

*****Adapted from Dancing with AI by MIT**
<https://dancingwithai.media.mit.edu/curriculum>



Movement and Visual AI

What IS Movement?

- *How can you tell if something is moving or not?*
- *Are there different kinds of movement?*



***What is this movement?
What are they doing?***



Gif via Giphy

(**Dancing with AI - Day 1, Slide 7)

***What is this movement?
What are they doing?***



Gif via Giphy

(**Dancing with AI - Day 1, Slide 9)

Let's Reflect!

What physical qualities helped you identify the movement? For example: they used a **certain position**, their hands moved **up and down**, their movement was **quick** or **slow**, etc.



Let's Reflect!

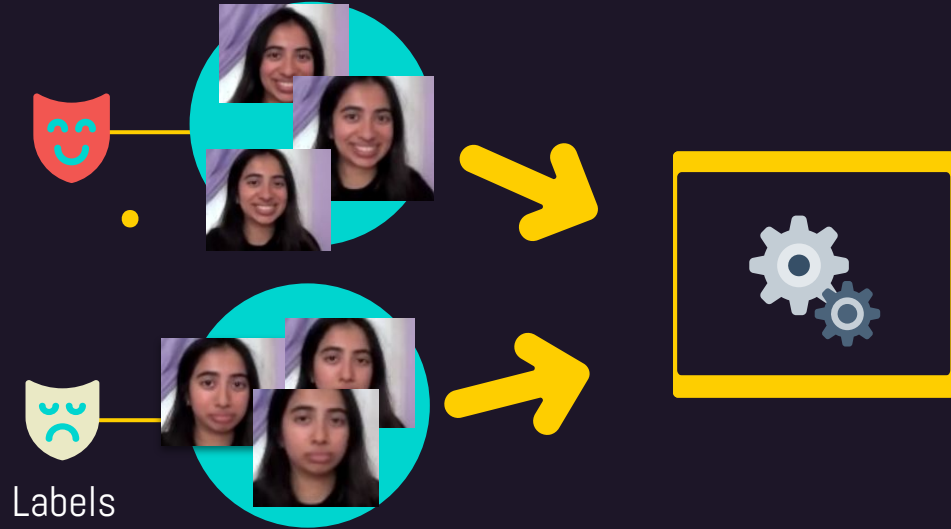
What physical qualities helped you identify the movement? For example: they used a **certain position**, their hands moved **up and down**, their movement was **quick** or **slow**, etc.

These are "features" of the movement.

These features and many others are what Machine Learning systems and visual AI use to recognize images and movements, too!



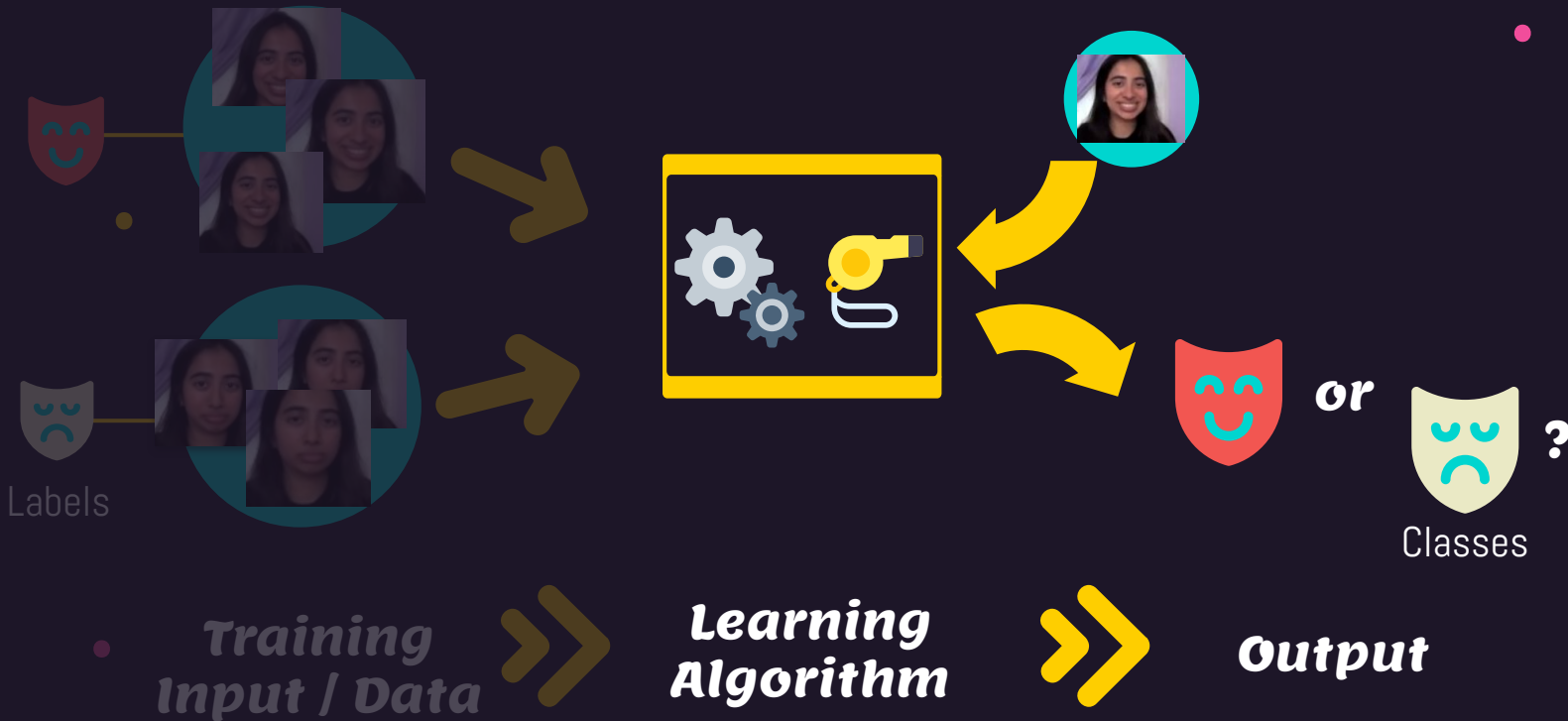
How do Machine Learning systems recognize what they see?



**Training
Input / Data**

**Learning
Algorithm**

How do Machine Learning systems recognize what they see?



Example of a Working Visual AI - Pictionary with an AI!!



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

***Shake
Break!***



Teachable Machine (by Google)



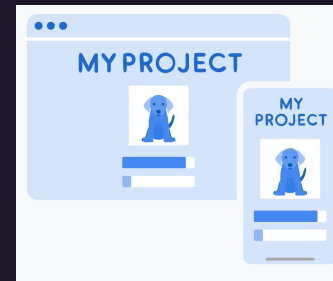
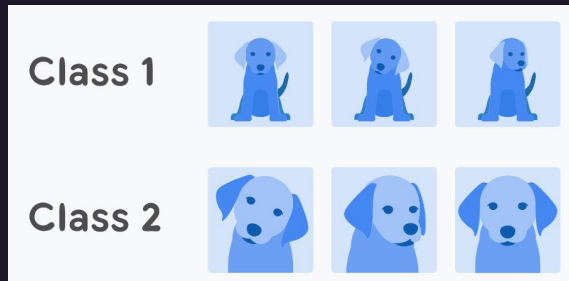
We can use Teachable Machine to train a variety of models with data collected by our computers. We're going to use images and poses.

To capture this data, the computer uses a camera - so you might need to turn off yours if you're here virtually. :)

We're going to train a model together!



Training an ML Model with Teachable Machine



**Training
Input Samples**



**Learning
Algorithm**



Output

Let's Try It!



- Go to <https://teachablemachine.withgoogle.com/train>
- First, I'll train an image model and a pose model (you can follow along or watch!)
- Then, YOU come up with 2-3 labeled categories and train an image model and a pose model to differentiate them. Train at least 30 samples for each class.



Chillin' like a Villain



1. How can you trick the AI that you created into identifying something **incorrectly**?



2. What **harmful effects** would those tricks have if your AI system was used in your school/neighborhood/city?

The data you feed your model is very important to what it learns and how it handles tricky situations.

Crazy Cake Caper!

(don't do this in real life...)

You're a team of aspiring robbers, ready to steal a shipment of delicious cake that I've just loaded into a van. Your inside person has told you the route my van will take to arrive at its destination (my house).

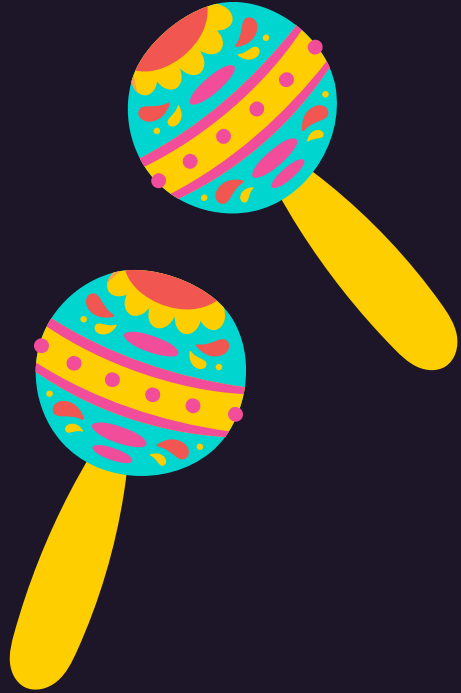
The van is driven by an AI that knows to stop when it sees a **red** stop sign, to follow the **numbers** on a speed limit sign, and to slow down at **any yellow caution signs**.

How can you trick this AI van to easily steal the cakes?



*Those plots you came up with
are examples of **adversarial data**
- one of the many reasons
modern AI can fail in the
real-world.*

***Awesome
Work,
Everybody!***



Acknowledgements and Attribution

This curriculum was adapted from “Dancing with AI” curriculum from the MIT Media Lab, licensed as CC-BY-NC under Creative Commons (link on slide 1). “Dancing with AI” was created by the Personal Robots Group at the MIT Media Lab.

Slides taken directly from “Dancing with AI” curriculum or those with few alterations are marked with a footnote, with the original slide identified.

All other slides are either created by Jazmin Collins (using templates and graphics from “Dancing with AI”) or largely altered from their original form to fit the “Movement and Visual AI” lesson plan.