

# Week3 – Intro to Deep Learning

# What is Deep Learning?

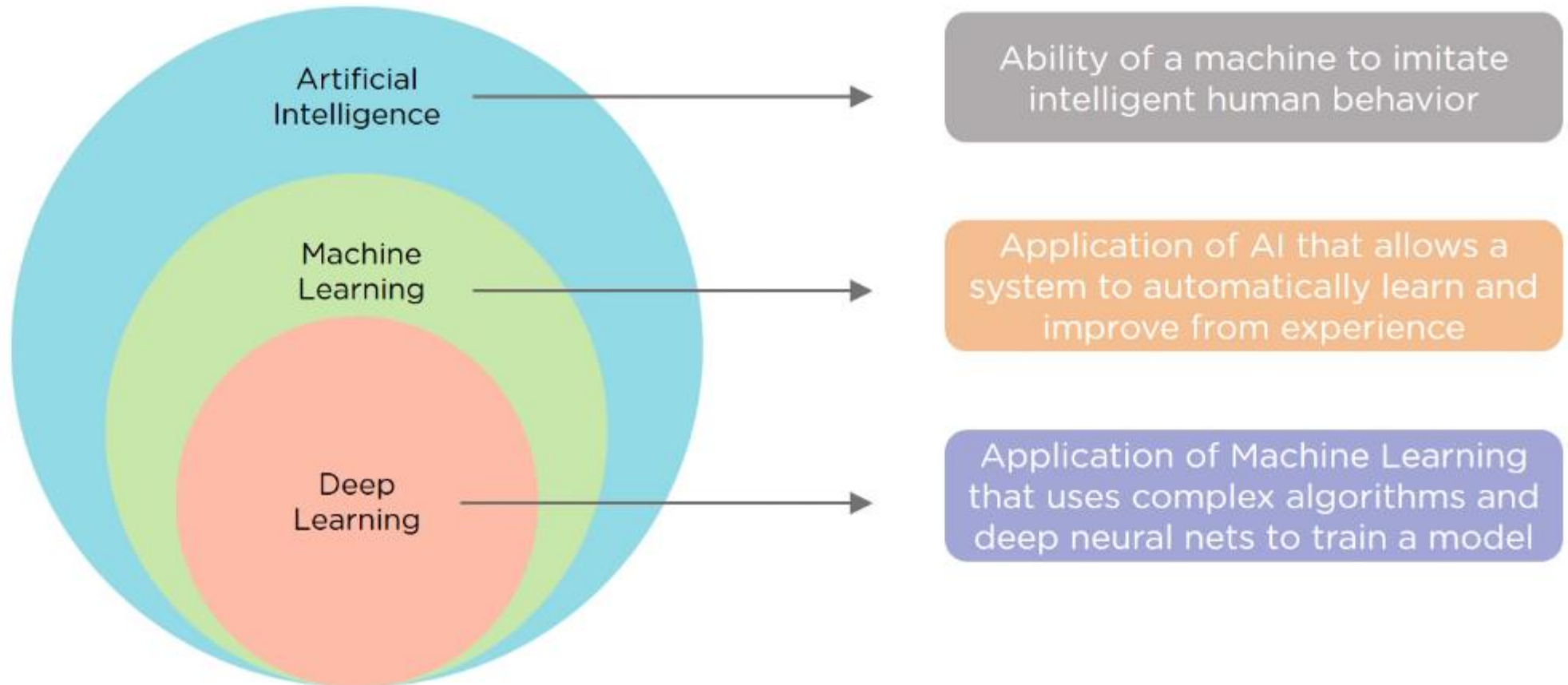
- <https://www.youtube.com/watch?v=6M5VXKLf4D4>

# What is neural network?

- <https://www.youtube.com/watch?v=bfmFfD2RIcg&list=PLEiEAq2VkUUIYQ-mMRAGilfOKyWKpHSip&index=2>

# What is Deep Learning?

Deep Learning is a subfield of Machine Learning that deals with algorithms inspired by the structure and function of the brain



# Why do we need Deep Learning?



## Process huge amount of data

Machine Learning algorithms work with huge amount of structured data but Deep Learning algorithms can work with enormous amount of structured and unstructured data



## Perform complex algorithms

Machine Learning algorithms cannot perform complex operations, to do that we need Deep Learning algorithms



## To achieve the best performance with large amount of data

As the amount of data increases, the performance of Machine Learning algorithms decreases, to make sure the performance of a model is good, we need Deep Learning



## Feature Extraction

Machine Learning algorithms extract patterns based on labelled sample data, while Deep Learning algorithms take large volumes of data as input, analyze the input to extract features out of an object and identifies similar objects



# Applications of Deep Learning

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Cancer Detection

Deep Learning helps to detect cancerous tumors in the human body

# Applications of Deep Learning

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Sophia robot



Robot Navigation

Deep Learning is used to train robots to perform human tasks

# Applications of Deep Learning

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Autonomous Driving Cars

Distinguishes different types of objects, people, road signs and drives without human intervention



# Applications of Deep Learning

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Machine Translation

Given a word, phrase or a sentence in one language, automatically translates it into another language

# Applications of Deep Learning

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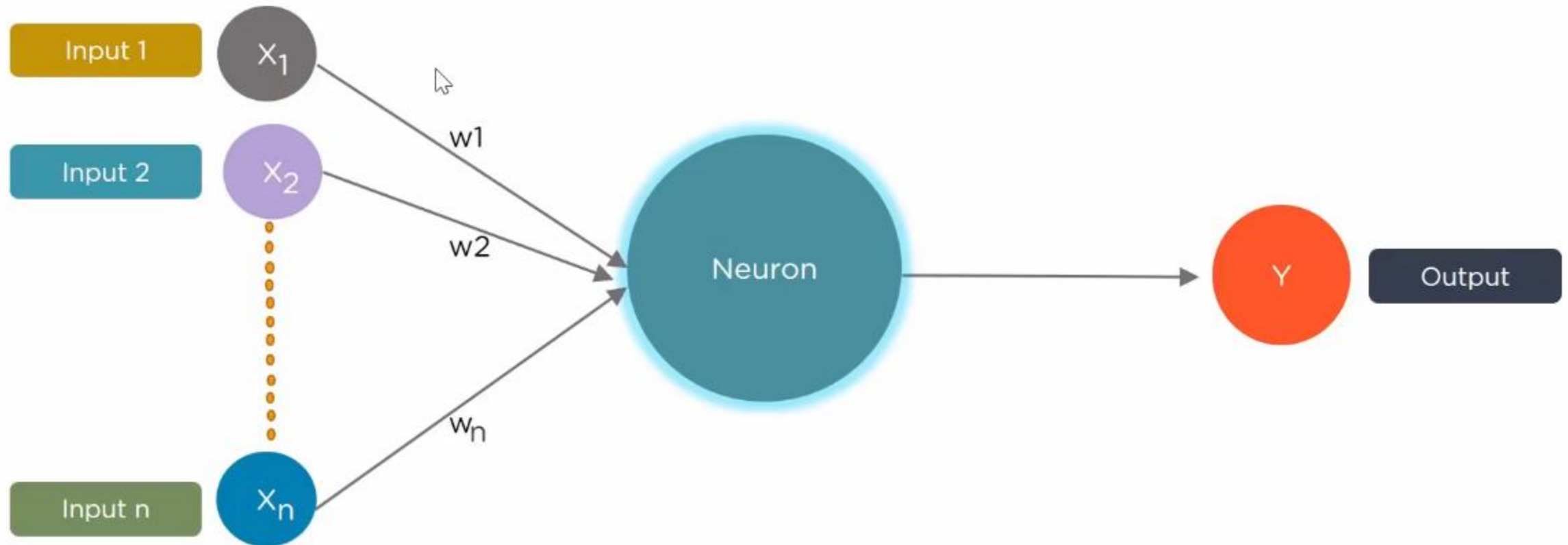


Colorization of images

Uses the object and their context within the photograph to color the image

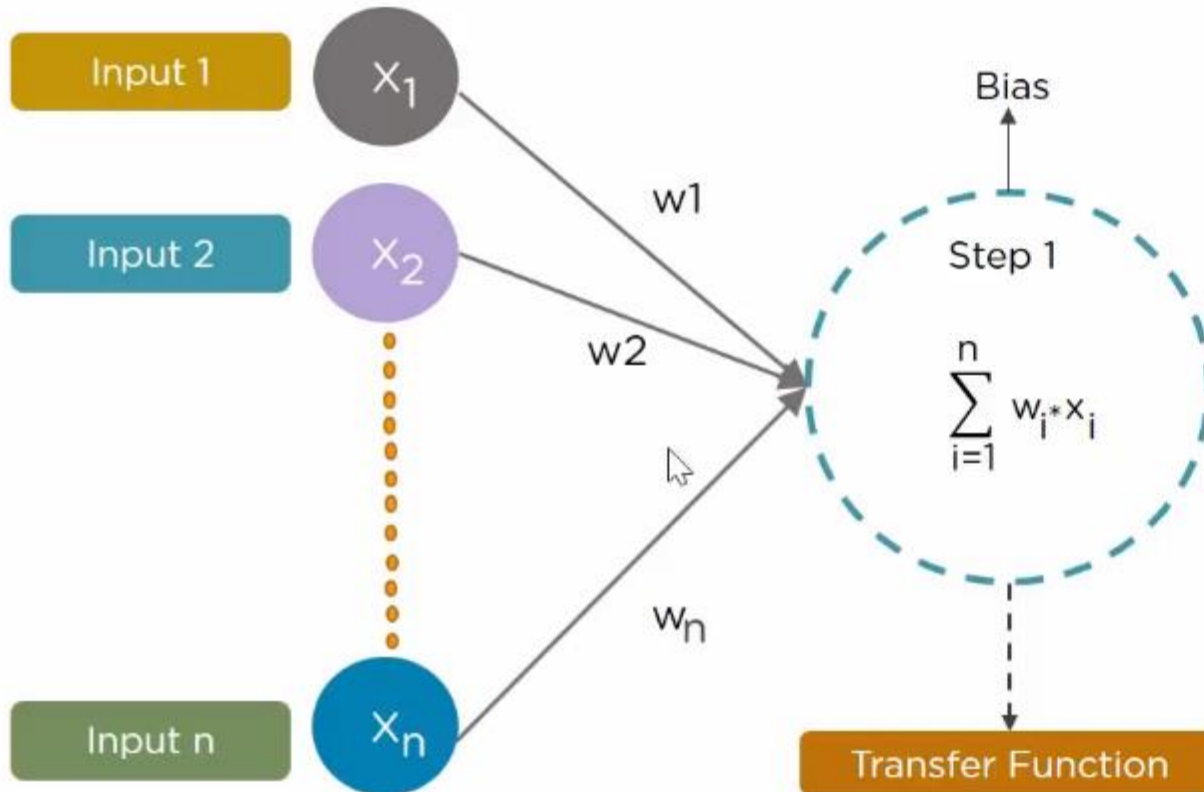
# What is a Neural Network?

Deep Learning is based on the functioning of a human brain, let's understand how does an Artificial Neural Network look like



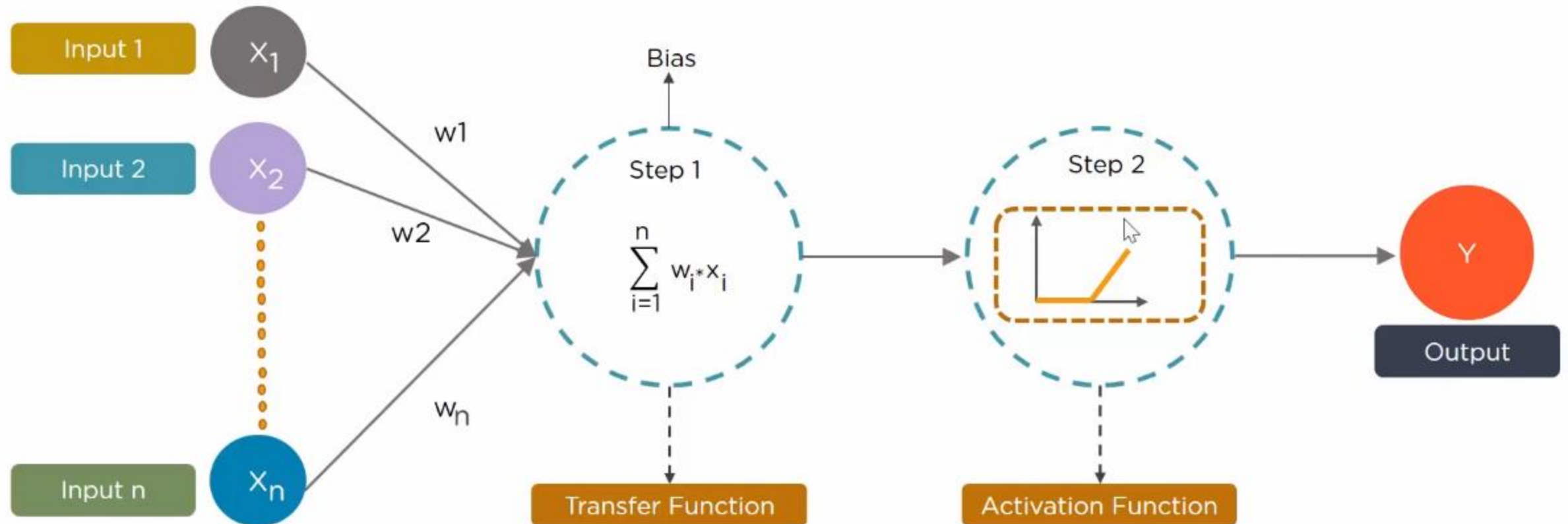
# What is a Neural Network?

First step in the process is to calculate the weighted sum of the inputs



# What is a Neural Network?

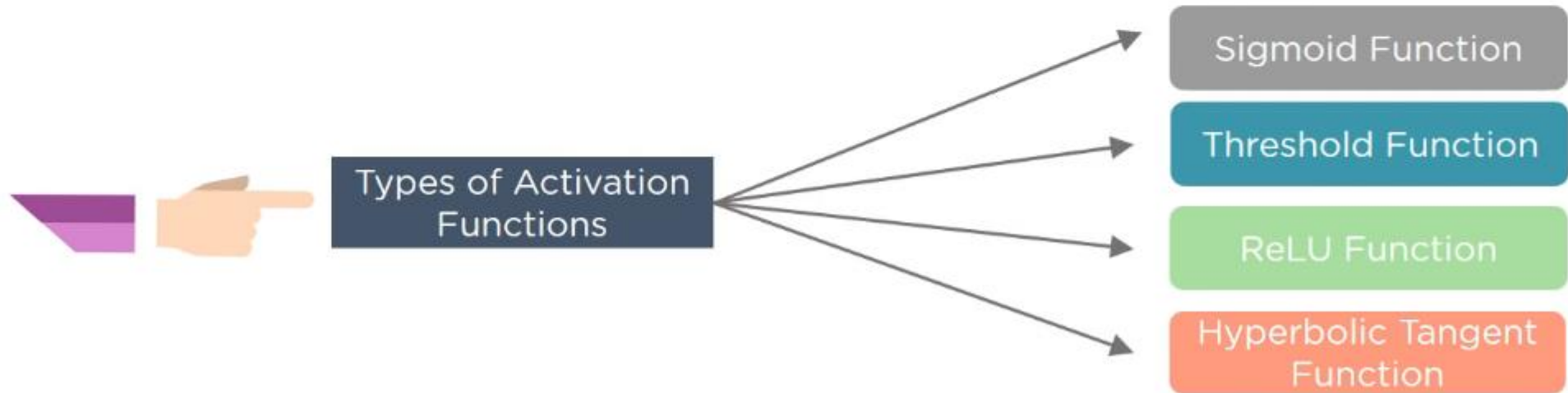
Second step in the process is to pass the calculated weighted sum as input to the activation function to generate the output





# Activation Functions

An Activation function takes the “weighted sum of input plus the bias” as the input to the function and decides whether it should be fired or not



# MNIST DEMO

- Live on Jupyter/Colab