

Beyond AI Hype

Data & Algorithms

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Session II



Session II Schedule

AI Activity Presentations

Group Discussion

Data & Algorithms Lecture

ML Activity

Activity Debrief



AI Activity Presentations

- Flashcards
- AutoDraw
- Google Translate

Group Discussion

- What do you know about datasets?
- What do you know about algorithms?
- Do you know how they impact ML models?

Data & Algorithms Lecture

What is data?

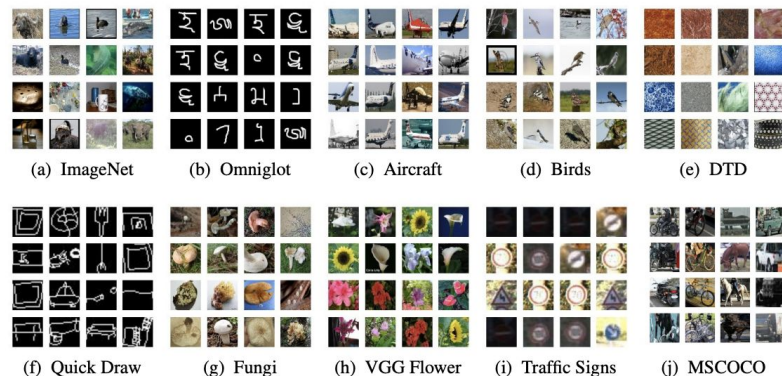
Data is information or facts that are collected, organized, and stored for analysis, interpretation, or reference. It can be in the form of numbers, text, images, audio, or any other representation that can be processed and used to gain insights, or make decisions.

Data is typically generated from observations, measurements, or interactions with the environment.



What are datasets?

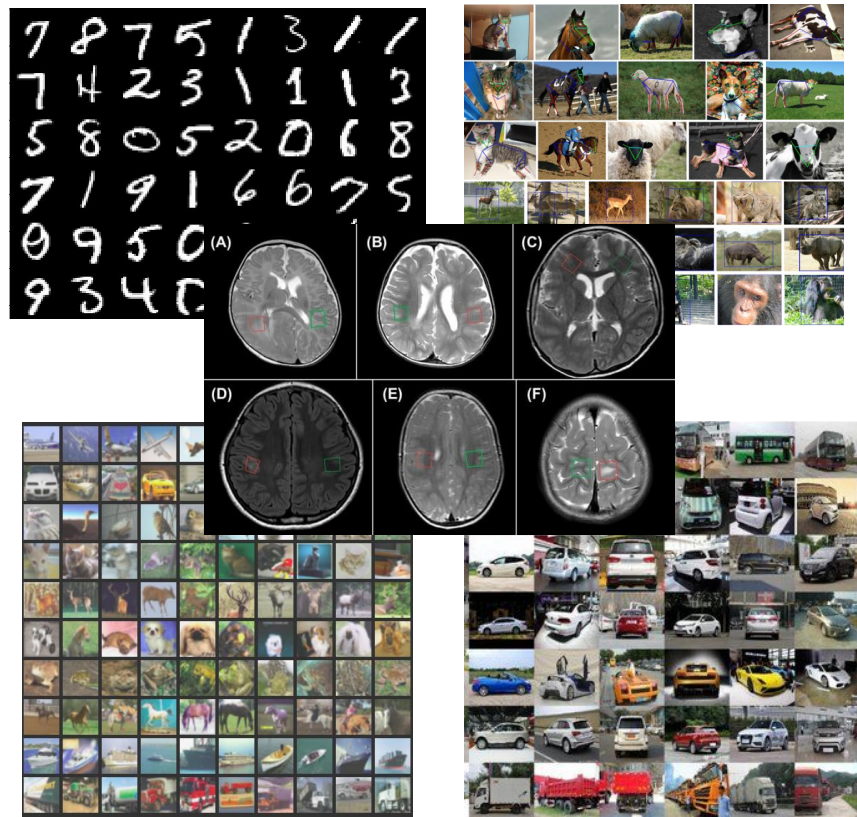
Datasets refer to structured collections of related data that are organized and stored together. Datasets are used to analyze and draw insights from the collected data. They can contain information from diverse sources and domains, such as surveys, experiments, observations, or real-world events.



<https://paperswithcode.com/dataset/meta-dataset>

Dataset Examples

Datasets can be used
to train machine
learning models that
recognize a variety
of things like cars,
animals, types of
cancer, numbers, and
more!



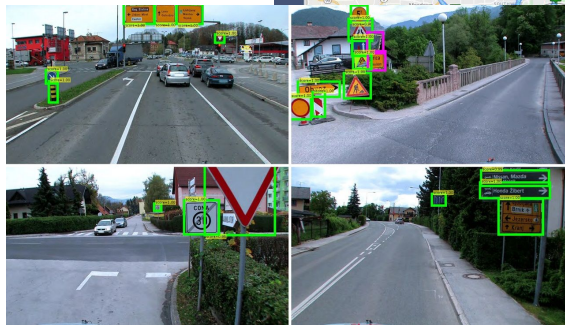
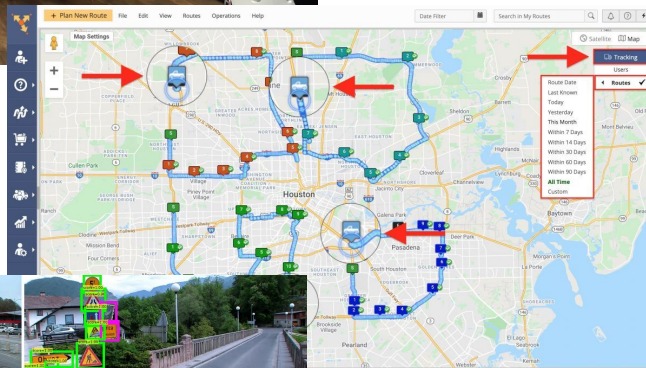
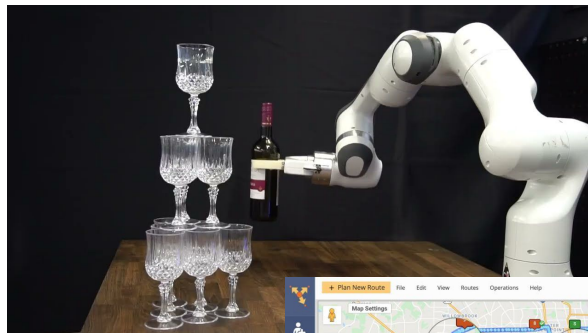
What is an algorithm?

An algorithm is a set of step-by-step instructions or rules that are designed to solve a specific problem or perform a specific task. They can be simple or complex, and they are used to solve problems, make decisions, process data, or accomplish a specific goal. Algorithms are essential in programming and computing as they provide the logic and instructions necessary for computers to perform tasks accurately and efficiently.



Algorithm Examples

Algorithms can be used to train computers and robots to perform different tasks such as recognizing images, performing specific tasks, and analyzing trends from data.

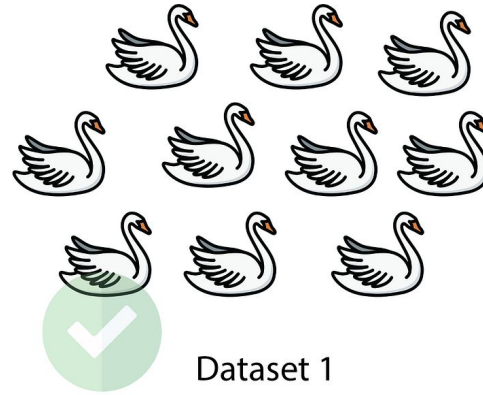


...datasets and
algorithms also come
with issues!



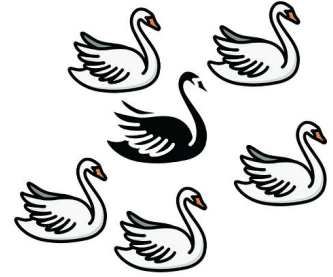
Dataset Bias

- People have biases that affect how they perceive and value things
- Datasets can be biased in how they are collected, organized, and annotated



Dataset 1

All swans are white

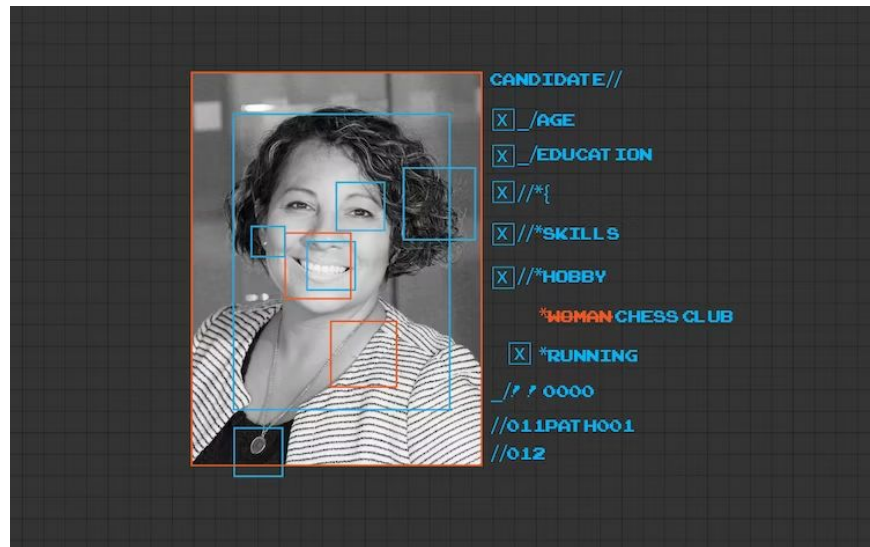


Dataset 2

<https://towardsdatascience.com/types-of-biases-in-data-cafc4f2634fb>

Algorithmic Bias

- Algorithmic bias refers to the presence of unfair or discriminatory outcomes in automated decision-making systems or algorithms
- Biased datasets can also lead to biased algorithms



<https://www.liberties.eu/en/stories/decision-making-algorithm/44189>

How does bias impact ML models?



How is data used in ML?

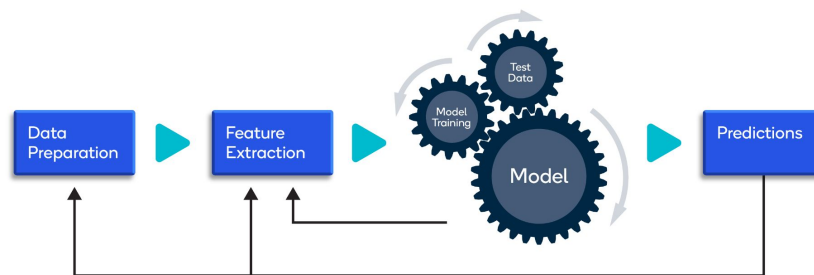
- Collect data
- Clean data
- Label data
- Separate data into training + validation + test



<https://www.shaip.com/blog/top-10-data-labeling-faqs/>

How are ML models trained?

- Build ML model
- Tune hyperparameters
- Input data
- Train ML model



<https://developer.qualcomm.com/software/qualcomm-neural-processing-sdk/learning-resources/ai-ml-android-neural-processing/data-collection-pre-processing>

How are ML models evaluated?

- Evaluate model
 - Check statistics
- Refine parameters
- Re-train model

		Prediction	
		0	1
True Label	0	48 true negatives	8 false positives
	1	4 false negatives	37 true positives

<https://www.jeremyjordan.me/evaluating-a-machine-learning-model/>

ML Activity

Teachable Machines by Google

teachablemachine.withgoogle.com



ML Activity Instructions

- Gather data (images, sounds, poses, etc.)
- Train model
- Export model
- Write up your findings

Teachable Machines Tutorials

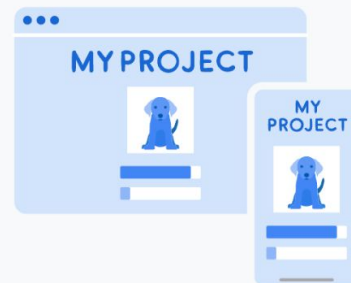
Class 1



Class 2



TRAIN MODEL



1 Gather

Gather and group your examples into classes, or categories, that you want the computer to learn.

[Video: Gather samples](#) ▶

2 Train

Train your model, then instantly test it out to see whether it can correctly classify new examples.

[Video: Train your model](#) ▶

3 Export

Export your model for your projects: sites, apps, and more. You can download your model or host it online.

[Video: Export your model](#) ▶

ML Activity Write-Up

- Test out what images/sounds/poses your model **works on**
- Test out what images/sounds/poses your model **doesn't work** on
- How can you **trick** your model?
- How does **tweaking** your model improve the performance?
 - Try changing the epochs, batch size, and learning rate

Activity Debrief

Activity Debrief

- How did you like the activity?
- What did you learn?
- What questions do you still have?

Questions?

End of Session II

Thank you!
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