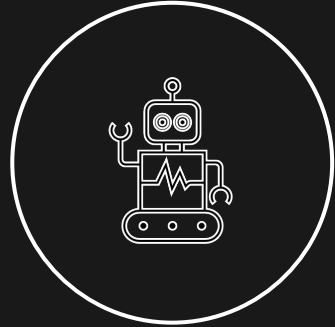


# Introduction to Machine Learning

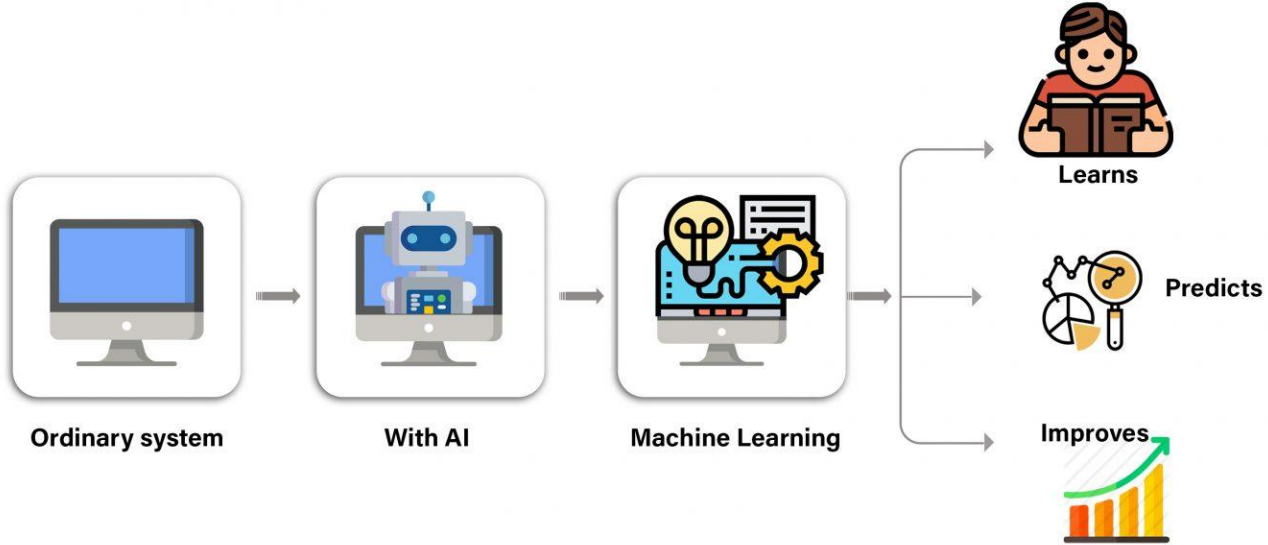
Here is where your presentation begins

# What is Machine Learning?

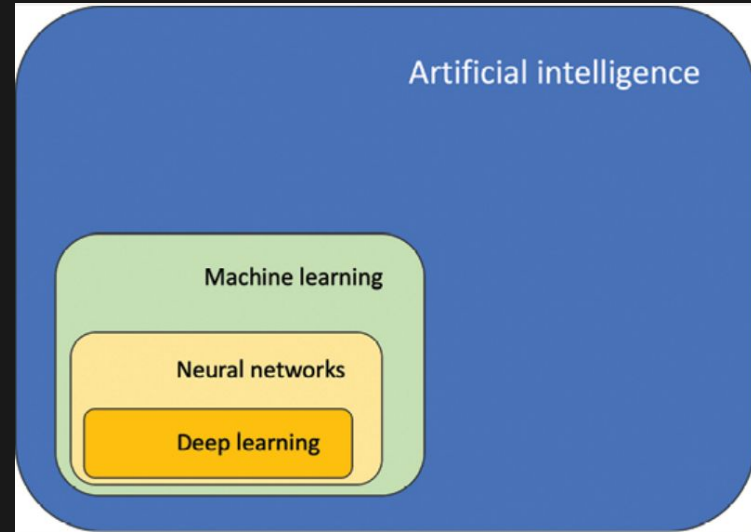
Machine Learning is useful for tasks with steps that would take too long to write or that are too complex to describe. Instead of describing a task's exact steps to a machine, we can use Machine Learning to show the machine examples of the task over and over again until it learns how to perform that task.



# Concept of Machine Learning



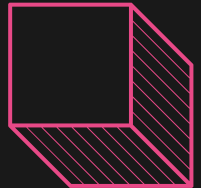
# Difference between Machine Learning and Artificial Intelligence



*Artificial intelligence* is a general term used to describe projects where a machine is doing something that would normally require human intelligence. It doesn't say anything about *how* you get the machine to do that thing, and there are lots of different techniques you can use. ML is just one way to make an AI project.

# AI Cases

- Object recognition
- Speech recognition/sound detection
- Natural Language Processing/Sentiment Analysis
- Prediction (given some inputs, what is the expected output for unseen examples)
- Creative tasks (learning to draw an image in a style of an artist)
- Translation between languages
- Restoration/Transformation (generating faces based on what it knows a face is)

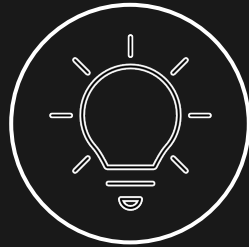


# How Machine Learning Works?



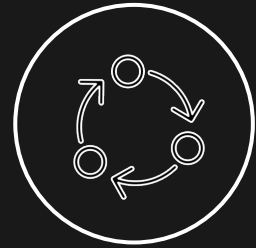
## Supervised learning

Observing what others did in similar situations.



## Unsupervised learning

Observing a situation and trying to come up with the best possible logic on the spot to decide/conclude.



## Reinforcement Learning

Learning from previous mistakes/successes.



# Supervised learning

In Supervised Learning, a computer can see the characteristics and value of 5 houses and come up with the value of the 6th house if its characteristics are known.

Or, it can tell what word in a sentence is the name of a country or city, given there are example sentences that may or may not contain names of cities or countries. Plus, every occurrence of a country and city name is tagged in these examples.





# Unsupervised learning

Unsupervised learning is where you ask the computer to make decisions based on raw data attributes and a set of measurable quantities. Some examples would include asking a computer to come up with localities in a dataset where the latitude and longitude of a house are given. It would use Lat-Long to find distances and form localities of houses.

You can also ask it to come up with a shortened version of a blog post, based on the number of words in the post. Note that no decisions made by others are given to the computer. As you can imagine, these methods might not be exactly close to human subjectivity. Unlike the supervised learning model, unsupervised learning models will make decisions based on a few mathematical quantities you ask them to.






# Reinforcement learning

This is the third type of learning. Under this method, the computer starts by making random decisions and then learns based on errors it makes and successes it encounters as it goes. A recent discovery was an algorithm that could play many different arcade games after learning the correct/wrong moves. Reinforcement learning algorithms start by making a lot of mistakes in the beginning and then get better as they go.

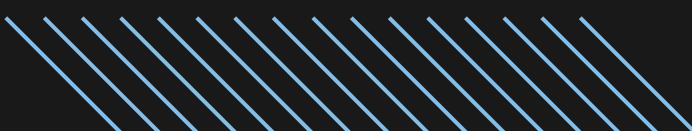
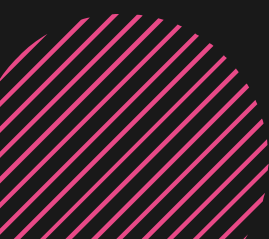


ML is all about predicting stuff essentially.

It is intelligent because:

1. It takes some data to **train** the system
  2. Learns **patterns** from this data
  3. **Classifies** new data it has not seen before for a best guess of what it probably is, based on knowledge gained from step 2.
- 

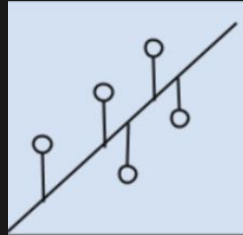
The beauty of ML is that it learns by itself from the data passed to it.



# Common ML Tasks

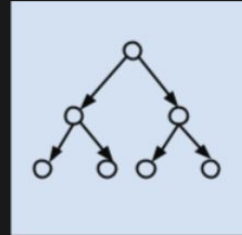
## Regression

Predict numerical values (e.g., Price of house)



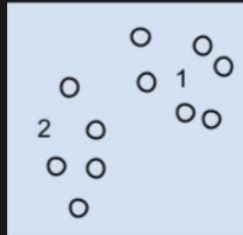
## Classification

One of n labels... (classify cats, dogs, human)



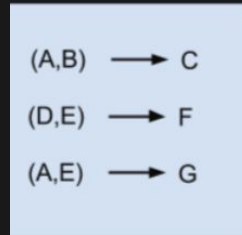
## Clustering

Most similar other examples (e.g., Related products of Amazon)



## Association Rules

E.g., finding associations between products in purchases





# Examples of ML



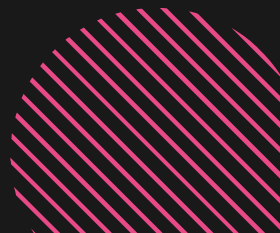
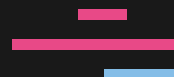
Image recognition



# Examples of ML

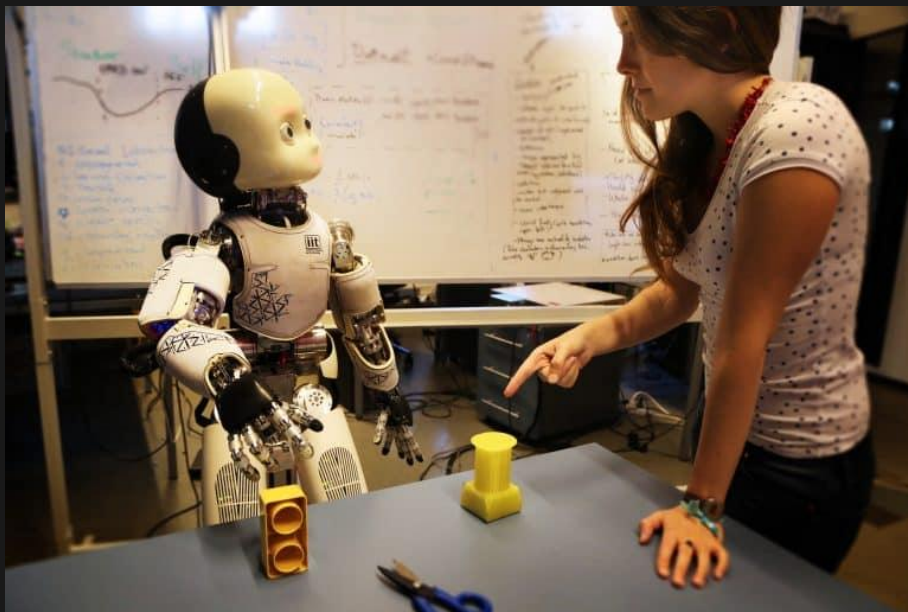


Style transfer

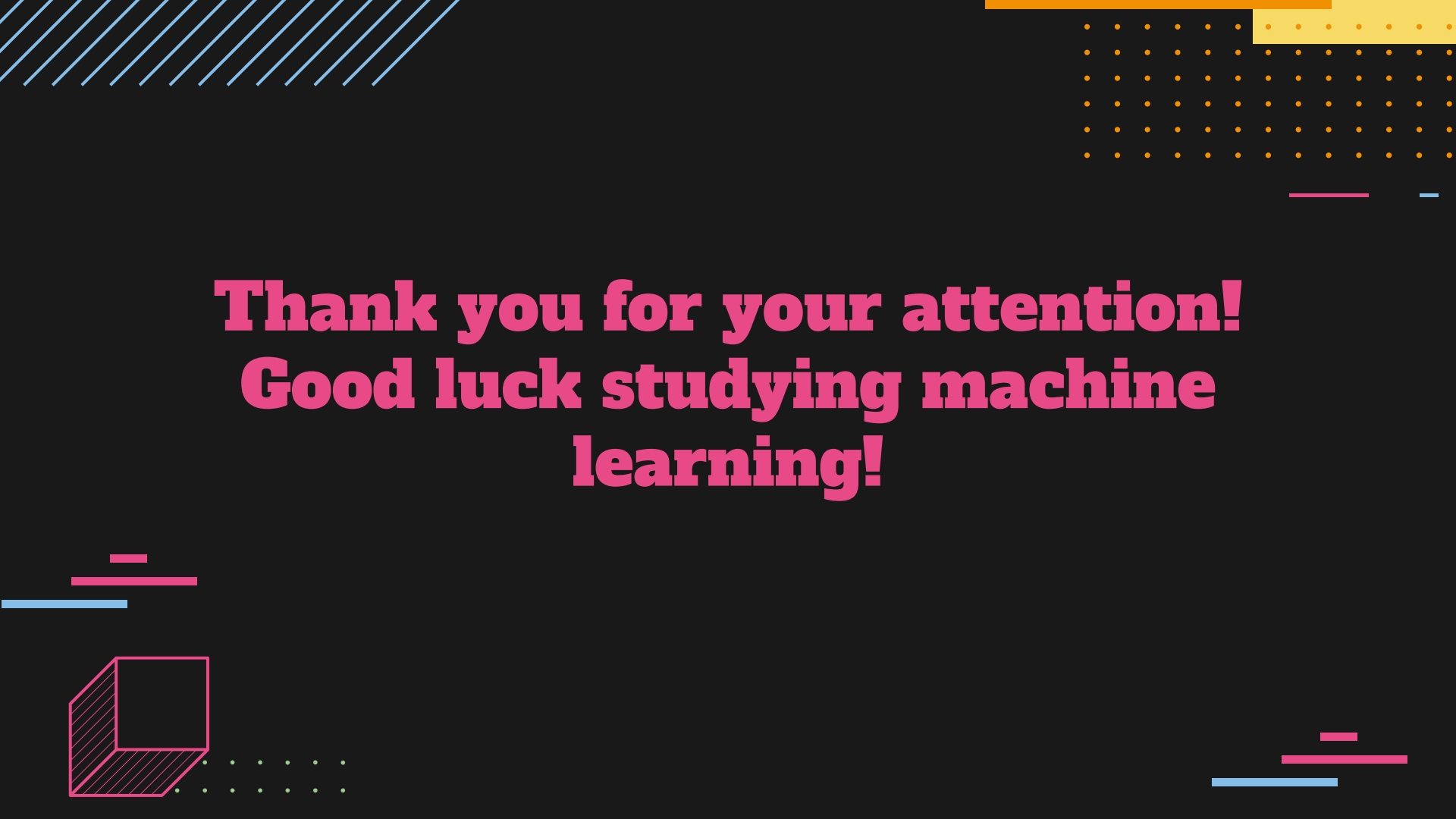




# Examples of ML



Robotics



**Thank you for your attention!**  
**Good luck studying machine  
learning!**

