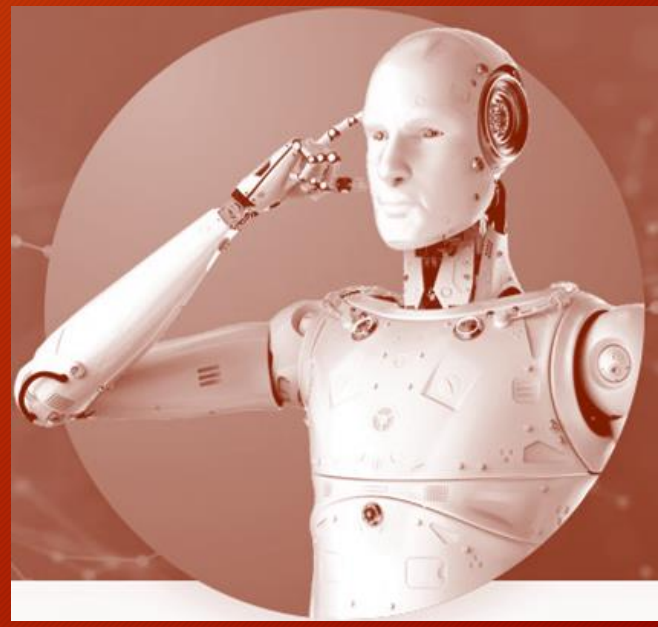
192GEO206T- MACHINE LEARNING



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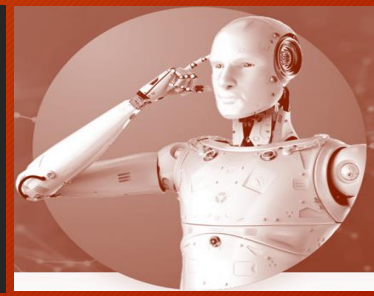
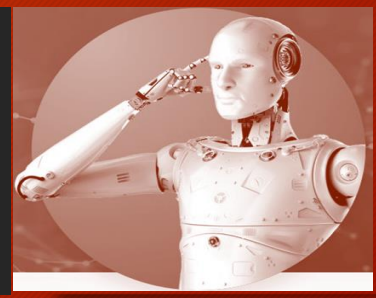
Objective



After completing this Lesson, you should be able to learn

- What is Machine Learning?
- How ML is used in industry?
- Why ML is happening now?
- Learn the principles of using AI responsibly.
- Types of Machine Learning.

UNIT-1 INTRODUCTION



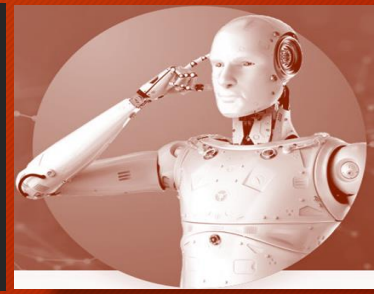
Learning – Types of Machine Learning – Supervised Learning – The Brain and the Neuron – Design a Learning System – Perspectives and Issues in Machine Learning – Concept Learning Task – Concept Learning as Search – Finding a Maximally Specific Hypothesis – Version Spaces and the Candidate Elimination Algorithm – Linear Discriminants – Perceptron – Linear Separability – Linear Regression.


What is
Learning
Your Suggestion……..

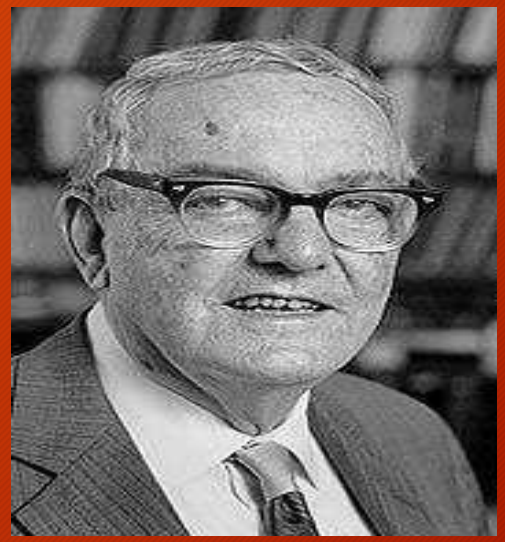
What is Learning?

- Getting better at some task through practice.
- Learning from data
- Learning from experience
- Fundamental parts of intelligence – Learning and adapting

Machine Learning Definition

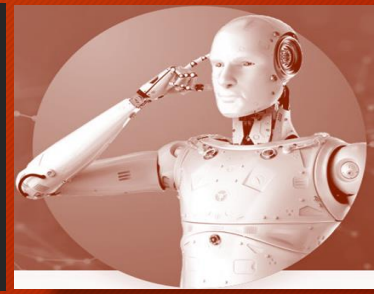


- **Herbert Alexander Simon**: "Learning is any process by which a system improves performance from experience."
- "Machine Learning is concerned with computer programs that automatically improve their performance through experience. "



Herbert Alexander Simon
Turing Award 1975
Nobel Prize in Economics 1978

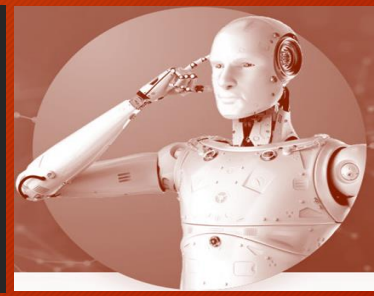
Machine Learning Definition



- “A computer program is said to learn from experience E with respect to some task T and some performance measure P, if its performance on T, as measured by P, improves with experience E”.

Tom Mitchell,
Machine Learning, McGraw Hill, 1998

Eg: Hand writing recognition

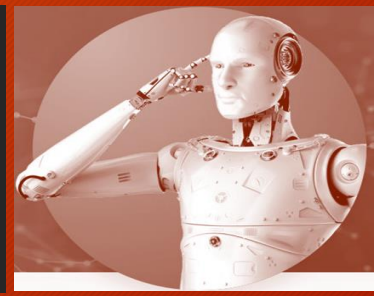


T: recognizing and classifying hand writing

P: Percent of words correctly classified

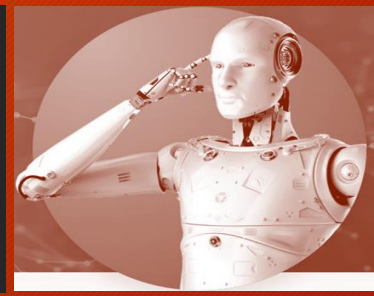
E: a database of handwritten words with given classsification

Who's using it?



- Financial services
- Government
- Health care
- Retail
- Oil and gas
- Transportation

Some successful applications of ML



- Learning to recognize spoken words.
- Learning to drive an autonomous vehicle.
- Learning to classify new astronomical structurs.
- Facial recognition technology
- Optical character recognition technology.
- Recommendation Engine.

ML in different Sectors

Mechanical Engineering

- Production floors
- Manufacturing supply chains
- Predicting mechanical failure
- Reducing test and calibration time

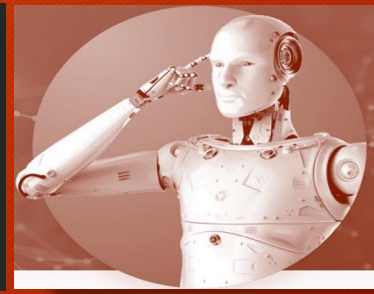
Embedded System

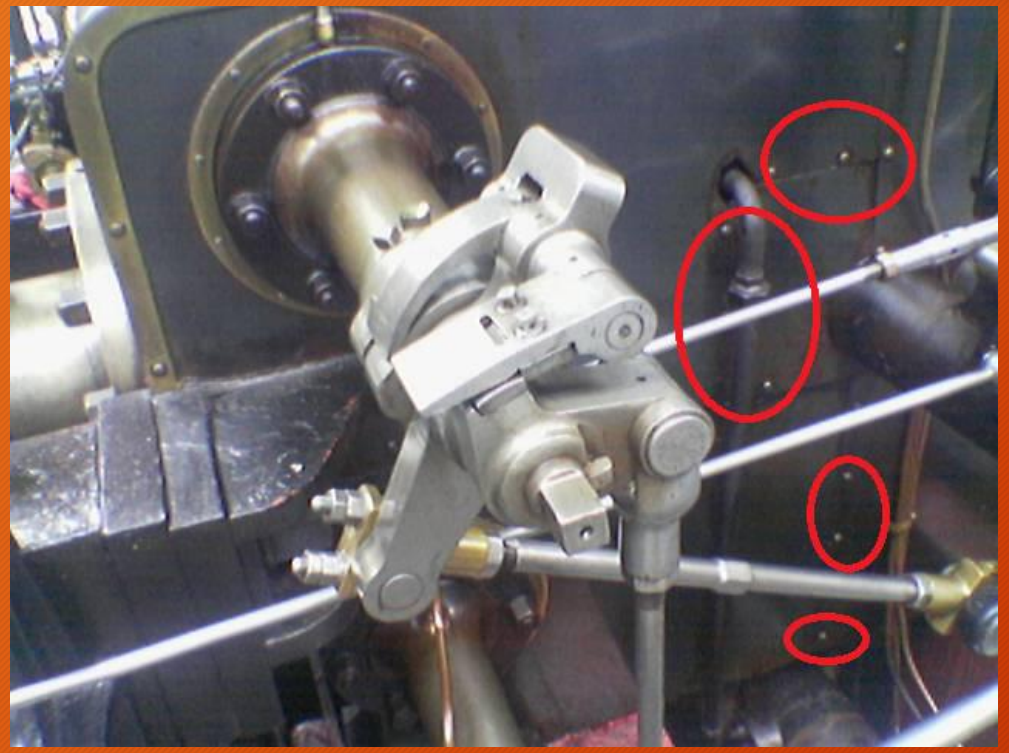
- Sensor devices that detect acoustic or optical anomalies and discrepancies
- Cameras for monitoring visual parameters and microphones for recording soundwaves
- Image sensors

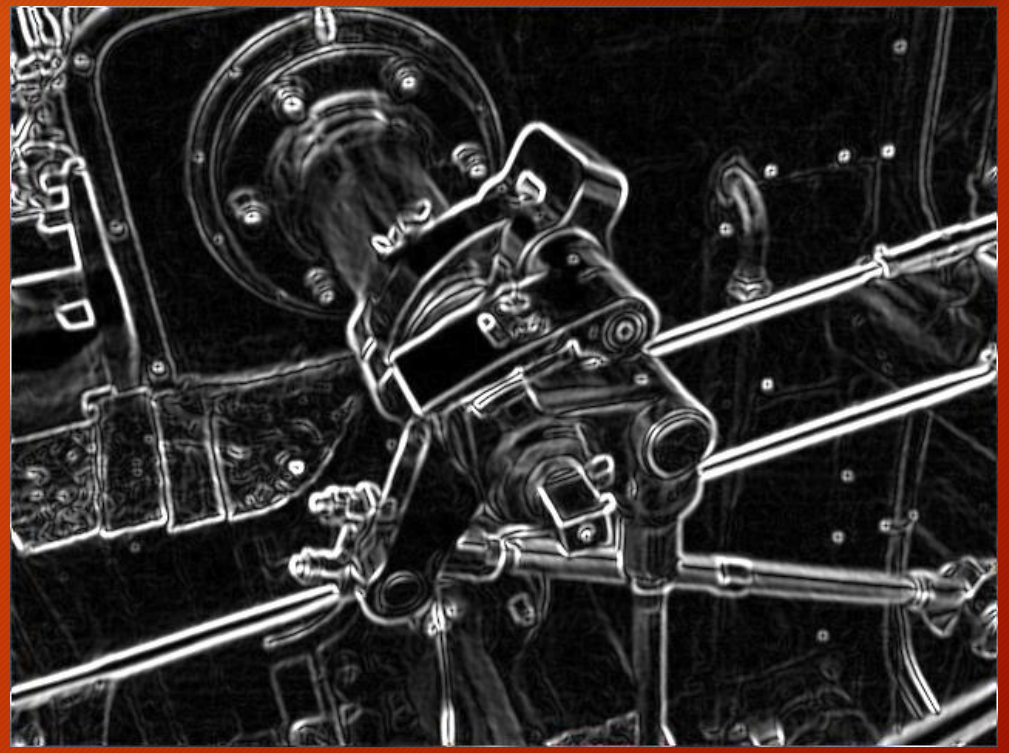
Communication System

- Signal detection
- Channel encoding and decoding
- Channel estimation, prediction, and compression
- End-to-end communications
- Resource allocation

Testing with image-example

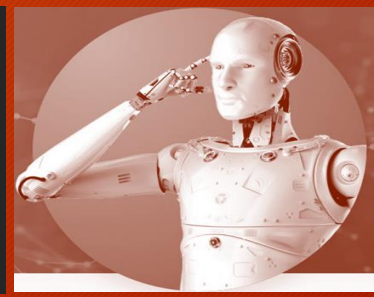






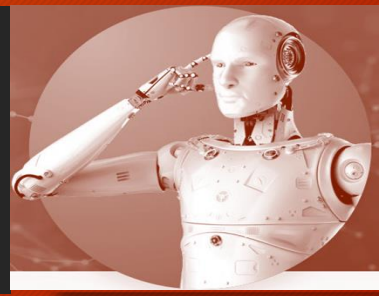
https://en.wikipedia.org/wiki/Sobel_operator

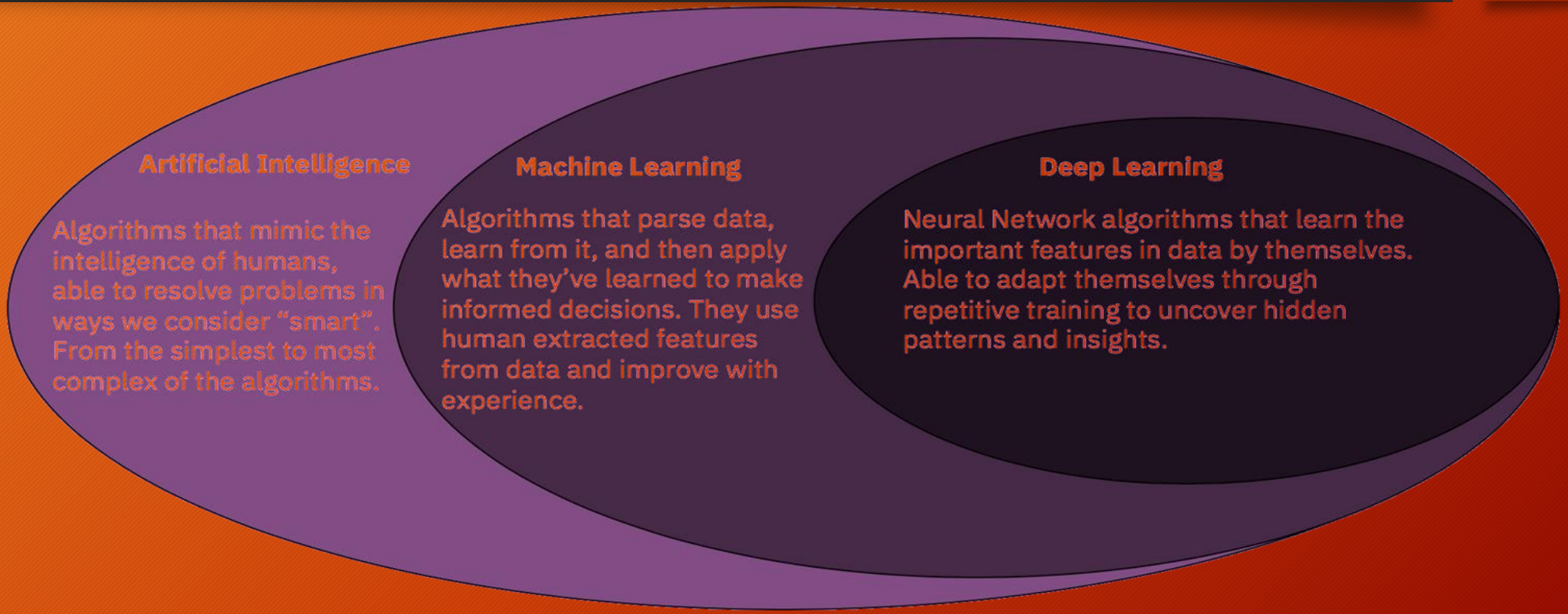
Why Machine Learning is so important?



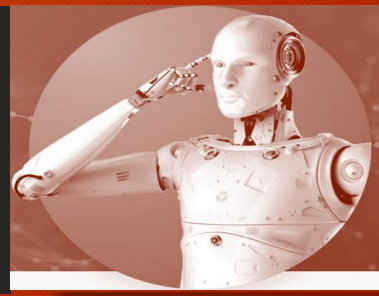
- Increase in Data Generation
- Improve Decision Making
- Uncover patterns & trends in data
- Solve complex problems

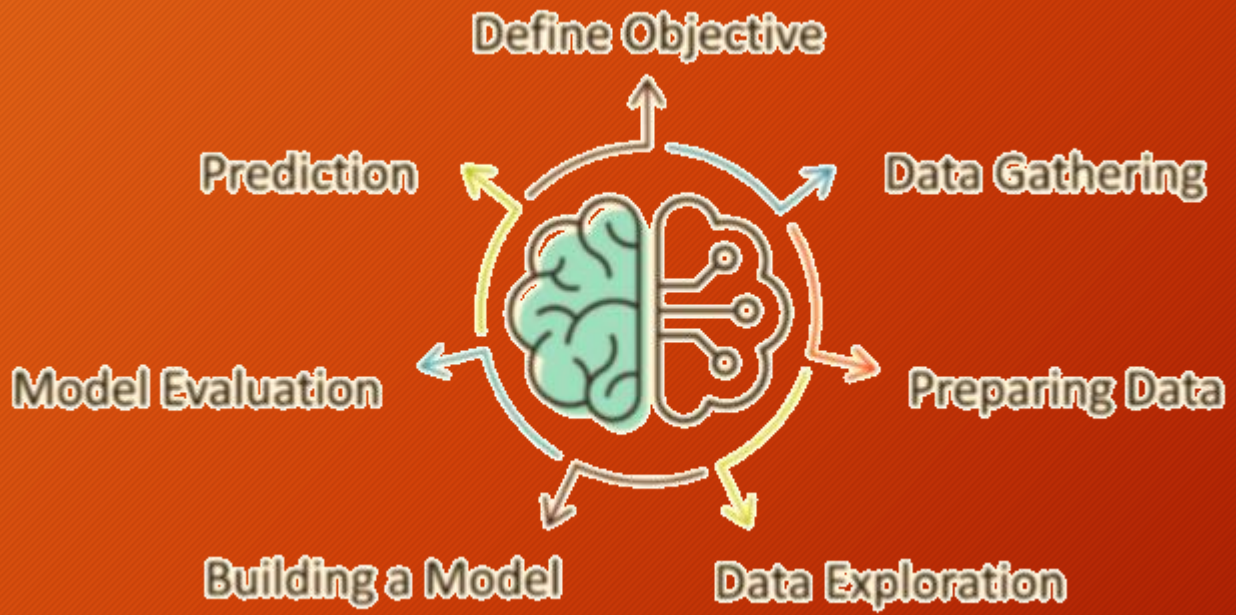
AI-ML-DL



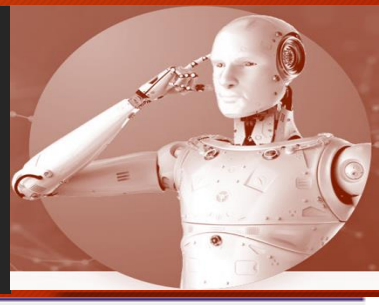

Artificial Intelligence
Algorithms that mimic the intelligence of humans, able to resolve problems in ways we consider "smart". From the simplest to most complex of the algorithms.
Machine Learning
Algorithms that parse data, learn from it, and then apply what they've learned to make informed decisions. They use human extracted features from data and improve with experience.
Deep Learning
Neural Network algorithms that learn the important features in data by themselves. Able to adapt themselves through repetitive training to uncover hidden patterns and insights.

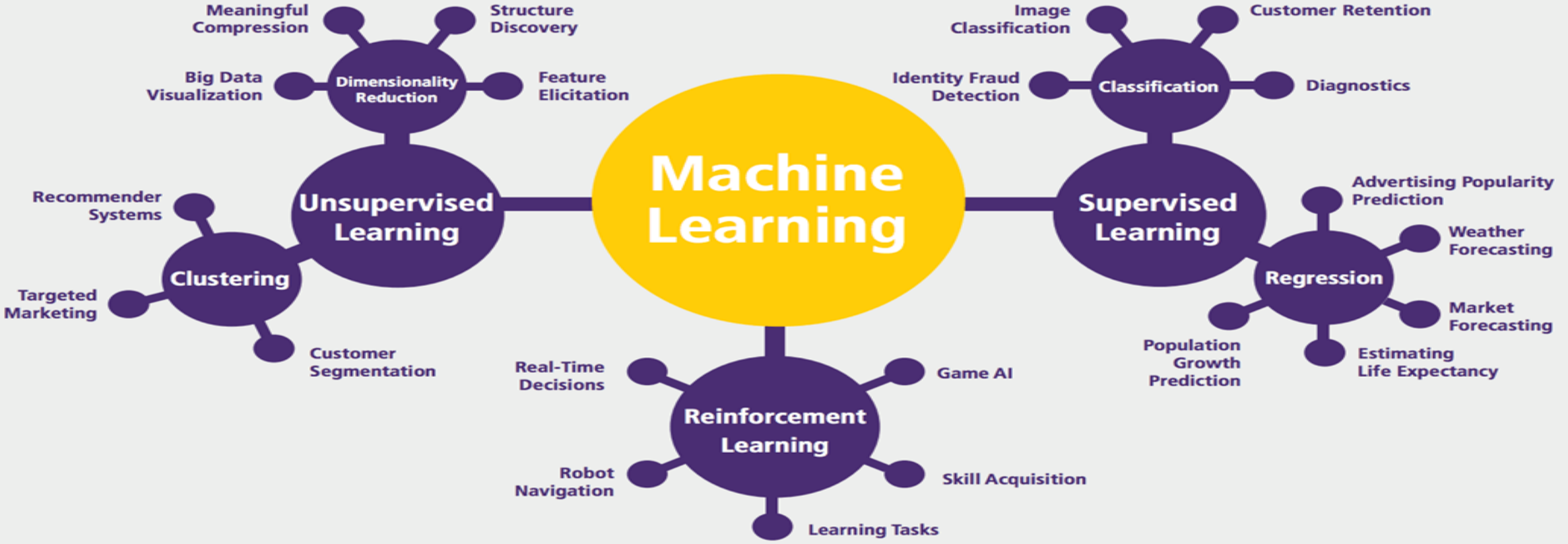
Machine Learning Process



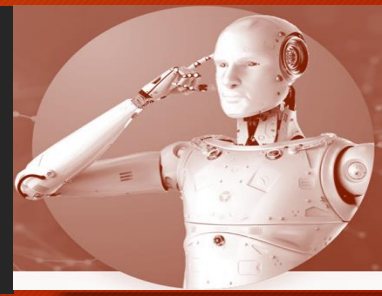


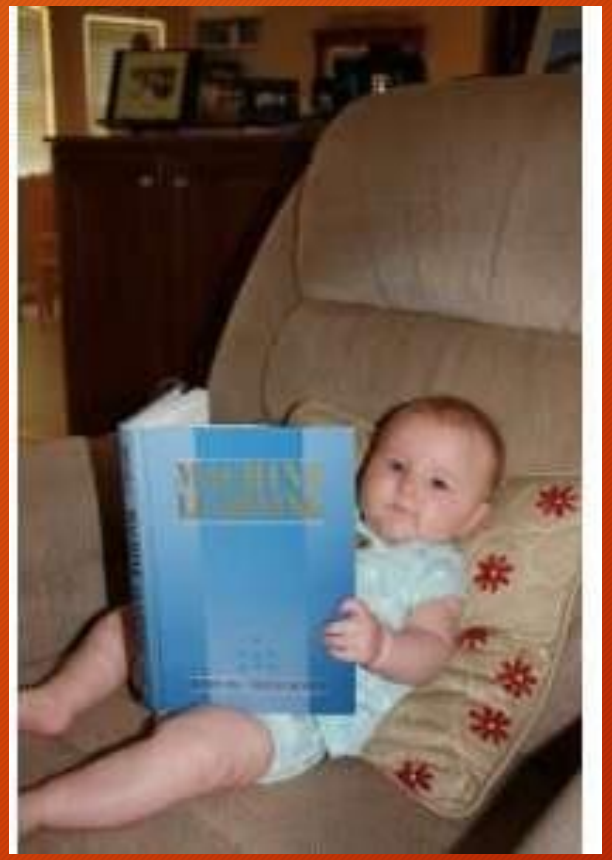
Machine learning Algorithms and where they are used?





Want to Learn More?





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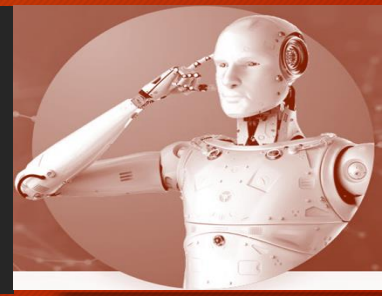

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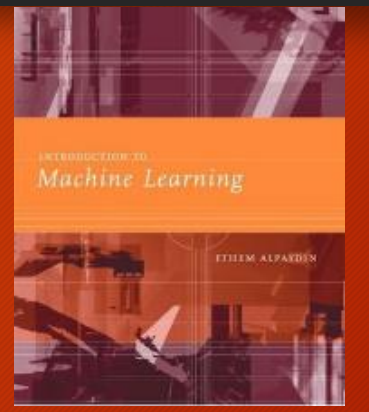
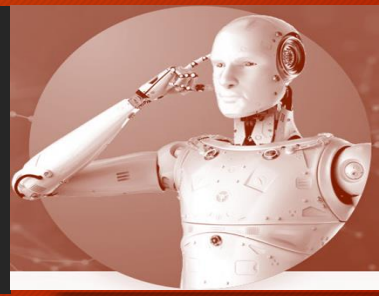


2. Jason Bell, —Machine learning – Hands on for Developers and Technical Professionals, First Edition, Wiley, 2014.

More Reference



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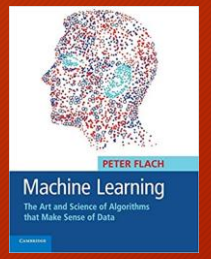
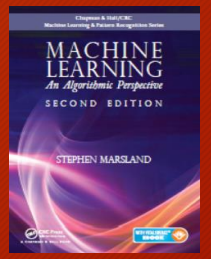
2. Peter Flach, —Machine Learning: The Art and Science of Algorithms that Make Sense of Data, First Edition, Cambridge University Press, 2012.

3. Stephen Marsland, “Machine Learning: An Algorithmic Perspective”, CRC Press, 2009





THANK YOU