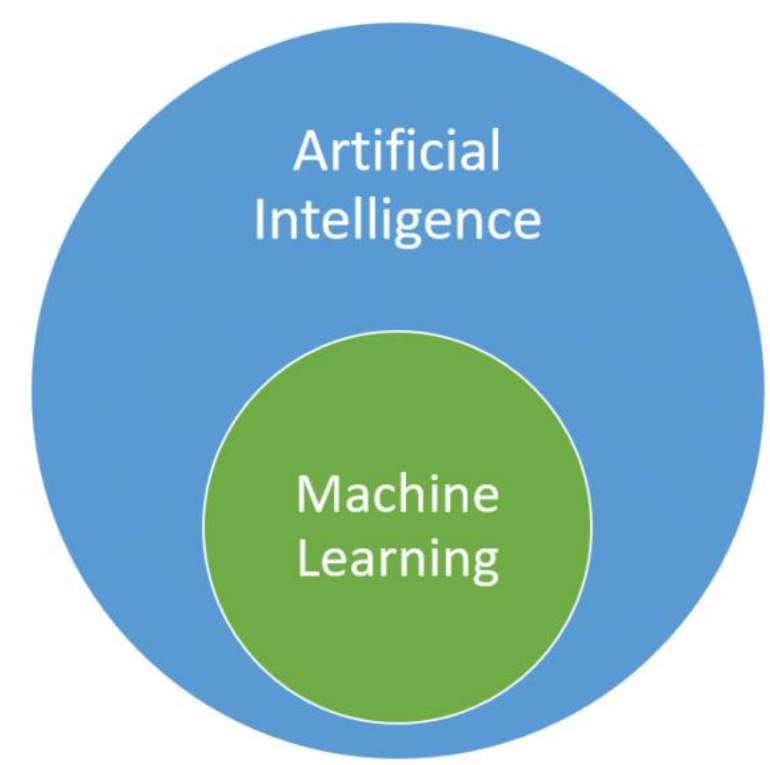
Machine Learning

Artificial intelligence covers everything related to making machines smart or intelligent. Whether it's a robot, a refrigerator, a car, or a software application, if you are making them intelligent, then it's AI.

Machine Learning is commonly used alongside AI but they are not the same thing. ML refers to systems that can learn by themselves, that get smarter and smarter over time without human intervention.

ML is a subset of AI.



Using machine learning, one can make classifiers like an animal classifier, which can identify animals by analyzing their image:

In this lesson, we will learn how ML works in detail.

Topic Covered in the Lesson

1. Machine learning
2. Teachable machines
3. Training data & ML models
4. ML in PictoBlox

Key Learning Outcomes

At the end of the lesson, you will be able to:

1. Understand how machine learning similar is to human learning.
2. Understand how does machine learning cycle work.
3. Make ML models using images in Teachable Machine.
4. Use ML models in PictoBlox to make ML projects.

5. Make an ML model that classifies an image as a cat or a dog.

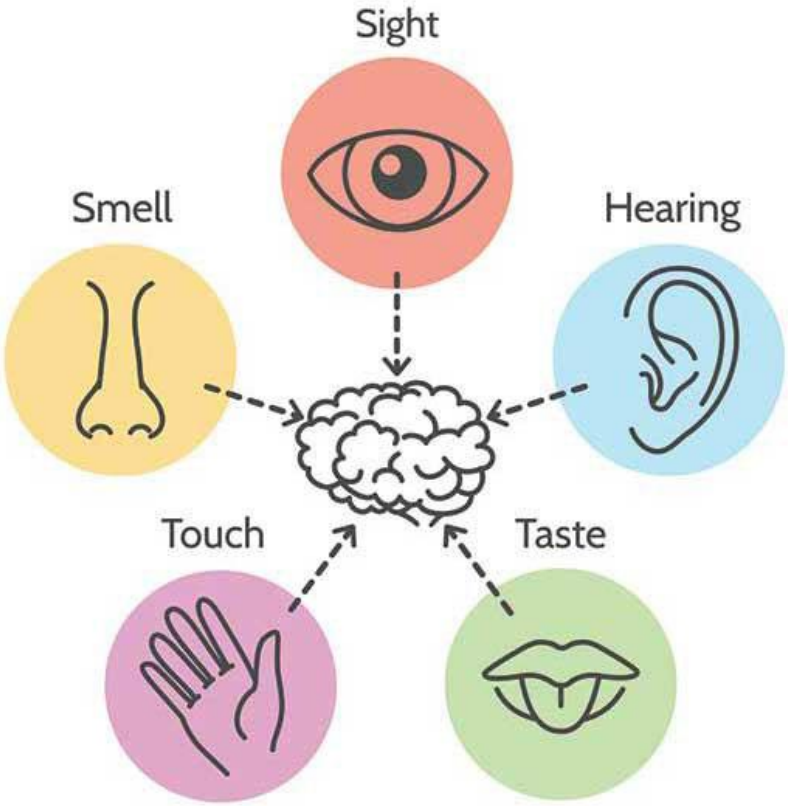
Let’s begin!

Human Learning Process

Humans learn through a four-step process:

1. Sense environment: We first take information about the objects available in our environment through our five senses:
    0. Vision
    1. Touch
    2. Smell
    3. Taste

4. Sound



2. Analyze information: The next step is to analyze the information gathered from our senses and using our previous knowledge, identity the objects e.g. a dog, a house, etc.
3. Decide & act: In this step, using the knowledge and information about the object, we decide what we want to do. E.g., if it is a cat we want to play with it, but if it is a tiger, we run!
4. Increase knowledge: Humans learn from the output of the last step. E.g., if you decide to play with the cat, but the cat scratched you, then you would register the particular cat as not friendly and increase your knowledge.

The process is an ever-going process that ultimately results in increased knowledge about the understanding of environment.

Using this process, you learn everything walking, reading, speaking, classifying things, etc.

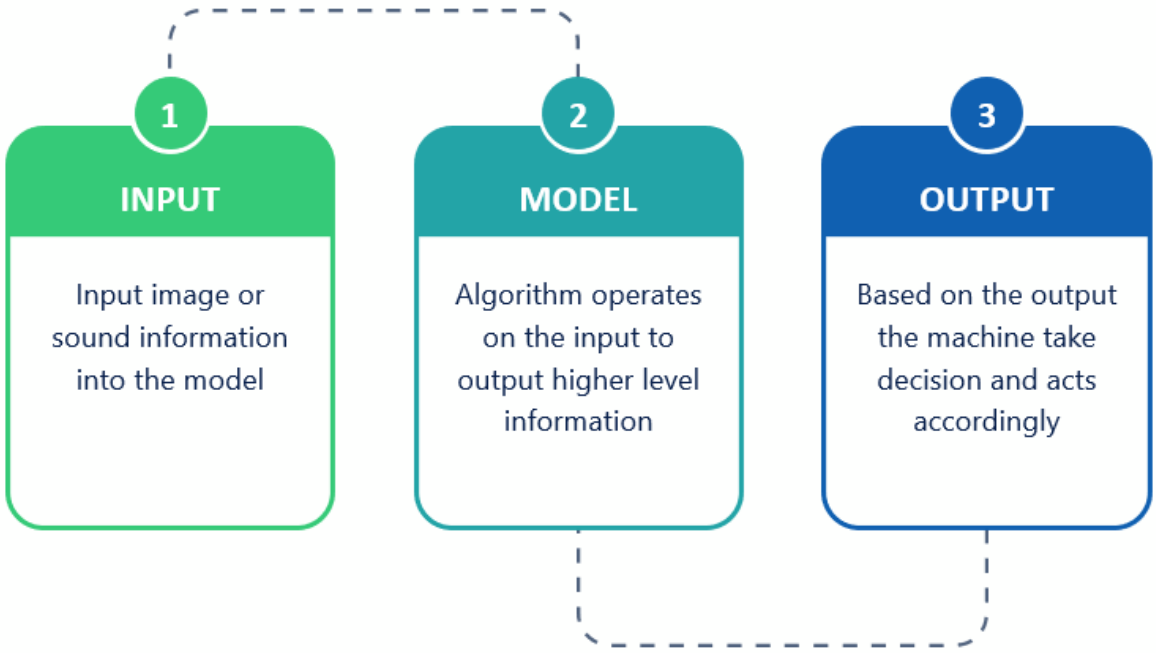
How Machines Learn

We saw how humans learn. But how do machines learn? Is it the same as humans or is it any different? Let's have a look.

Definition

> *Machine learning is the process of machines learning how to act by themselves without any human intervention. It is basically getting a computer to perform a task without explicitly being programmed to do so.*

Machine Learning Model



Machine Learning Life Cycle

Let us explore the process of making a machine learning model to identify cat and dog from images:

Step 1: Define Project/Objective

1. Specify the problem – Classification of image as a dog or a cat.
2. Define unit of analysis or prediction target.
3. Define the type of model: Image, sound or pose? In our case it will be image.

Step 2: Explore and Acquire Training Data

The training data is an initial set of data used to help a machine develop algorithm.

To identify cats and dogs we would require lots of images of cats and dogs as the training data.

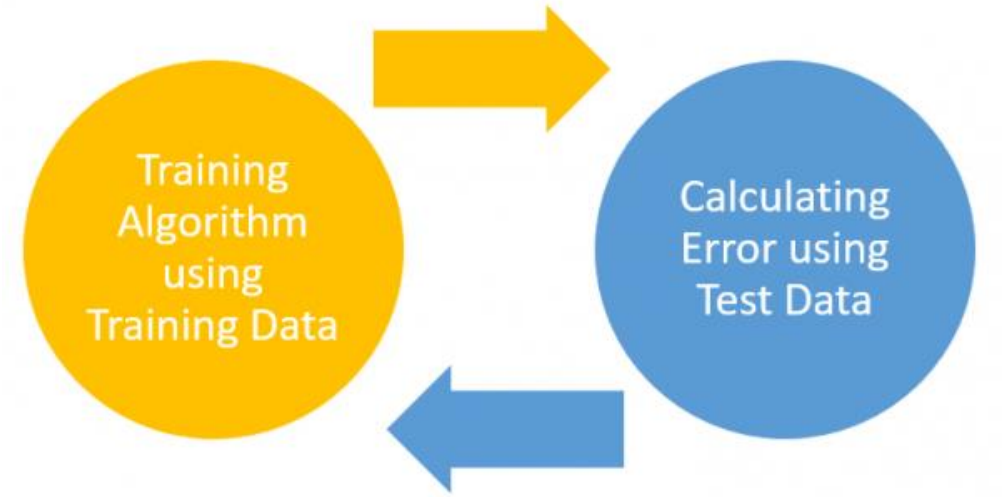
Cats:

Dogs:

Step 3: Model Training

This stage is concerned with creating a model from the data given to it. At this stage, a part of the training data is used to find model algorithm which helps to minimise the error for the given data. The remaining data are then used to test the model.

These two steps are generally repeated a number of times in order to improve the performance of the model.



In our case we make the model to identify image in two category:

1. Cats
2. Dogs

Step 4: Deploy the Model

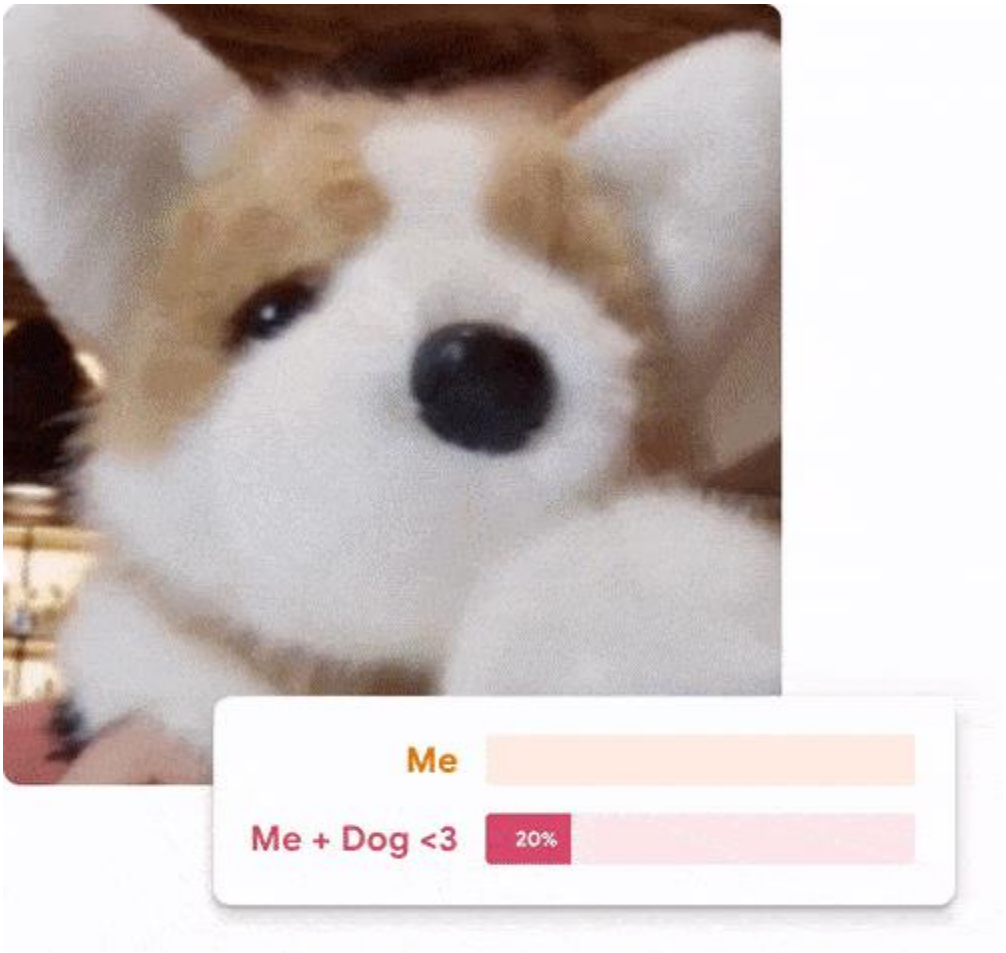
Now you are ready to use the model to identify a new image as cat and dog.

In the next topic, we introduce you to Teachable Machine, where you will learn how to train ML models.

Introduction to Teachable Machine

Teachable Machine is a tool that makes it fast and easy to create machine learning models for your projects. What is more, it does not require any coding making it perfect for beginners with no or little coding experience to learn machine learning.

You can train a computer to recognize your images, sounds, & poses and export your model for PictoBlox.



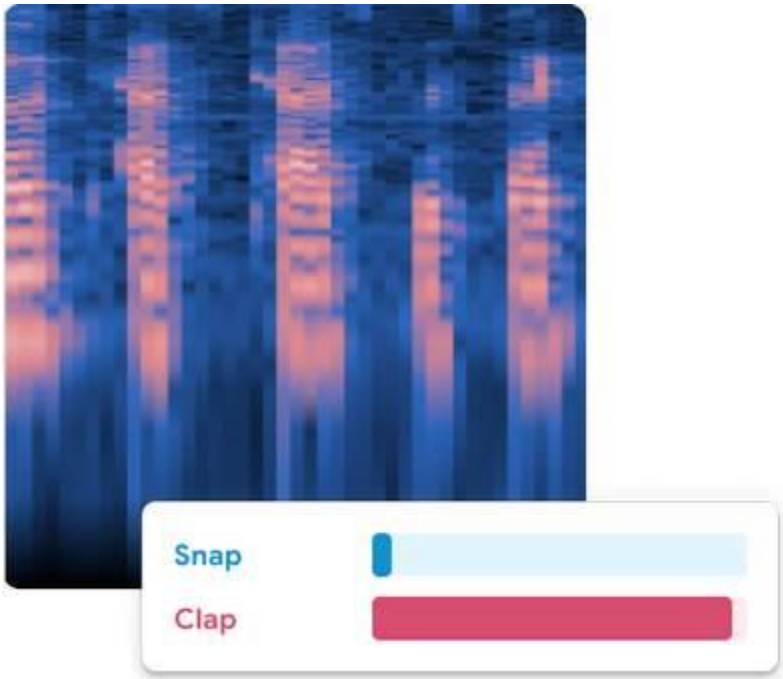
Types of Models You Can Make

1. Image

Teach the model to classify images from files or your webcam.

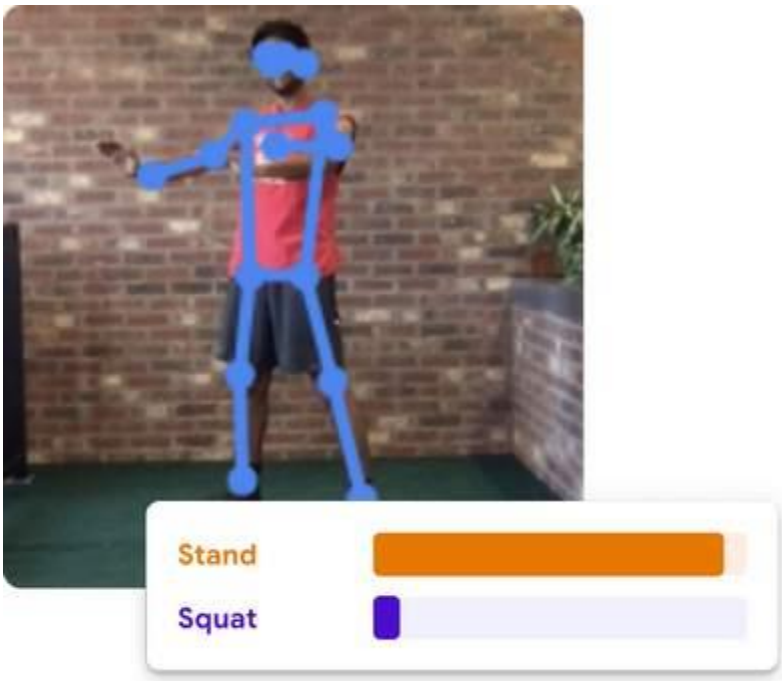
2. Audio

Teach the model to classify audio by recording short sound samples.



3. Pose

Teach the model to classify body positions from files or striking poses in your webcam.



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