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

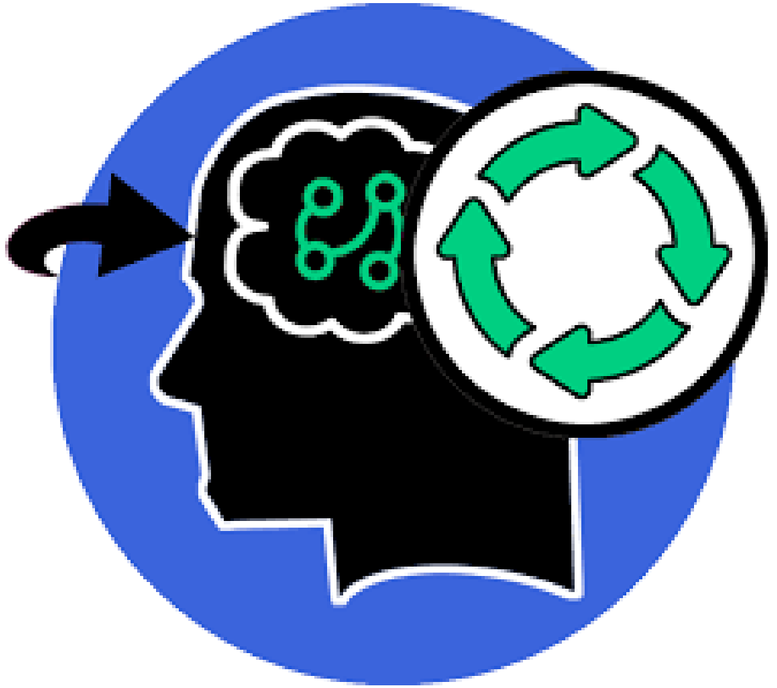
COURSE NAME : Artificial Intelligence

III YEAR /V SEMESTER

Unit 1- INTRODUCTION

Topic 3 : The Level of the Model

RECALL



AI techniques

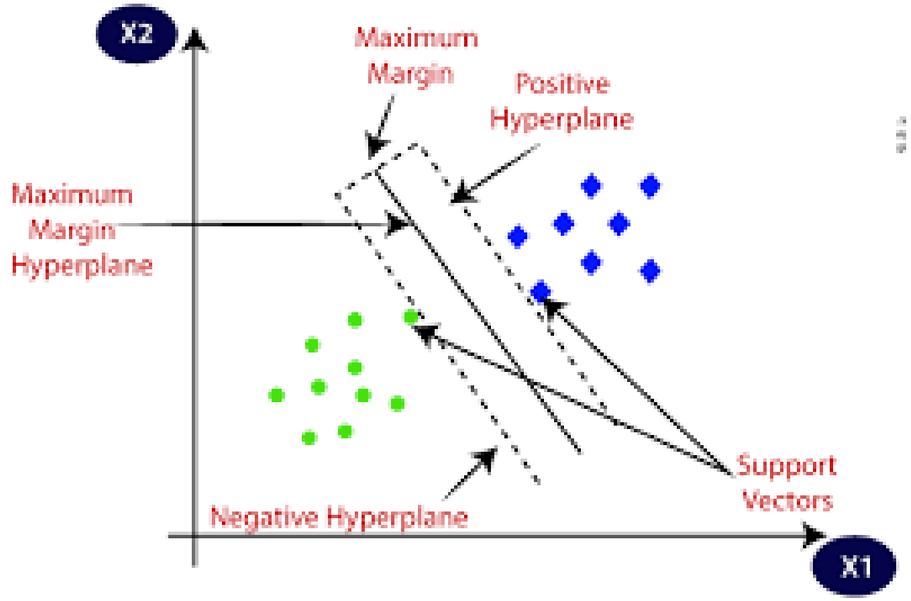
- Heuristics.
- Support Vector Machines.
- Artificial Neural Networks.
- Markov Decision Process.
- Natural Language Processing.

Heuristics are used in machine learning (ML) and artificial intelligence (AI) when it's impractical to solve a particular problem with a step-by-step algorithm

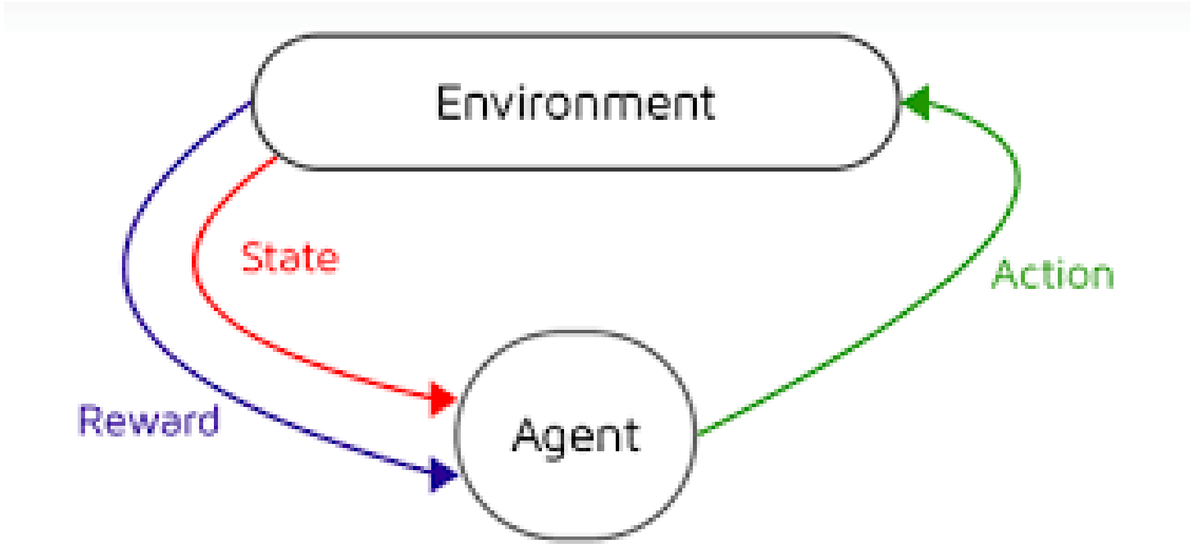
example, **if a student needed to decide what subject she will study at university, her intuition will likely be drawn toward the path that she envisions most satisfying, practical and interesting**.

Support Vector Machine or SVM is one of the most popular Supervised Learning algorithms, which is used for Classification as well as Regression problems.

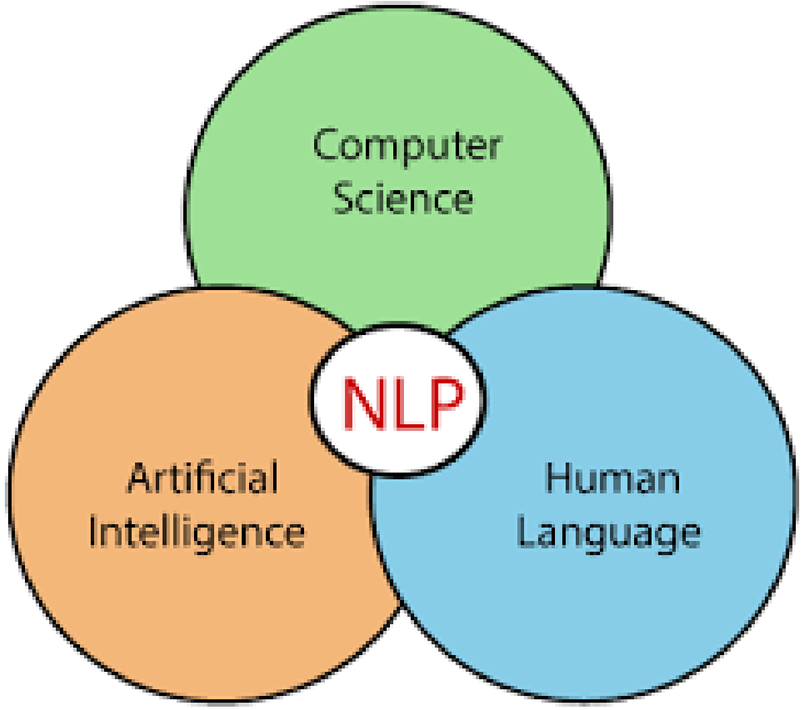
SVM is **a supervised machine learning algorithm which can be used for classification or regression problems**.



Markov decision processes are an extension of Markov chains; the difference is the addition of actions (allowing choice) and rewards (giving motivation).



Natural Language Processing (NLP) is a branch of Artificial Intelligence (AI) that enables machines to understand the human language.



- To understand the different types of AI learning models, we can use two of the main elements of human learning processes: **knowledge and feedback.**
- From the **knowledge perspective**, learning models can be classified based on the representation of input and output data points.
- In terms of the **feedback**, AI learning models can be classified based on the interactions with the outside environment, users and other external factors

AI Learning Models: Knowledge-Based Classification

Factoring its representation of knowledge, AI learning models can be classified in two main types: **inductive and deductive.**

—**Inductive Learning**: This type of AI learning model is based on inferring a general rule from datasets of input-output pairs.. Algorithms such as knowledge based inductive learning(KBIL) are a great example of this type of AI learning technique

— **Deductive Reasoning:** Also referred to as top-down reasoning, it helps deduce new information from logically related known information.


ACTIVITY

AI Learning Models: Feedback-Based Classification

Based on the feedback characteristics, AI learning models can be classified as supervised, unsupervised, semi-supervised or reinforced.

—**Unsupervised Learning:** Unsupervised models focus on learning a pattern in the input data without any external feedback. Clustering is a classic example of unsupervised learning models.

—**Supervised Learning:** Supervised learning models use external feedback to learning functions that map inputs to output observations. In those models the external environment acts as a “teacher” of the AI algorithms.

—**Semi-supervised Learning**: Semi-Supervised learning uses a set of curated, labeled data and tries to infer new labels/attributes on new data data sets. Semi-Supervised learning models are a solid middle ground between supervised and unsupervised models.

—**Reinforcement Learning**: Reinforcement learning models use opposite dynamics such as rewards and punishment to “reinforce” different types of knowledge. This type of learning technique is becoming really popular in modern AI solutions.

AI Success Criteria

- Is the task clearly defined?
- Is there an implemented procedure performing the task?
- Is there an identifiable set of regularities or constraints that the procedure uses to derive its power?

State-Space Search

Computers should solve problems.

A traditional problem domain for AI is the *blocks world*.

Problem description:

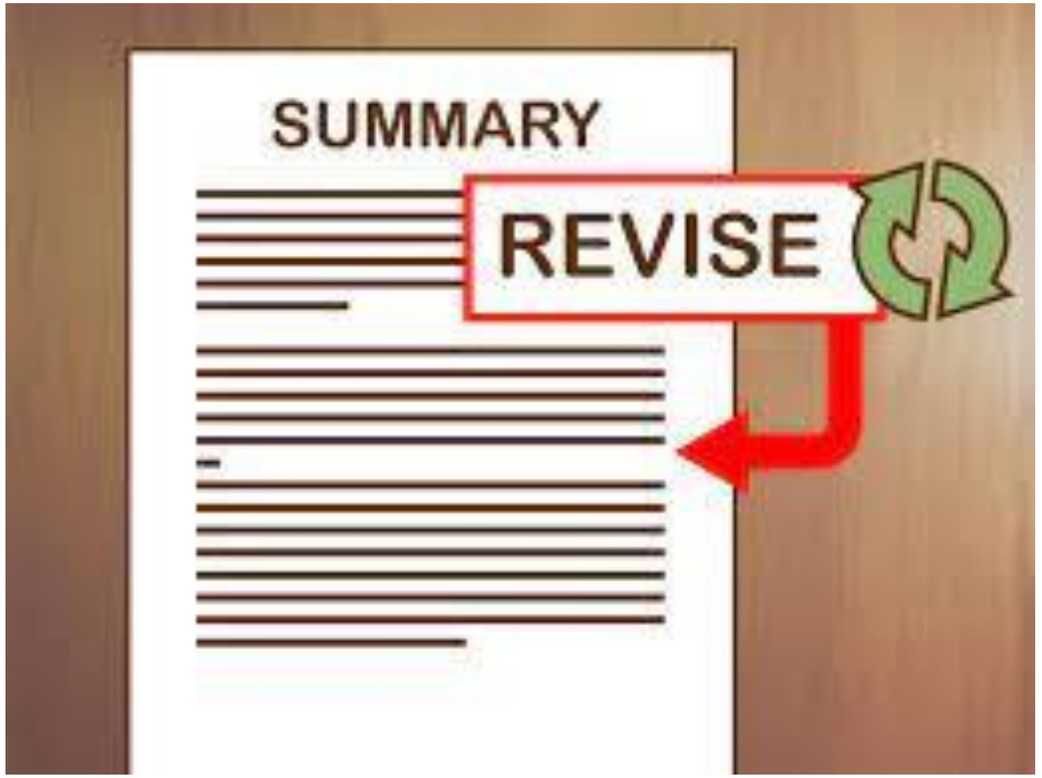
Given blocks A, B and C, with C on B,
arrange the blocks so that A is on B and B is on C.
You may only pick up and move one block at a time.

Defining the Problem as a State Space Search

- The focus now is on the first two things.
- Lets consider an example of problem statement "Play Chess"
- To build a program that could "Play chess", we would first have to;
  - specify the starting position of chess board,
  - the rules that define the legal moves
  - the board positions that represent a win for one side or the other
  - In addition we must make goal of winning the game.

Implementation: the problem definition

- General state space search (next slide) takes a problem definition as its argument:
  - Initial-state
  - A successors function: state → a set of action-result pairs
  - A goal-test function: state → true or false
  - (optionally) a cost function: action → a number > 0


SUMMARY
REVISE

EVALUATION

- List the AI Learning model
- What is state space search?

REFERENCES

1. S. Russell and P. Norvig, "Artificial Intelligence: A Modern Approach||, Prentice Hall, Third Edition, 2009.

THANK YOU