

Gate-way to ml

MACHINE LEARNING **INTRODUCTION**

BASIC TECHNIQUES AND WHERE TO BEGIN

One bit of advice: it is important to view knowledge as sort of a semantic tree—make sure you understand the fundamental principles, ie the trunk and big branches, before you get into the leaves/details or there is nothing for them to hang on to.

—Elon Musk

The semantic tree: artificial intelligence and machine learning

Machine learning \subseteq artificial intelligence

ARTIFICIAL INTELLIGENCE

Design an intelligent agent that perceives its environment and makes decisions to maximize chances of achieving its goal.
Subfields: vision, robotics, machine learning, natural language processing, planning, ...

MACHINE LEARNING

Gives "computers the ability to learn without being explicitly programmed" (Arthur Samuel, 1959)

SUPERVISED LEARNING

Classification, regression

UNSUPERVISED LEARNING

Clustering, dimensionality
reduction, recommendation

REINFORCEMENT LEARNING

Reward maximization

Artificial intelligence

ARTIFICIAL INTELLIGENCE IS THE STUDY OF AGENTS THAT PERCEIVE THE WORLD AROUND THEM, FORM PLANS, AND MAKE DECISIONS TO ACHIEVE THEIR GOALS

MANY FIELDS FALL UNDER THE UMBRELLA OF AI, SUCH AS COMPUTER VISION, ROBOTICS, MACHINE LEARNING, AND NATURAL LANGUAGE PROCESSING.

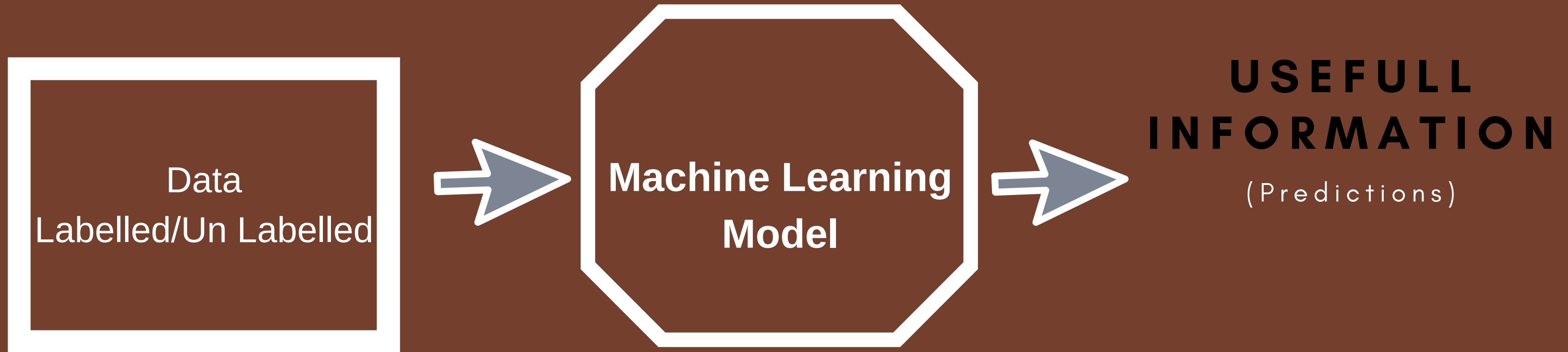
GOOGLE ASSISTANT GOOGLE I/O



*What is actually machine
learning ???...*



MACHINE LEARNING , THE BIG PICTURE



Machine learning the general division

1

SUPERVISED LEARNING

2

**UN SUPERVISED
LEARNING**

3

REINFORCED LEARNING



SUPERVISED LEARNING

In supervised learning problems, we start with a data set containing training examples with associated correct labels.



SUPERVISED LEARNING

For example, when learning to classify handwritten digits, a supervised learning algorithm takes thousands of pictures of handwritten digits along with labels containing the correct number each image represents. The algorithm will then learn the relationship between the images and their associated numbers, and apply that learned relationship to classify completely new images (without labels) that the machine hasn't seen before.

The background of the slide features a complex, abstract design. On the left side, there are vertical bars in shades of yellow and blue, resembling a stylized bar chart or a decorative element. The top and bottom edges of the slide are decorated with horizontal bands of color, including blue, orange, and grey. The main content area is a light cream color.

SUPERVISED LEARNING

1. Regression

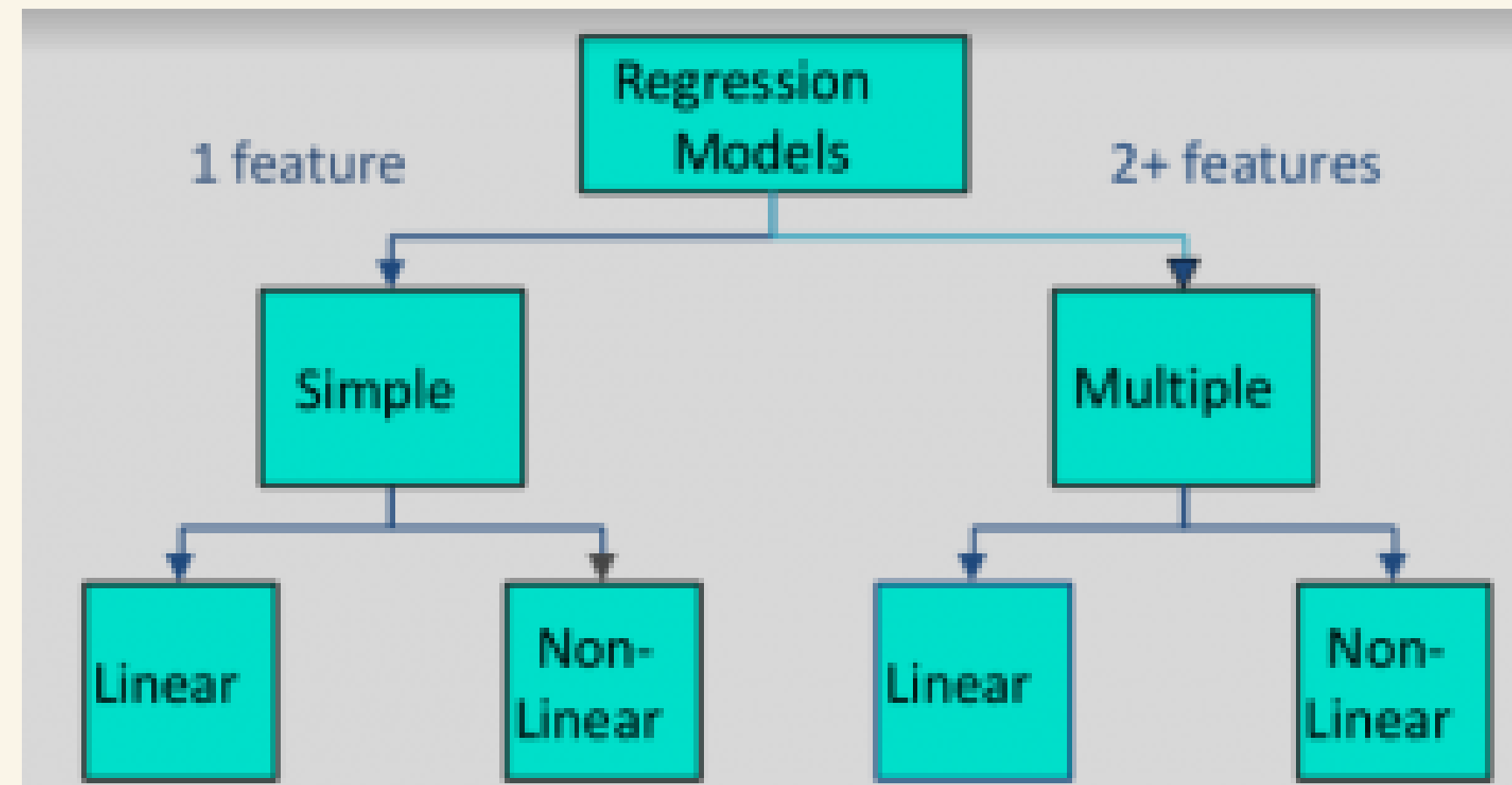
A regression problem is when the output variable is a real or continuous value, such as “salary” or “weight”.

Predicting age of a person

Predicting whether stock price of a company will increase tomorrow

Predicting whether a document is related to sighting of UFOs

REGRESSION



The background of the slide is composed of several overlapping rectangular blocks in muted colors: a dark blue block on the left, a dark brown block at the top center, a light grey block at the top right, an orange block on the right, a dark brown block at the bottom center, a light grey block at the bottom right, and a large orange block at the bottom right. On the far left, there is a vertical yellow bar with dark blue abstract shapes. A thin orange horizontal line is positioned above the title.

SUPERVISED LEARNING

2. Classification

A classification problem is when the output variable is a category, such as “red” or “blue” or “disease” and “no disease”. A classification model attempts to draw some conclusion from observed values



CLASSIFICATION

For example, when filtering emails “spam” or “not spam”, when looking at transaction data, “fraudulent”, or “authorized”. In short Classification either predicts categorical class labels or classifies data (construct a model) based on the training set and the values (class labels) in classifying attributes and uses it in classifying new data.

The background of the slide is a collage of various elements. On the left, there is a vertical strip with a dark blue background, featuring a yellow gear-like shape and three horizontal white bars. To the right of this, there are several rectangular panels. The top-left panel shows a dark blue background with glowing yellow circuit lines. The top-right panel is a solid light blue. The bottom-left panel shows a dark blue background with glowing yellow circuit lines. The bottom-right panel is a solid light blue. The main content area is a large white rectangle in the center.

UN SUPERVISED LEARNING

In un supervised learning problems, we start with a data set containing training examples with out associated correct labels.



UN SUPERVISED LEARNING

1. Clustering: A clustering problem is where you want to discover the inherent groupings in the data, such as grouping customers by purchasing behavior.
2. Association: An association rule learning problem is where you want to discover rules that describe large portions of your data, such as people that buy X also tend to buy Y.



REINFORCEMENT LEARNING

Reinforcement is about taking suitable action to maximize reward in a particular situation. It is employed by various software and machines to find the best possible behavior or path it should take in a specific situation.



REINFORCEMENT LEARNING

Example : The problem is as follows: We have an agent and a reward, with many hurdles in between. The agent is supposed to find the best possible path to reach the reward.

ALGORITHM PREDICTION



HOUSE PRICE PROBLEM

predicting price of house based on its features like no of rooms frontage accessibility et.



SPAM FILTER IN TRUE CALLER

Filtering out and blocking calls based on user input.



PRODUCT RECOMMENDATION

Given a purchase history for a customer and a large inventory of products, identify those products in which that customer will be interested and likely to purchase.

ALGORITHM PREDICTION



MEDICAL DIAGNOSIS

Given the symptoms exhibited in a patient and a database of anonymized patient records, predict whether the patient is likely to have an illness.



STOCK TRADING

Given the current and past price movements for a stock, determine whether the stock should be bought, held or sold.



FACE DETECTION

Given a digital photo album of many hundreds of digital photographs, identify those photos that include a given person.

next hands on section :

PYTHON CRASH COURSE