



# **SNS COLLEGE OF ENGINEERING**

Kurumbapalayam (Po), Coimbatore – 641 107

**An Autonomous Institution**

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A' Grade  
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

## **DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**COURSE NAME : 19CS501 Introduction to Machine Learning**

III YEAR /V SEMESTER

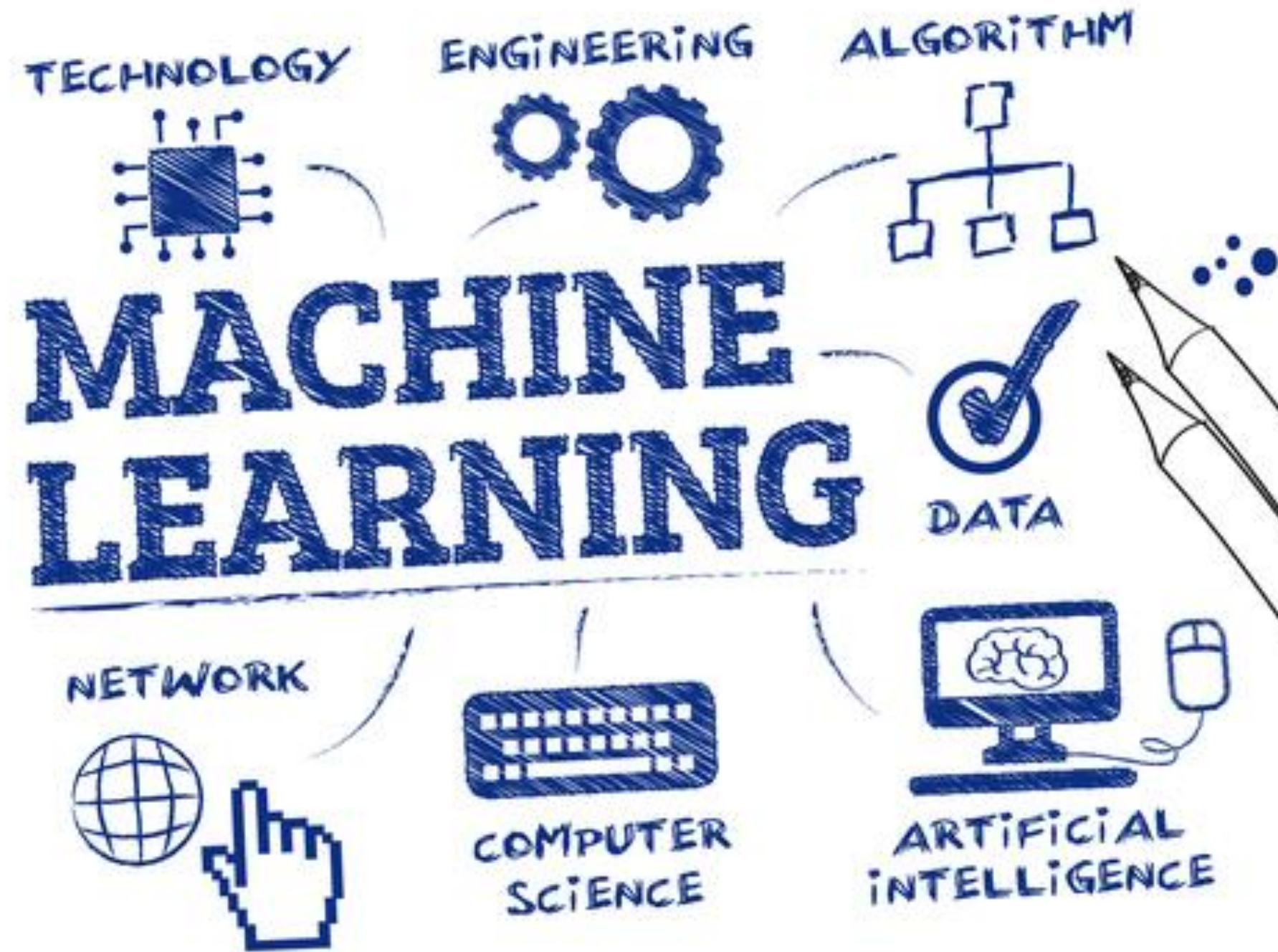
Unit 1- Introduction

Topic 01 : Introduction to Machine Learning

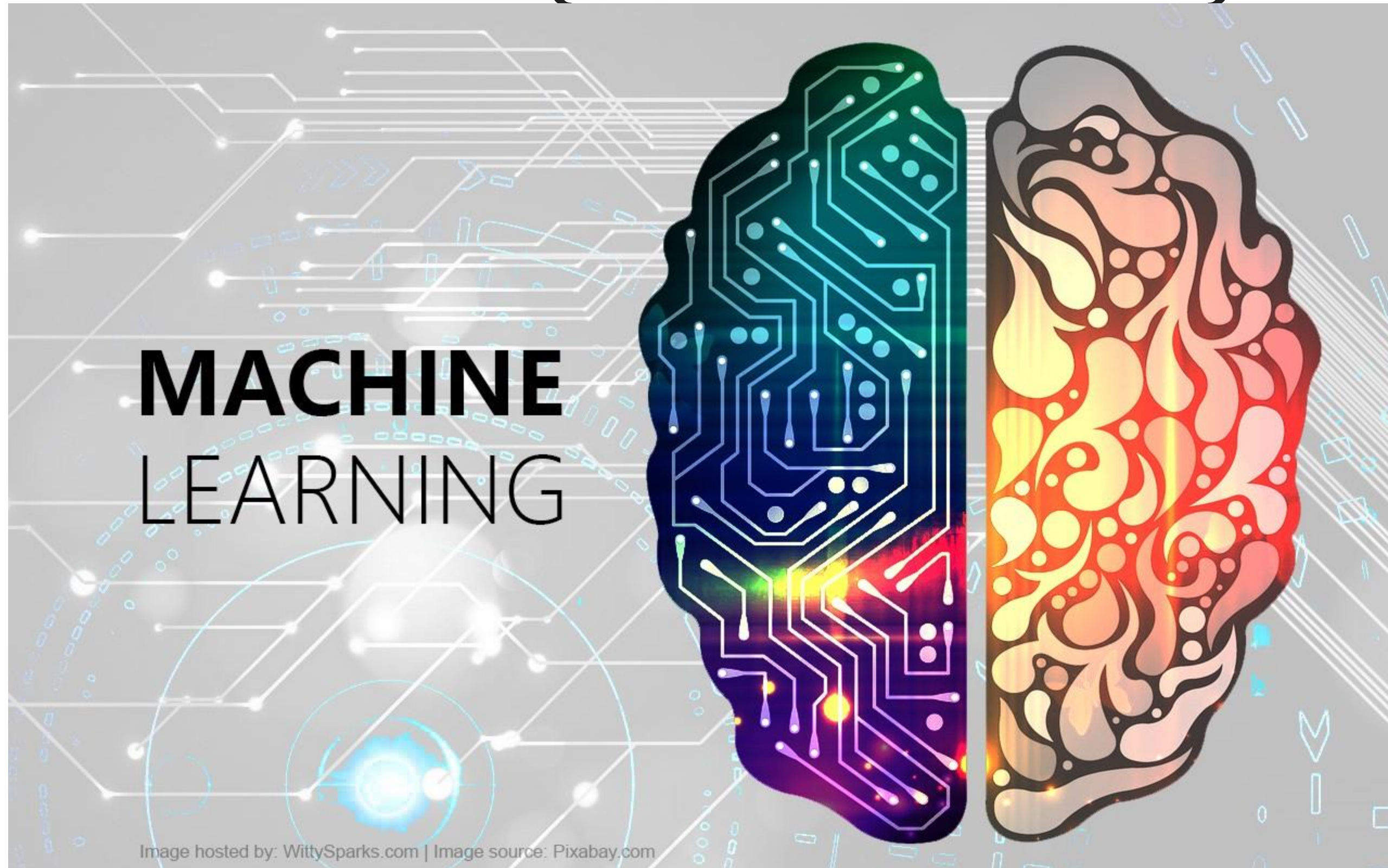




# Do you remember this?



# Debate(Machine Vs Human)





# Quick Questionnaire



How many people have heard about Machine Learning

How many people know about Machine Learning

How many people are using Machine Learning



# About

- subfield of Artificial Intelligence (AI)
- name is derived from the concept that it deals with “construction and study of systems that can learn from data”
- can be seen as building blocks to make computers learn to behave more intelligently
- It is a theoretical concept. There are various techniques with various implementations.
- [http://en.wikipedia.org/wiki/Machine\\_learning](http://en.wikipedia.org/wiki/Machine_learning)



## In other words...



“A computer program is said to learn from experience (E) with some class of tasks (T) and a performance measure (P) if its performance at tasks in T as measured by P improves with E”



# In other words...



“Learning systems are not directly programmed to solve a problem, instead develop own program based on

- examples of how they should behave
- from trial-and-error experience trying to solve the problem

## □ Another definition

- For the purposes of computer, machine learning should really be viewed as a set of techniques for leveraging data
- Machine Learning algorithms discover the relationships between the variables of a system (input, output and hidden) from direct samples of the system
- These algorithms originate from many fields (Statistics, mathematics, theoretical computer science, physics, neuroscience, etc.)



# Machine Learning: Data Driven Modeling



## Traditional programming



## Machine Learning







# Magic?



No, more like gardening

- Seeds = Algorithms
- Nutrients = Data
- Gardener = You
- Plants = Programs

“The goal of machine learning is to build computer system that can adapt and learn from their experience.”

Tom Dietterich





# Why “Learn” ?



- “Machine learning is programming computers to optimize a performance criterion using example data or past experience.
- There is no need to “learn” to calculate payroll
- Learning is used when:
  - ▣ Human expertise does not exist (navigating on Mars),
  - ▣ Humans are unable to explain their expertise (speech recognition)
  - ▣ Solution changes in time (routing on a computer network)
  - ▣ Solution needs to be adapted to particular cases (user biometrics)



# What We Talk About When We Talk About “Learning”

- Learning general models from a data of particular examples
- Data is cheap and abundant (data warehouses, data marts); knowledge is expensive and scarce.
- Example in retail: Customer transactions to consumer behavior:  
*People who bought “Blink” also bought “Outliers” (www.amazon.com)*
- Build a model that is *a good and useful approximation* to the data.



# Data Mining



- Retail: Market basket analysis, Customer relationship management (CRM)
- Finance: Credit scoring, fraud detection
- Manufacturing: Control, robotics, troubleshooting
- Medicine: Medical diagnosis
- Telecommunications: Spam filters, intrusion detection
- Bioinformatics: Motifs, alignment
- Web mining: Search engines



# What is Machine Learning?



- Optimize a performance criterion using example data or past experience.
- Role of Statistics: Inference from a sample
- Role of Computer science: Efficient algorithms to
  - Solve the optimization problem
  - Representing and evaluating the model for inference



# What is Machine Learning?



Let's dig deep into it...

What do you mean by

Apple

# Learning (Training)



Features:

1. Color: **Radish/Red**
  2. Type : **Fruit**
  3. Shape
- etc...



Features:

1. Sky Blue
  2. **Logo**
  3. Shape
- etc...



Features:

1. **Yellow**
  2. **Fruit**
  3. Shape
- etc...



# Assessment



What is true about Machine Learning?

- A. Machine Learning (ML) is that field of computer science
- B. ML is a type of artificial intelligence that extract patterns out of raw data by using an algorithm or method.
- C. The main focus of ML is to allow computer systems learn from experience without being explicitly programmed or human intervention.
- D. All of the above

ML is a field of AI consisting of learning algorithms that?

- A. Improve their performance
- B. At executing some task
- C. Over time with experience
- D. All of the above

Which of the following are ML methods?

- A. based on human supervision
- B. supervised Learning
- C. semi-reinforcement Learning
- D. All of the above

What is Machine learning?

- The autonomous acquisition of knowledge through the use of computer programs
- The autonomous acquisition of knowledge through the use of manual programs
- The selective acquisition of knowledge through the use of computer programs
- The selective acquisition of knowledge through the use of manual programs

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- All of the above





# REFERENCES



1. Tom M. Mitchell, “Machine Learning”, McGraw-Hill Education (India) Private Limited, 2013.
2. Trevor Hastie, Robert Tibshirani, Jerome Friedman, “The Elements of Statistical Learning: Data Mining, Inference, and Prediction”, Springer; Second Edition, 2009.

## THANK YOU