

Let's Learn Some Machines

Josh Myers-Dean, Robin Cosbey

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- > 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 listed with the commit message and the time since the last commit.

wwu-mentors / MachineLearning-Workshop

Unwatch 2 Star 1 Fork 1

Code Issues 0 Pull requests 0 Actions Projects 0 Wiki Security Insights

No description, website, or topics provided.

36 commits 1 branch 0 packages 0 releases 3 contributors MIT

Branch: master New pull request Create new file Upload files Find file Clone or download

File	Commit Message	Time
cosbeyr condensed PDF into slides for presentation	Latest commit a90498e	4 hours ago
workshop_tex	more small fixes for deployment	4 days ago
.gitignore	Added gitignore	3 months ago
LICENSE	Initial commit	15 months ago
README.md	More updates	3 months ago
decision.tree.png	Final updates	3 months ago
dt.png	Some more details	3 months ago
iris.csv	Initial material	3 months ago

github.com/wwu-mentors/.../advisories

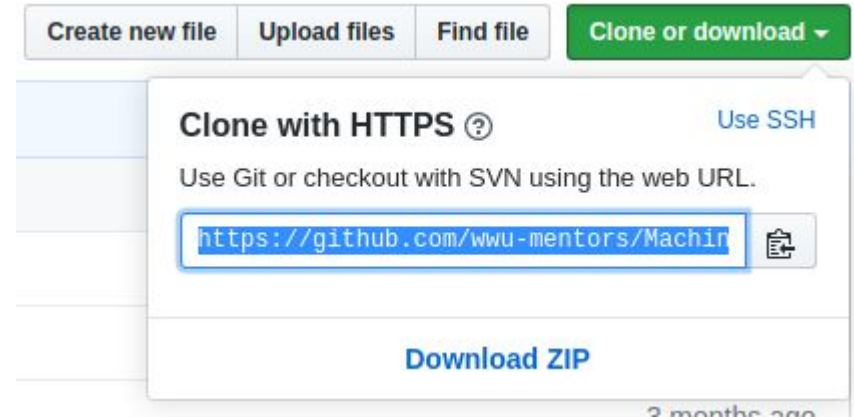
> Navigate to <https://github.com/wwu-mentors/MachineLearning-Workshop>

> 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

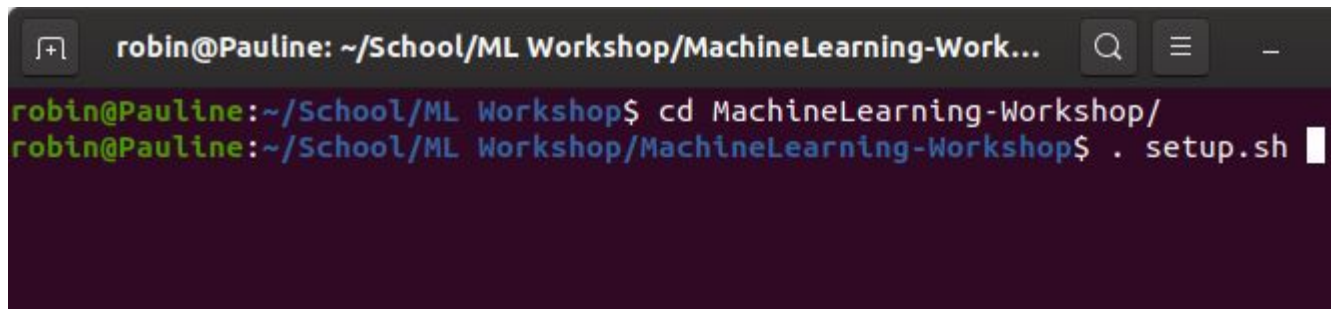
git clone <paste url here>

> 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

git clone <paste url here>

> Go into the repository

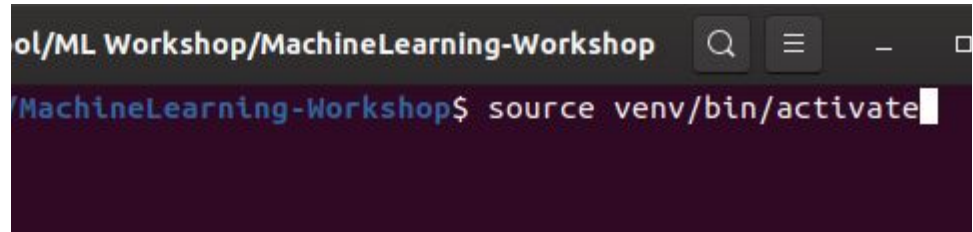
cd MachineLearning-Workshop

> Run the setup.sh bash script

. setup.sh

> Activate the virtual environment

source venv/bin/activate



```
ol/ML Workshop/MachineLearning-Workshop
MachineLearning-Workshop$ source venv/bin/activate
```

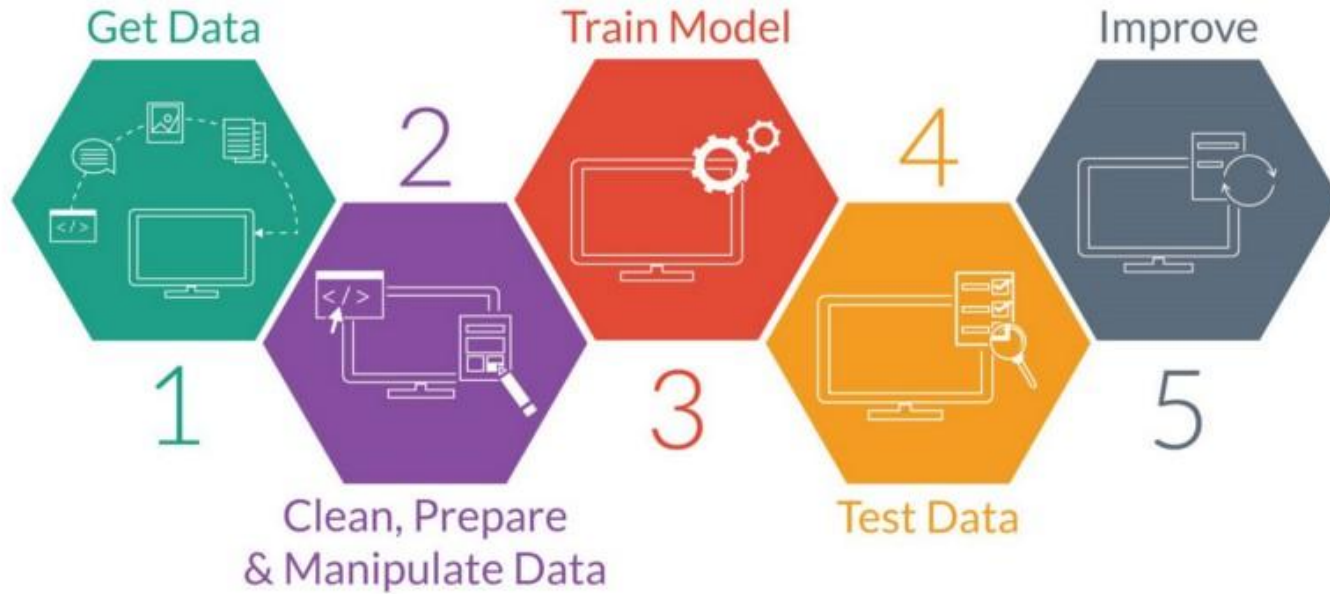
> Open the slides and/or pdf to follow along

evince ml_workshop.pdf &

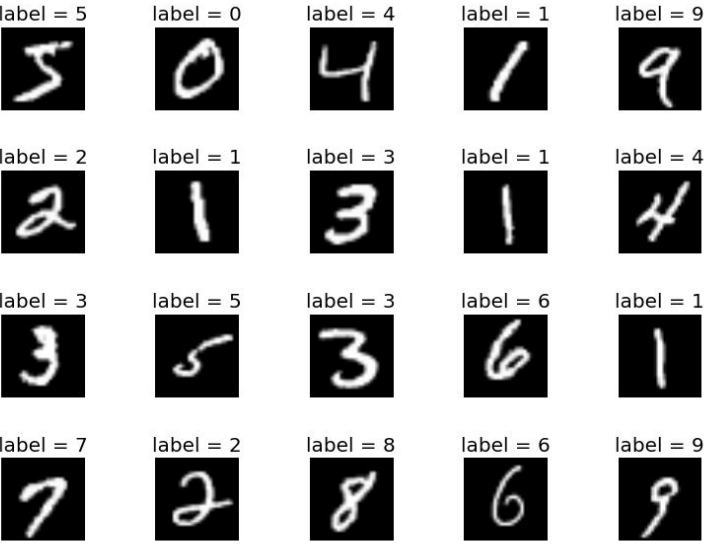
evince slides &

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

Introduction



Data



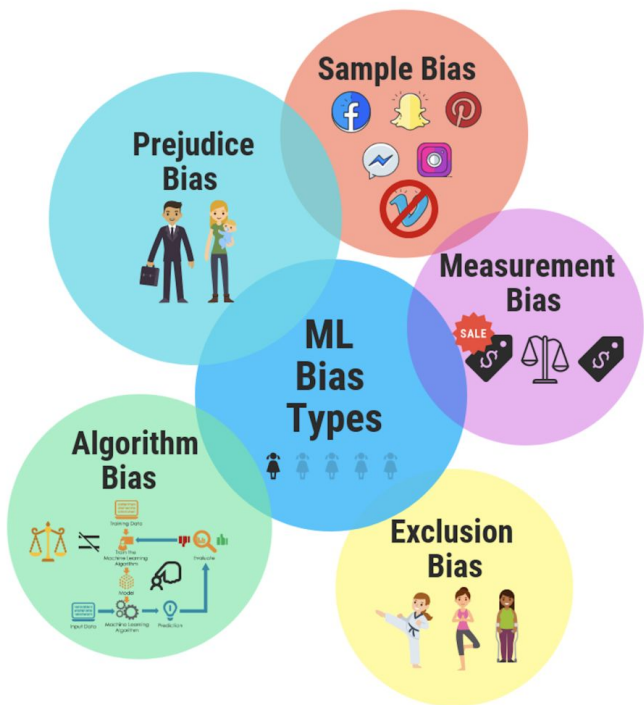
Iris Versicolor

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.

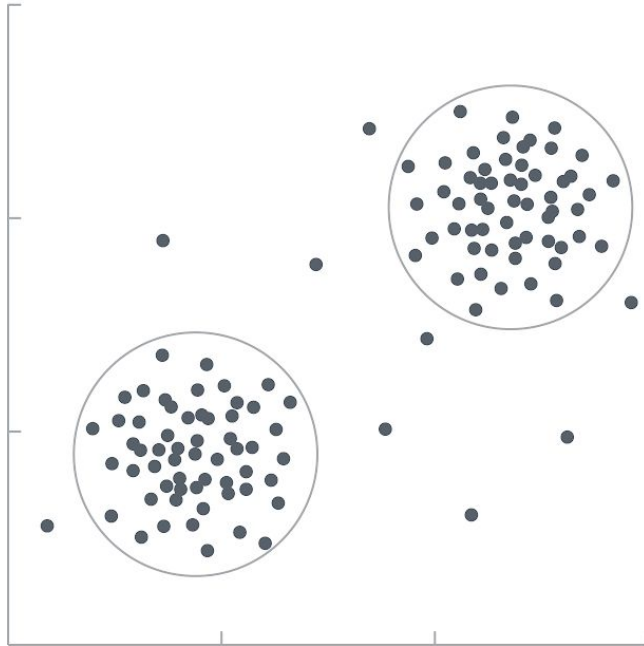
WHAT IF THE ANSWERS ARE WRONG?

JUST STIR THE PILE UNTIL THEY START LOOKING RIGHT.

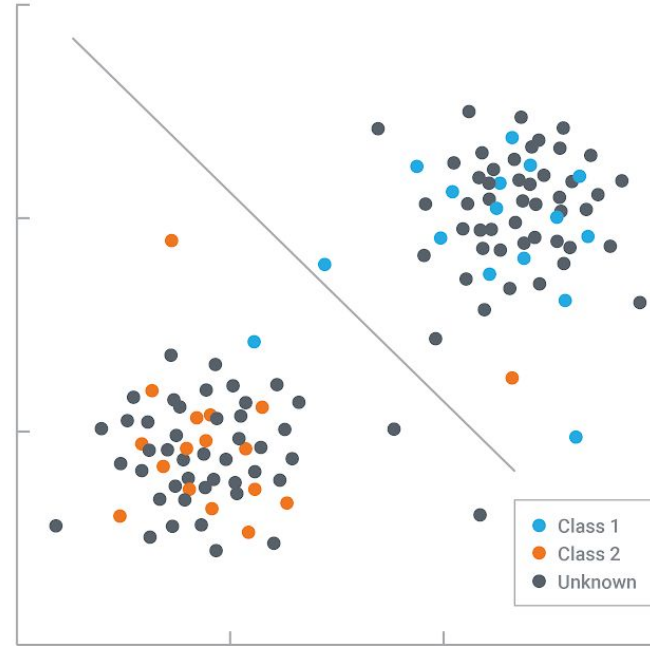


Unsupervised and Supervised Learning

UNSUPERVISED

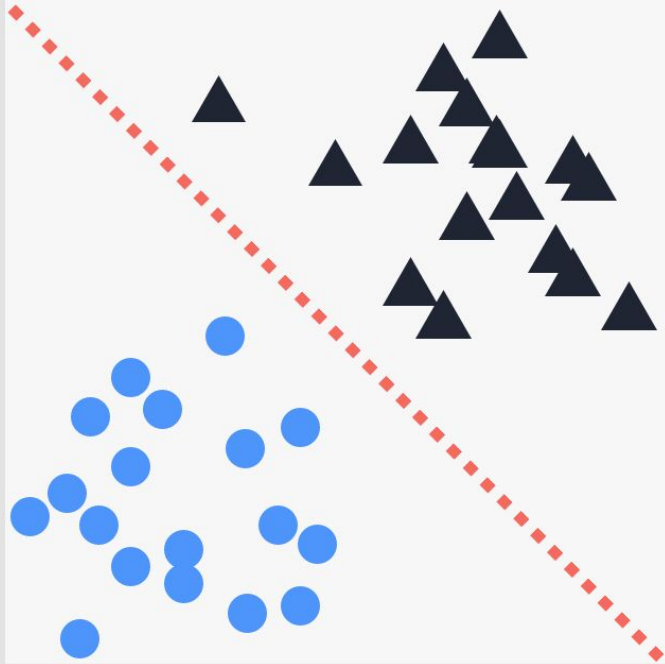


SUPERVISED

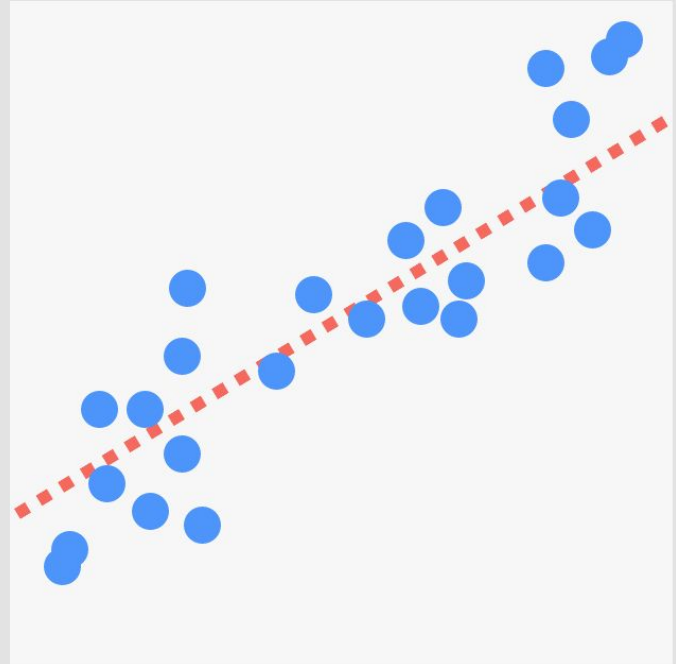


Supervised: Classification and Regression

Classification



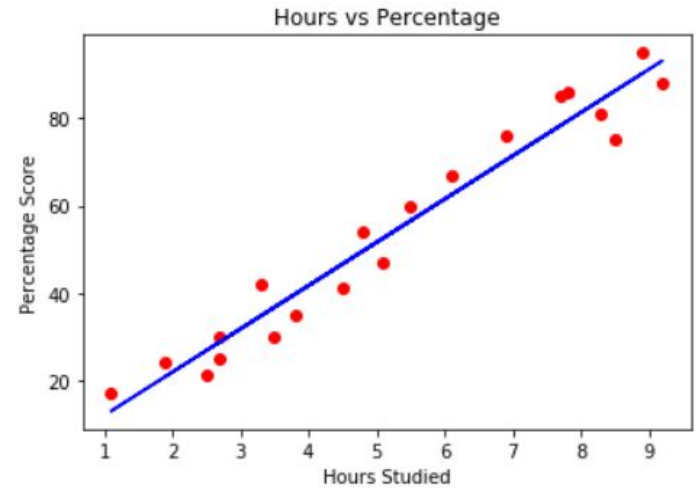
Regression



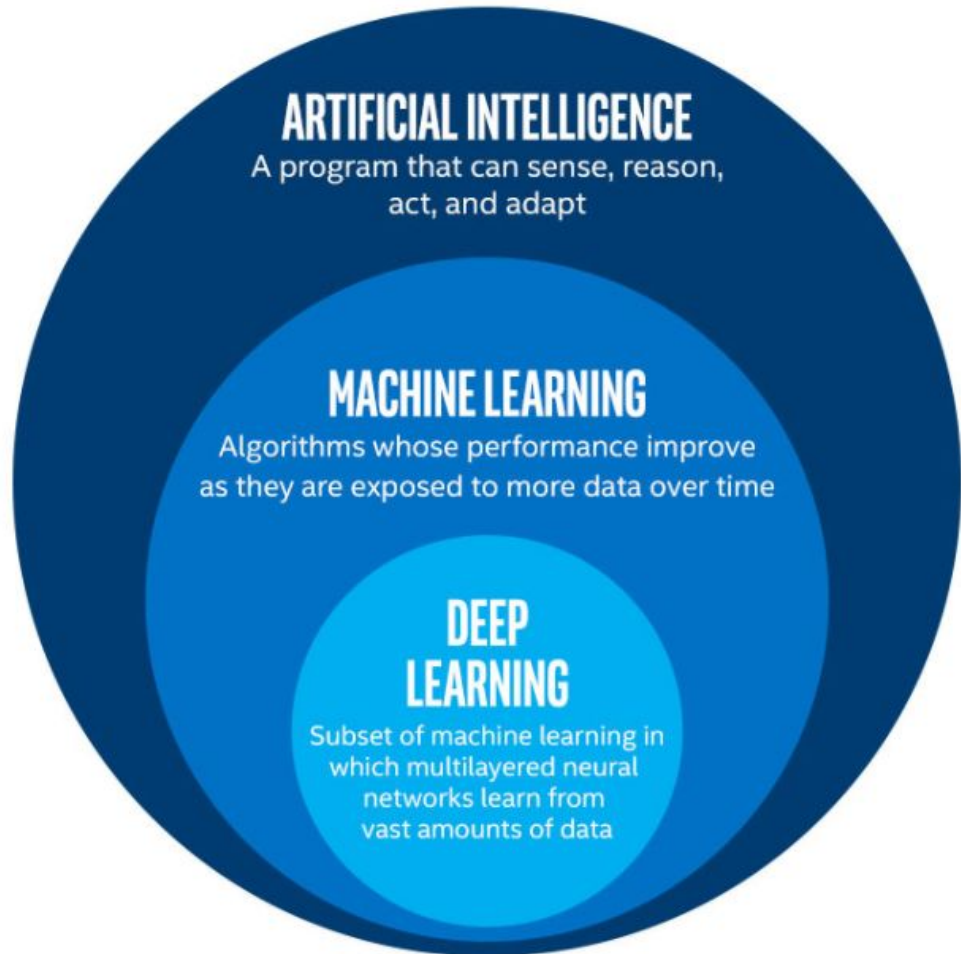
Classification



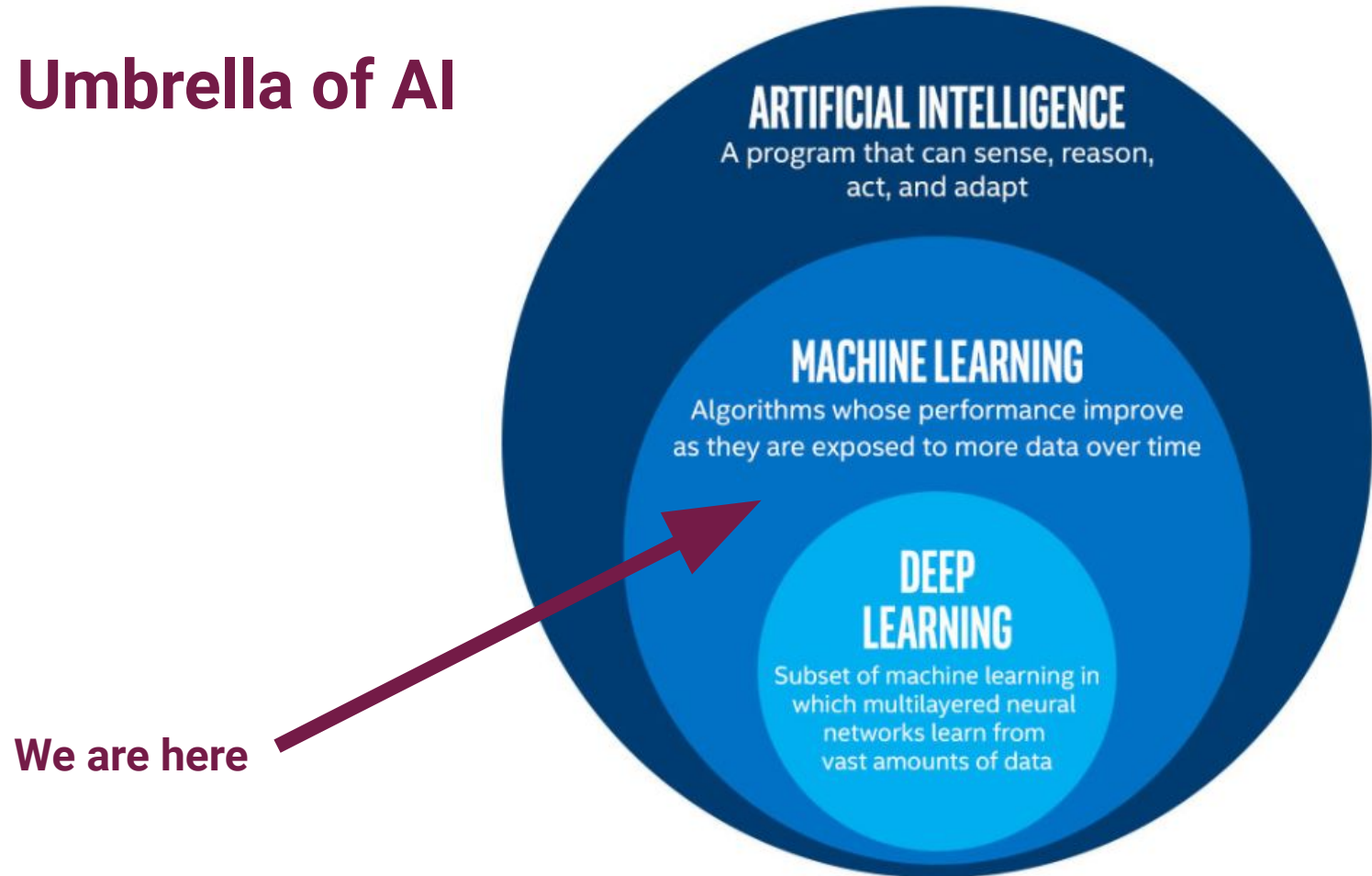
Regression



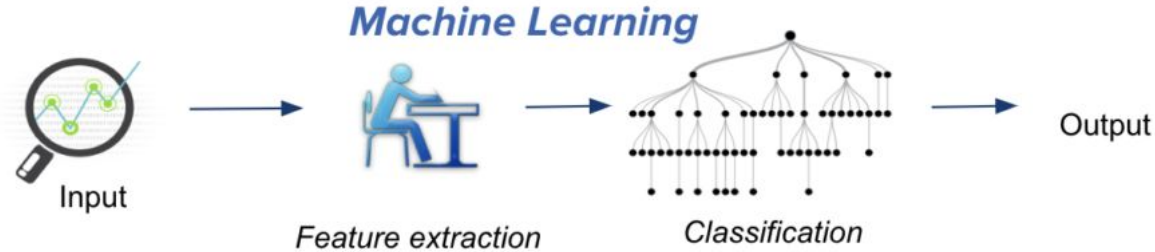
The Umbrella of AI



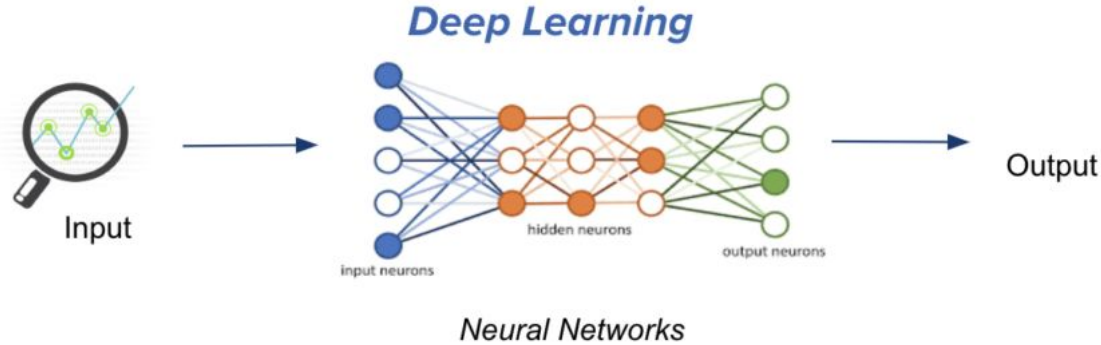
The Umbrella of AI



Machine Learning and Deep Learning



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

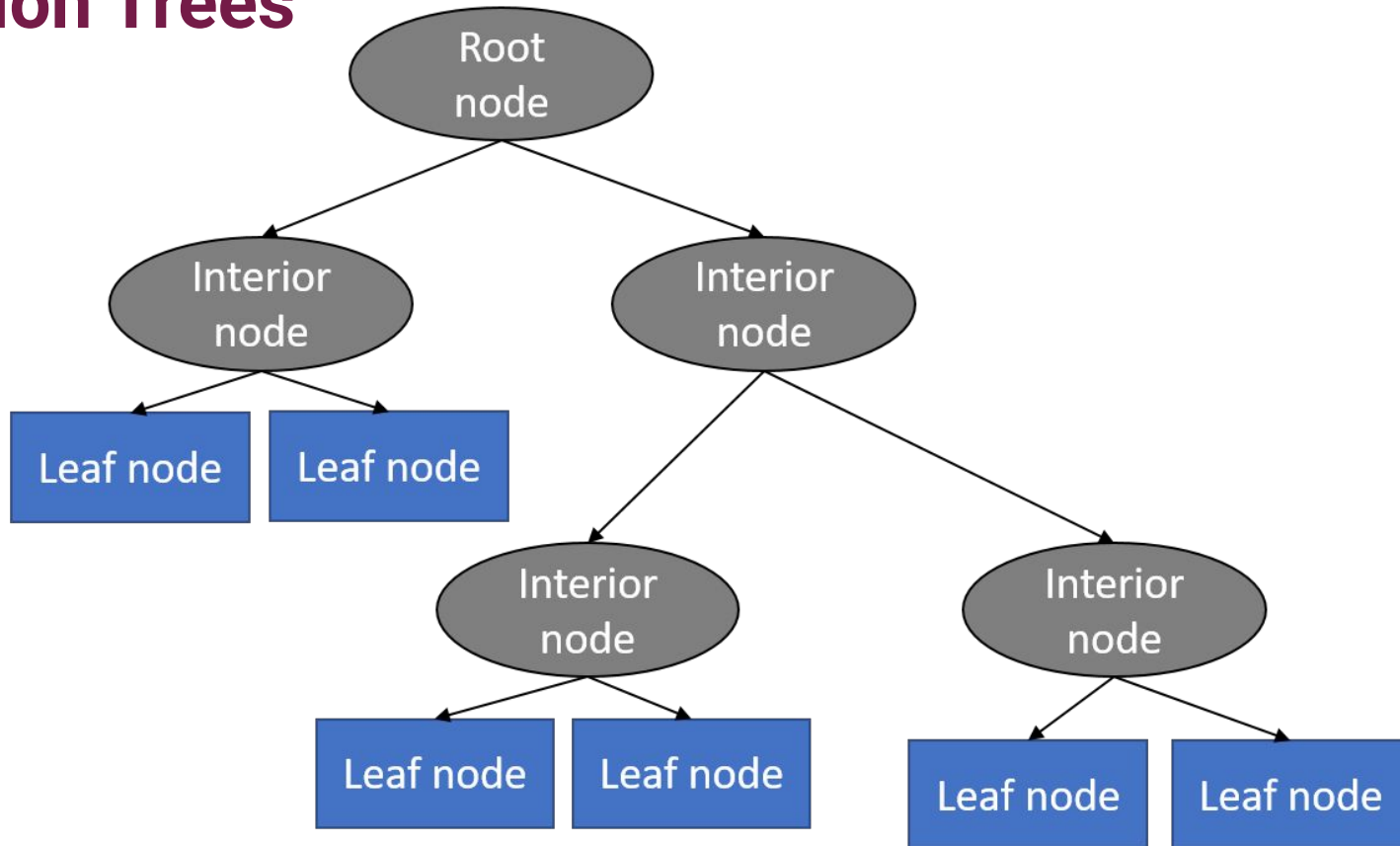


Deep learning learns hierarchical representation from the data itself, and scales with more data.

Machine Learning and Deep Learning

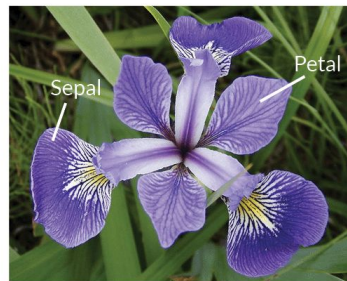
	Machine Learning	Deep Learning
Layered?	Sometimes	Yes
Scalable?	Sometimes	Yes (context dependent)
Data?	Small-Medium	Large
Hardware?	Less intensive (CPU)	More intensive (GPU)
Training Time?	Shorter training time (more feature extraction)	Longer training time
Interpretability?	Completely	Very difficult!

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**](#)