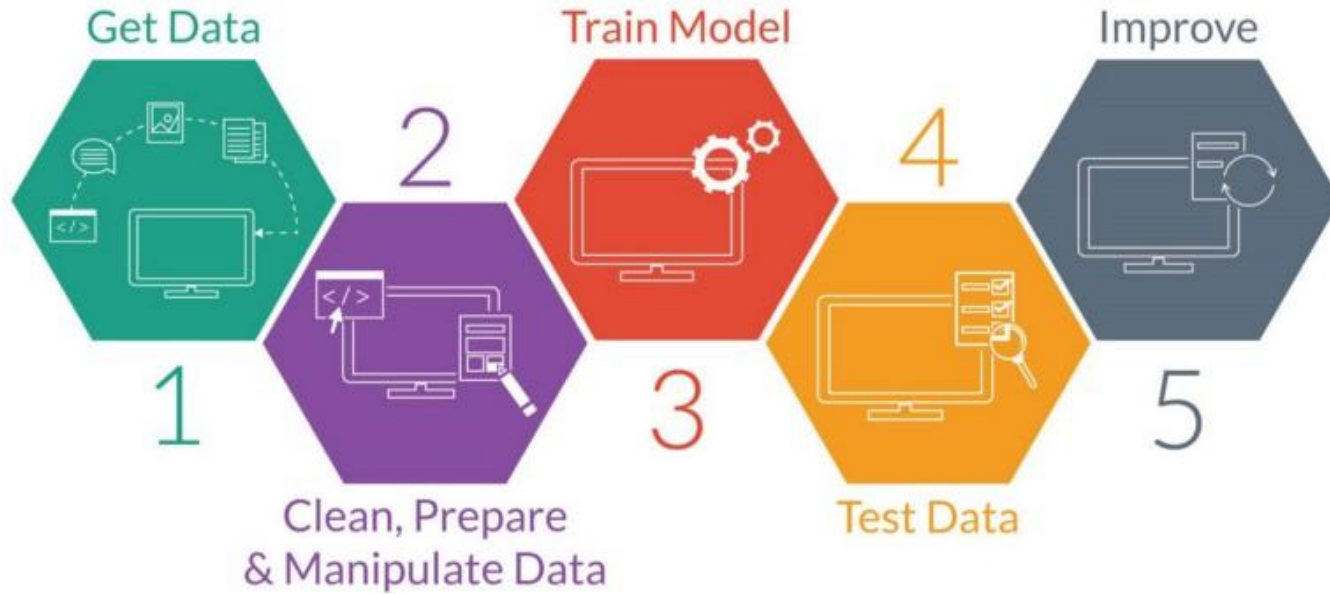
```
. setup.sh
```

> Open the slides and/or pdf to follow along

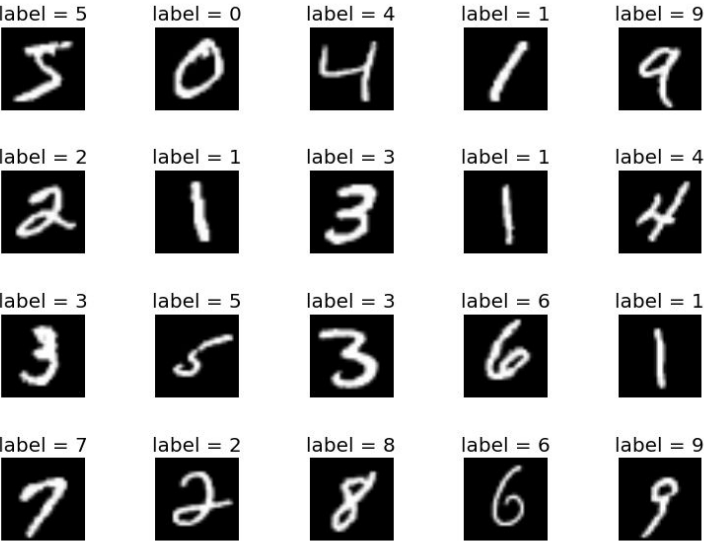
```
evince slides.pdf &  
evince ml_workshop.pdf &
```

> Did you get lost along the way? Raise your hand, we are here to help!

# Introduction



# Data



**Iris Versicolor**

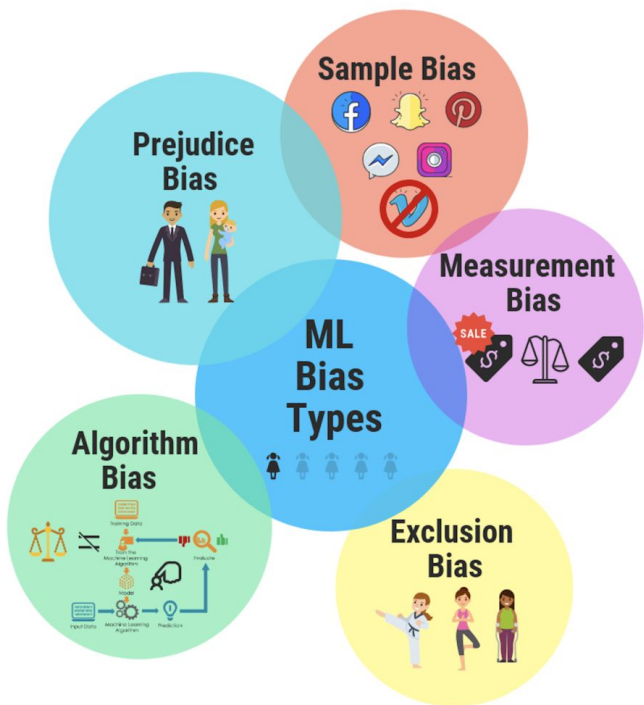
**Iris Setosa**

**Iris Virginica**

Iris	Sepal.L ( $a_1$ )	Sepal.W ( $a_2$ )	Petal.L ( $a_3$ )	Petal.W ( $a_4$ )	Class
$u_1$	5.5 cm	4.2 cm	1.4 cm	0.2 cm	Setosa
$u_2$	5.0 cm	3.4 cm	1.5 cm	0.2 cm	Setosa
$u_3$	6.1 cm	2.9 cm	4.7 cm	1.4 cm	Versicolor
$u_4$	6.2 cm	2.2 cm	4.5 cm	1.5 cm	Versicolor
$u_5$	6.3 cm	2.7 cm	4.9 cm	1.8 cm	Virginica
$u_6$	6.0 cm	2.2 cm	5.0 cm	1.5 cm	Virginica



# Bias and Data



THIS IS YOUR MACHINE LEARNING SYSTEM?

YUP! YOU POUR THE DATA INTO THIS BIG PILE OF LINEAR ALGEBRA, THEN COLLECT THE ANSWERS ON THE OTHER SIDE.

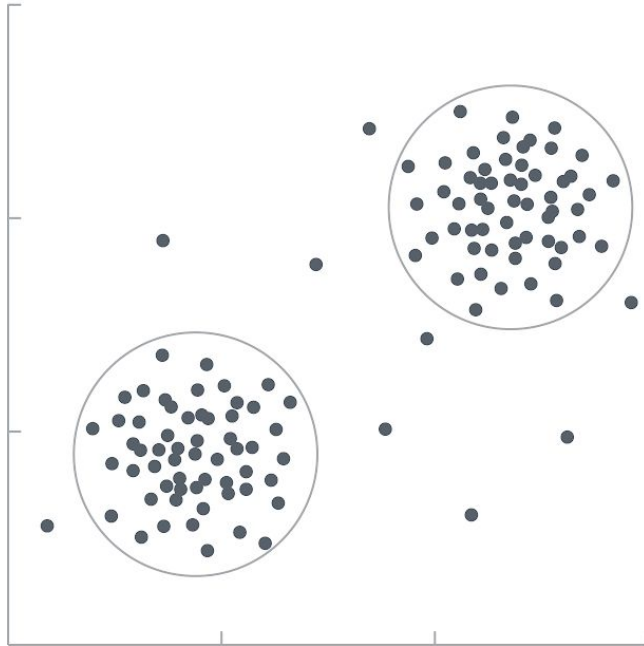
WHAT IF THE ANSWERS ARE WRONG?

JUST STIR THE PILE UNTIL THEY START LOOKING RIGHT.

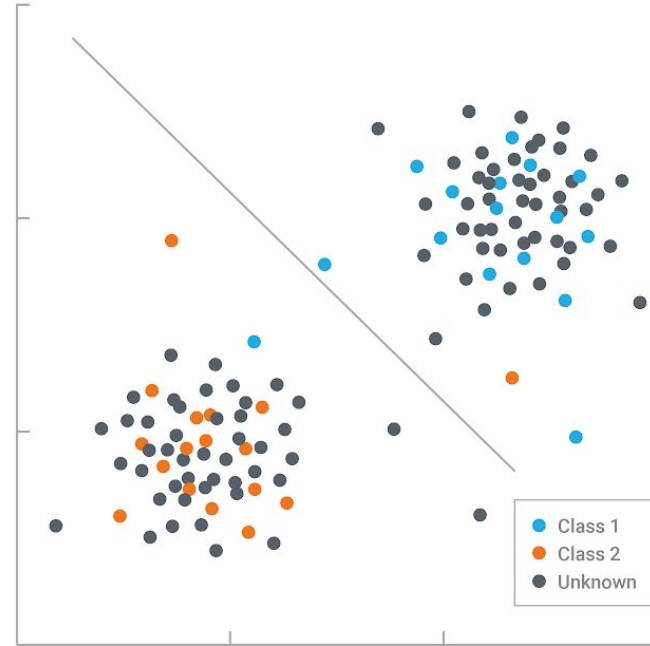


# Unsupervised and Supervised Learning

UNSUPERVISED

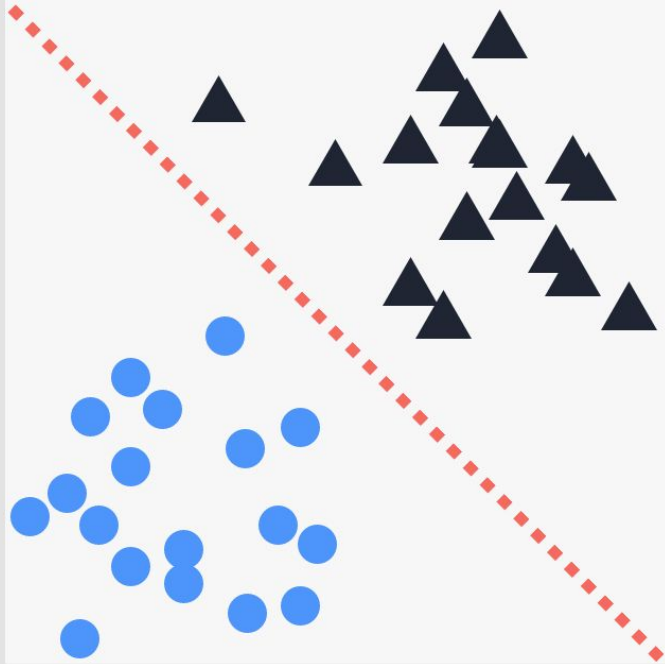


SUPERVISED

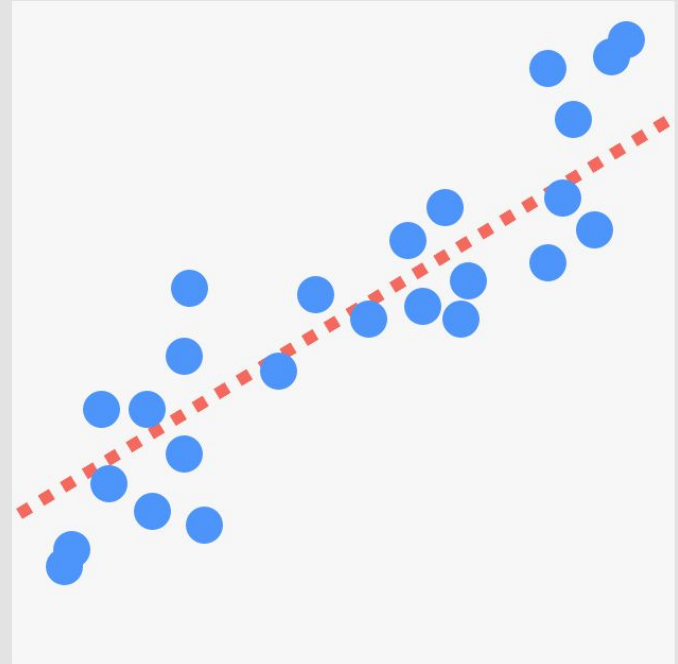


# Supervised: Classification and Regression

Classification



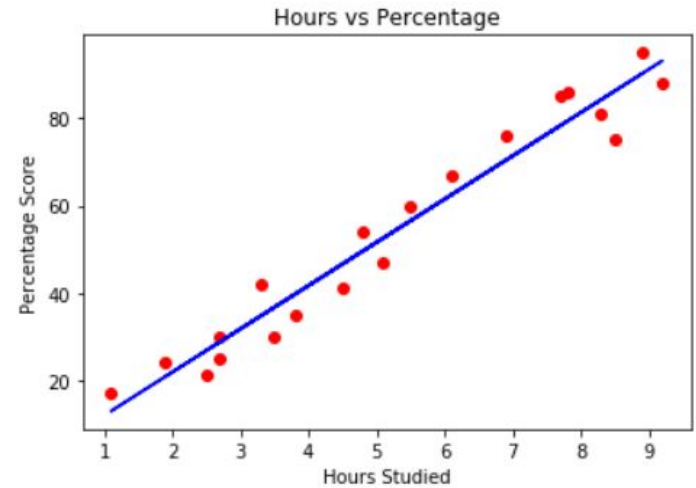
Regression



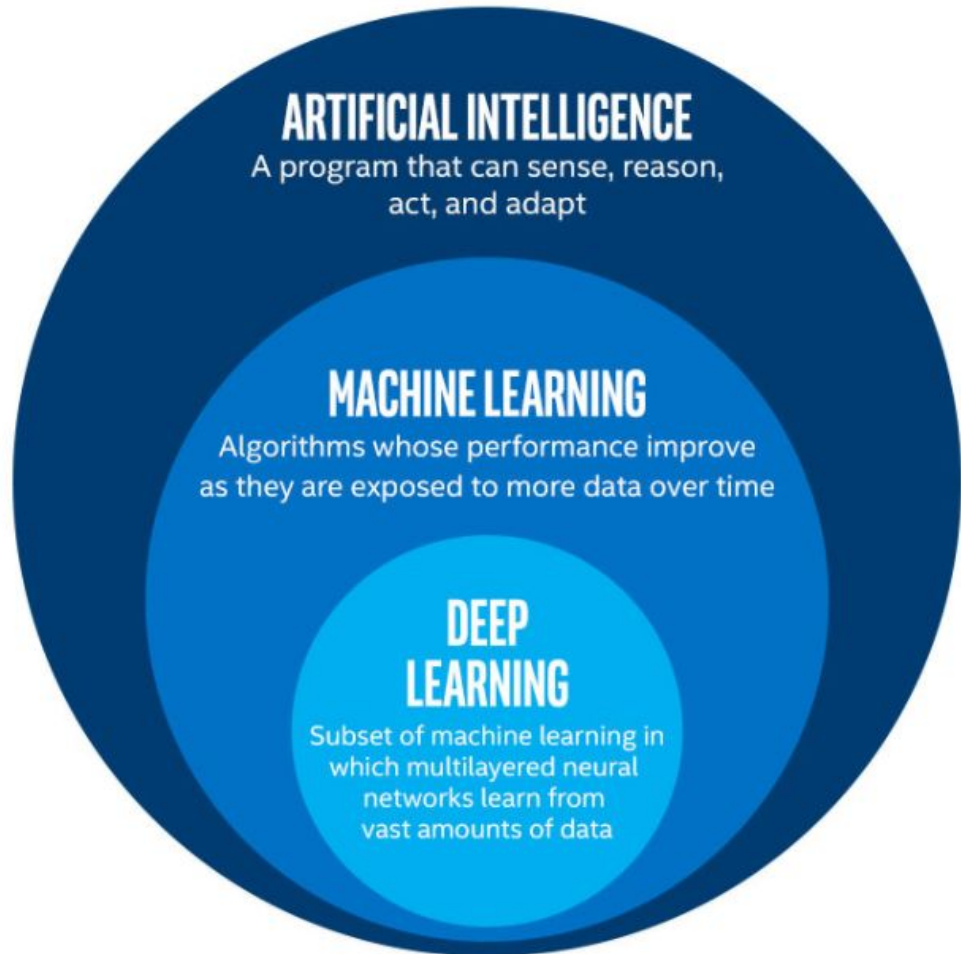
# Classification



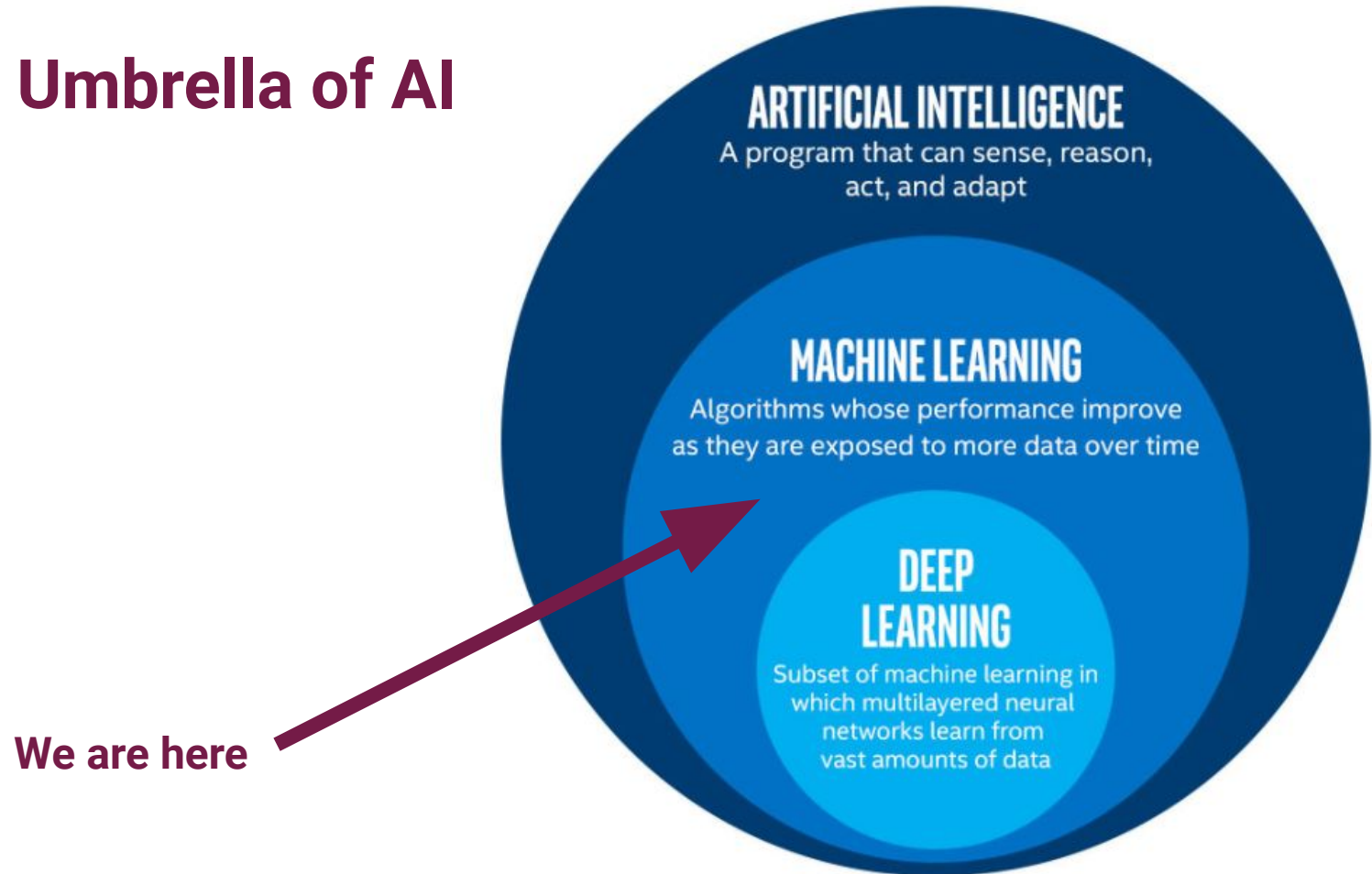
# Regression



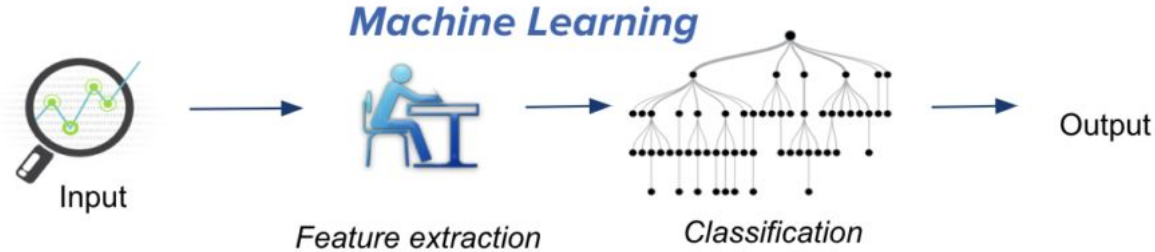
# The Umbrella of AI



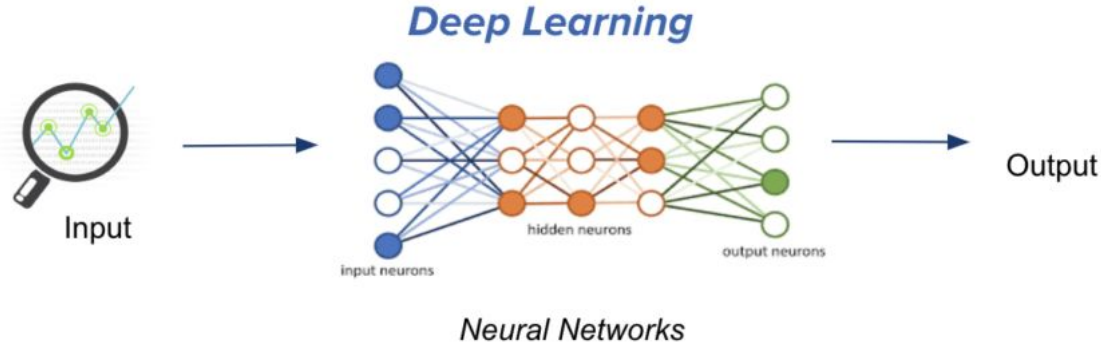
# The Umbrella of AI



# Machine Learning and Deep Learning



Traditional machine learning uses hand-crafted features, which is tedious and costly to develop.



Deep learning learns hierarchical representation from the data itself, and scales with more data.

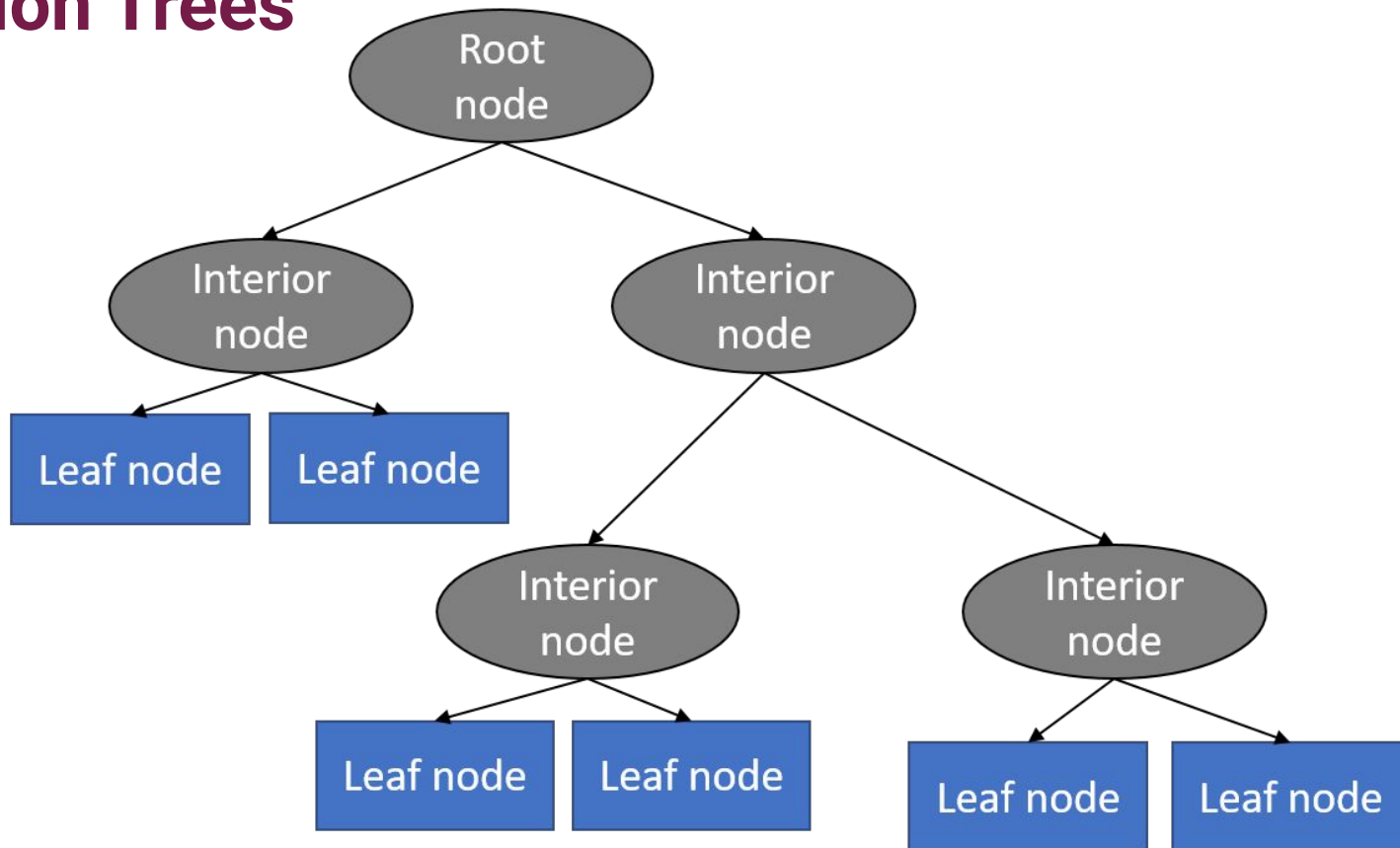


# Machine Learning and Deep Learning

	Machine Learning	Deep Learning
<b>Layered?</b>	Sometimes	Yes
<b>Scalable?</b>	Sometimes	Yes (context dependent)
<b>Data?</b>	Small-Medium	Large
<b>Hardware?</b>	Less intensive (CPU)	More intensive (GPU)
<b>Training Time?</b>	Shorter training time (more feature extraction)	Longer training time
<b>Interpretability?</b>	Completely	Very difficult!

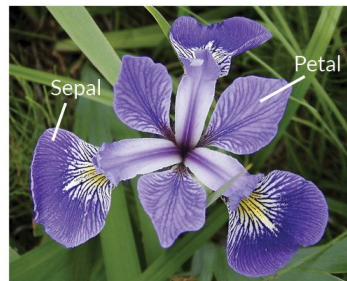


# ML: Decision Trees



# ML: Decision Trees

## Iris Dataset



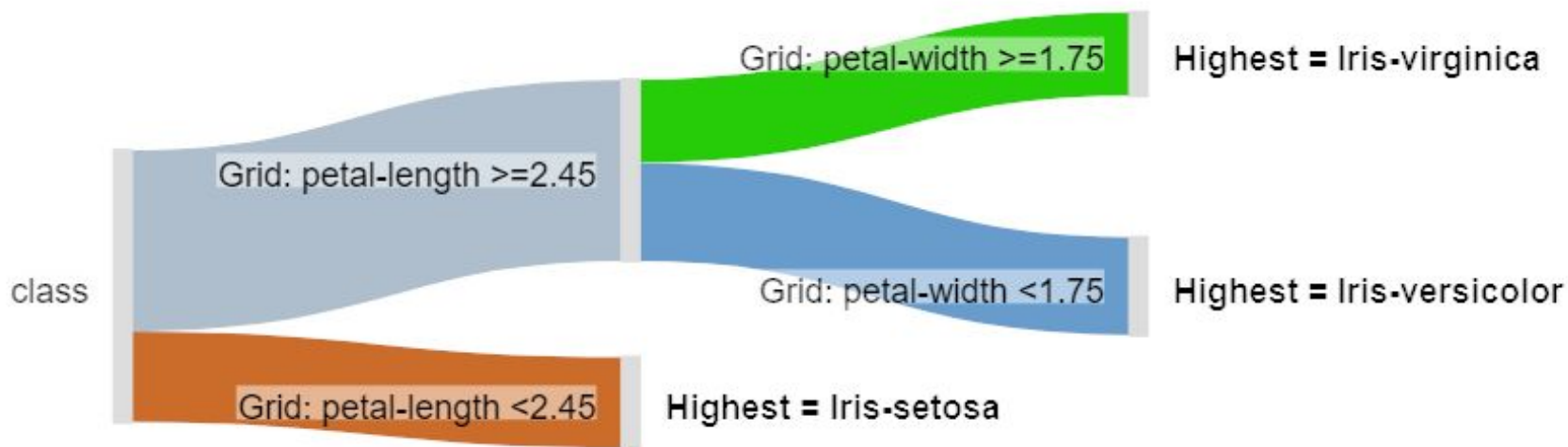
Iris Versicolor



Iris Setosa



Iris Virginica



# Now let's try it out!

## But first: any questions?

> For more information about what we have covered as well as additional algorithms and approaches, check out [\*\*ml\\_workshop.pdf\*\*](#)