EMERGING TECHNOLOGIES AND FUTURE SKILLS FOR BUSINESS LEADERS

-Prof. Supriya

MODULE 1: ARTIFICIAL INTELLIGENCE (AI), MACHINE LEARNING (ML) AND DEEP LEARNING

- Introduction
- Concept of Data Science
- AI and ML;
- Problem Spaces and Search Knowledge and Rationality
- AI vs Machine Learning
- Machine Learning - Types, Process and Applications
- Introduction to Deep Learning / Neural Networks
- Natural Language Processing
- Modeling Concepts and Applications and Use Cases in Finance, Marketing, Human Resource, Health Care, Productions and Supply Chain Management.

Introduction

What is Data Science?

- Interdisciplinary field
- Focuses on extracting knowledge from data sets which are typically huge in amount.
- The field encompasses analysis, preparing data for analysis, and presenting findings to inform high-level decisions in an organization.
- It incorporates skills from computer science, mathematics, statistics, information visualization, graphic, and business.

Why Data Science?

- Data is everywhere and is one of the most important features of every organization that helps a business to flourish by making decisions based on **facts**, **statistical numbers**, and **trends**.
- Due to this growing scope of data, data science came into the picture which is a **multidisciplinary IT field**
- Data scientists' jobs are the **most demanding in the 21st century**.

- Data analysis/ Data science helps us to ensure **we get answers to questions from data.**

- Data science, and in essence, **data analysis plays** an important role by helping us to **discover useful information** from the data, **answer questions**, and e**ven predict the future or the unknown**.

- It uses **scientific** approaches, **procedures**, **algorithms**, and **frameworks** to **extract knowledge** and **insight from a huge amount of data.**

Introduction to Data Science

- Data science is a concept to bring together **ideas**, **data examination**, **Machine Learning**, and **their related strategies** to **comprehend** and **dissect genuine phenomena with data.**

- It is an **extension of data analysis fields** such as **data mining**, **statistics**, and **predictive analysis**.

- It is a huge field that **uses a lot of methods** and **concepts** which belong to other fields like **information science**, **statistics**, **mathematics**, and **computer science**.

- Some of the techniques utilized in Data Science encompass **machine learning, visualization, pattern recognition, probability modeling data, data engineering,** etc.

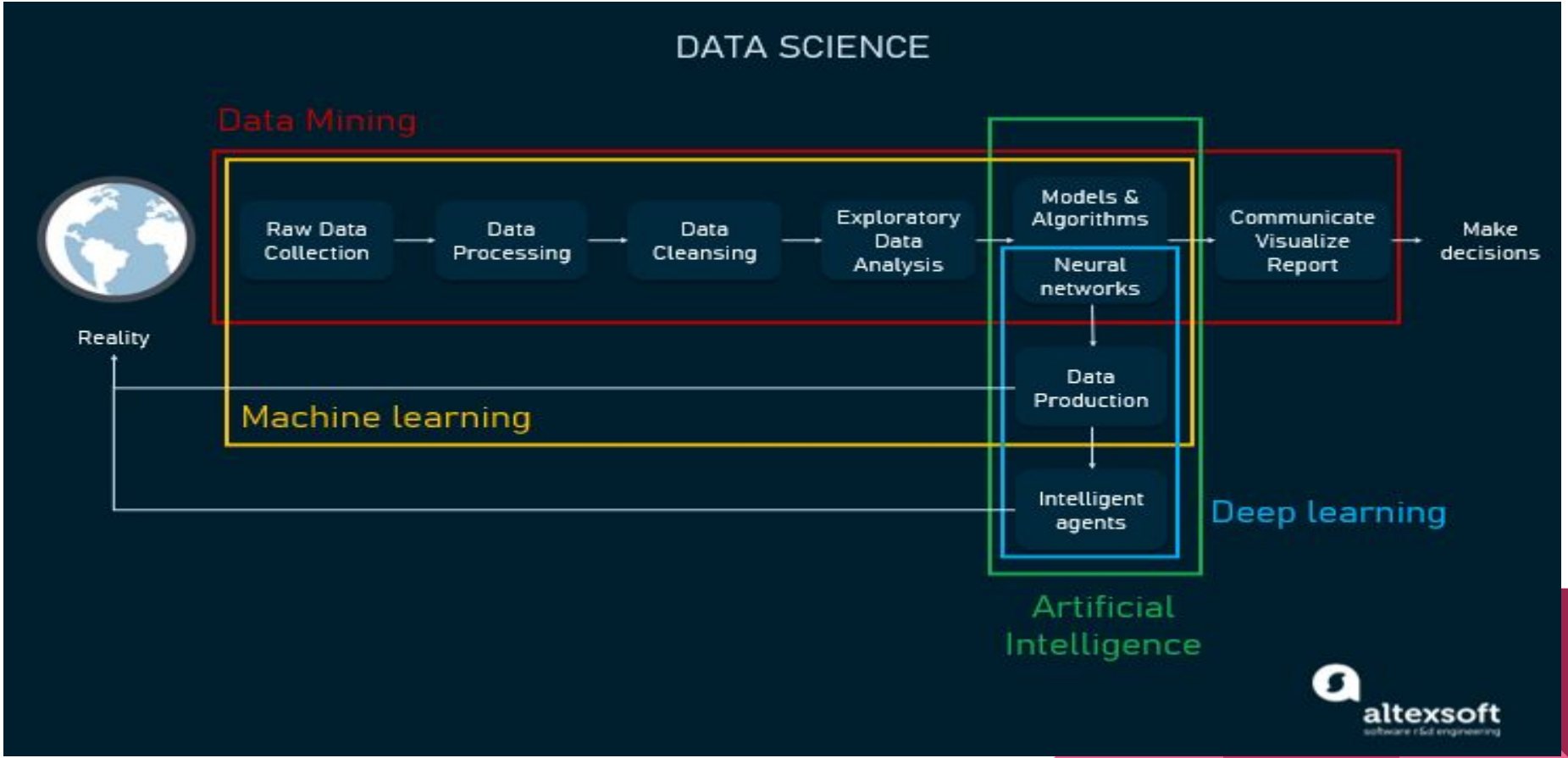
Artificial Intelligence (AI)

Artificial Intelligence (AI) refers to the simulation of human intelligence in machines that are programmed to think and act like humans.

It involves the development of algorithms and computer programs that can perform tasks that typically require human intelligence

Example: visual perception, speech recognition, decision-making, and language translation. AI has the potential to revolutionize many industries and has a wide range of applications, from virtual personal assistants to self-driving cars.

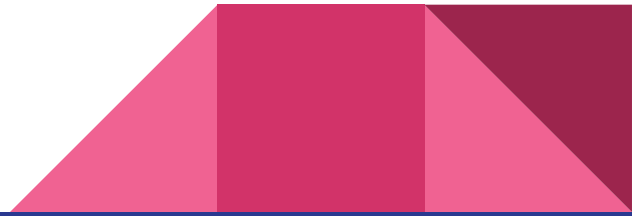
Machine Learning



AI vs ML

What’s the difference between AI and Machine Learning?

What are the similarities between AI and machine learning?



Problem Spaces and Search Knowledge and Rationality

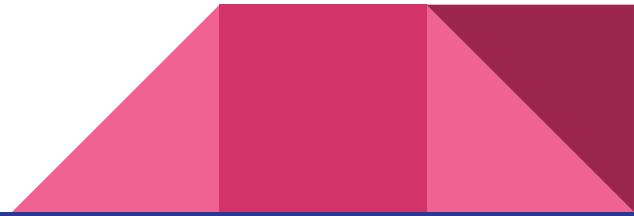
The problem space is a process that involves components for defining and solving a problem. The problem space theory is a concept in the problem-solving category of social science. The purpose of the problem space is to help individuals or organizations find problems and work solutions from the inside-out approach.

1. **Problem:** A problem is a specific task or challenge that requires finding a solution or making a decision. In artificial intelligence, problems can vary in complexity and scope, ranging from simple tasks like arithmetic calculations to complex challenges such as image recognition, natural language processing, game playing, and optimization. Each problem has a defined set of initial states, possible actions or moves, and a goal state that needs to be reached or achieved.

For example, Game of Chess, Route Planning

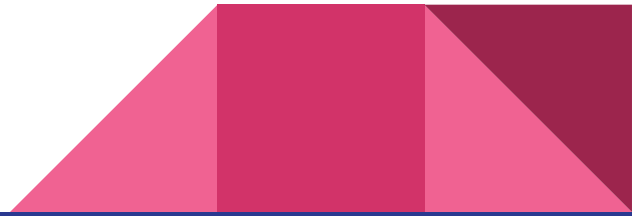
Problem Space: The problem space is the set of all possible states, actions, and transitions that can be encountered while attempting to solve a specific problem. It represents the entire landscape of potential solutions and paths from the initial state to the goal state.

Rationality:

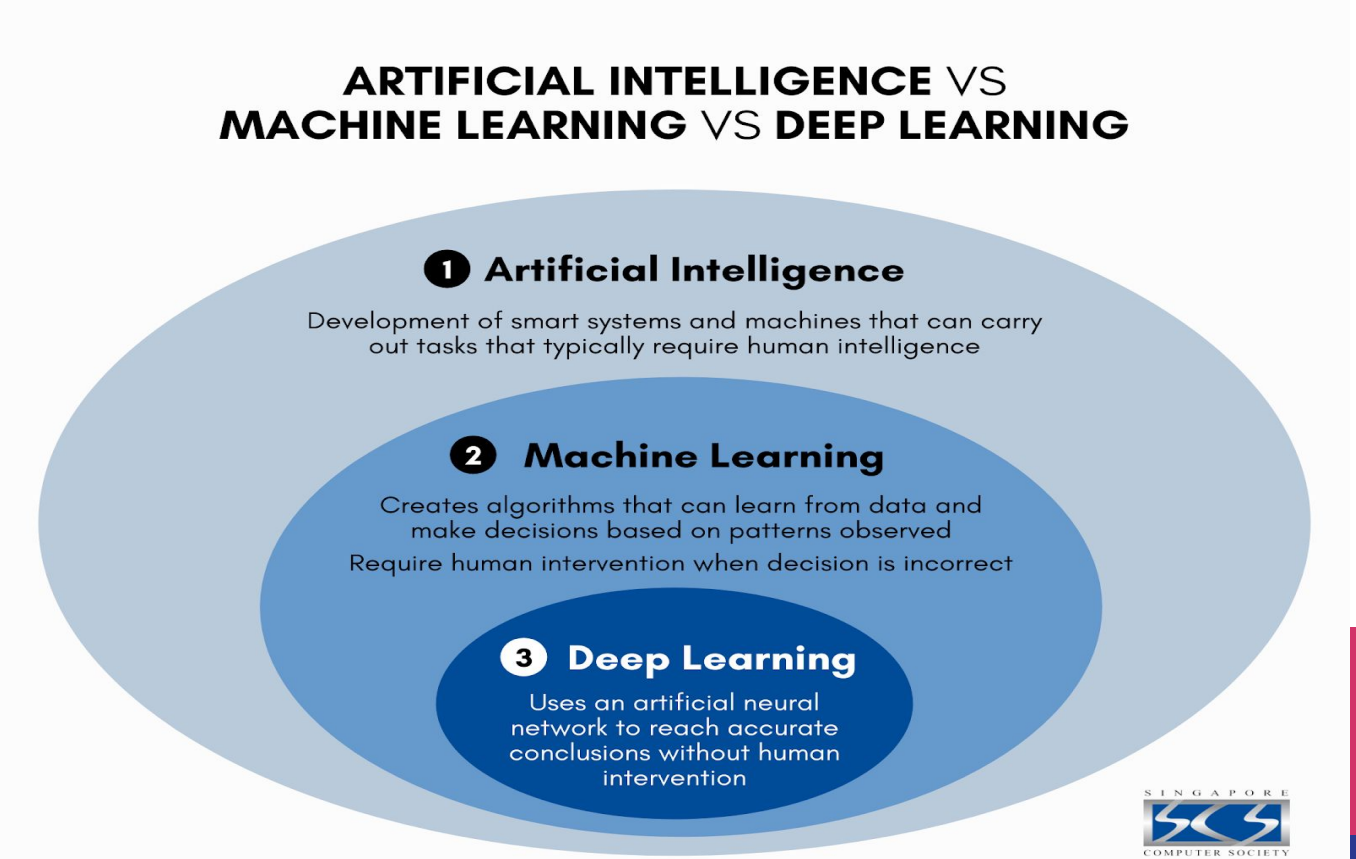


Machine learning (ML) can be categorized into several types based on different criteria. Here are some common ways to classify machine learning:

Supervised Learning
Unsupervised Learning
Semi-Supervised Learning
Reinforcement Learning
Deep Learning



Introduction to deep learning



NLP


Text
Video
Audio
NLP
Raw Language Processing
Entity Extraction
Relationship Extraction
Topic Classification
Sentiment Analysis

Applications of
Natural Language Processing