Artificial Intelligence

Prepare

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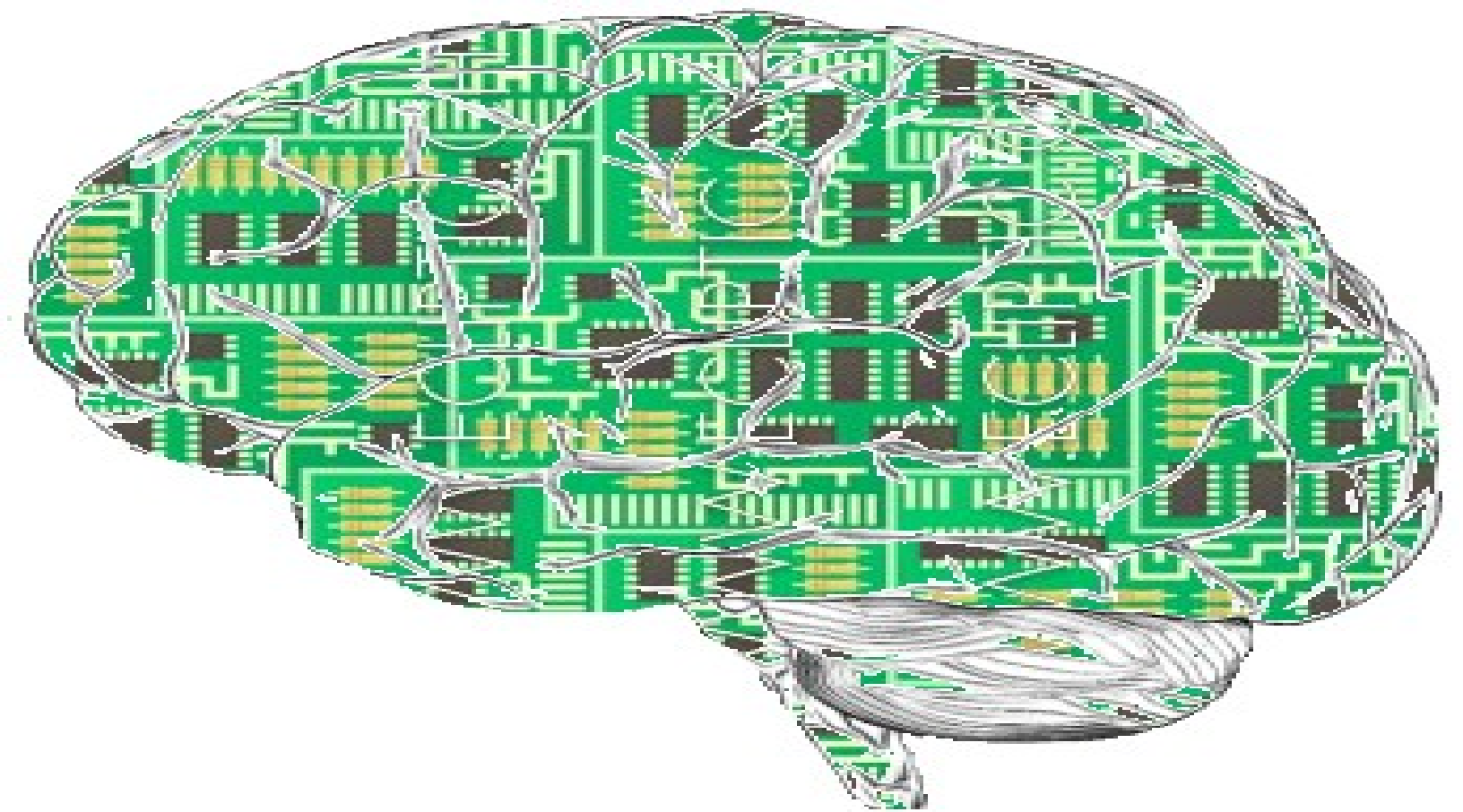
Chapter: 1

INTRODUCTION TO AI

Artificial Intelligence



AI Definitions

- We often hear that a computer called dumb computer any dumb machine because it does not think !

- So AI aims to develop the computer machine and provide it with the ability to think by feeding it with information and facts and know how to retrieve this information to answer queries. so that it has the ability to think like a human.

AI Definitions

- That science that researches how to make the computer perform the work that humans do better than they do.
- It is part of computer science that aims to design smart systems that give the same characteristics that we know of intelligence in human behavior.
- Programming computers so that they can have the ability to think and their ability to solve problems and make decisions

History of Artificial Intelligence

- **1950** A number of scientists have taken a new approach to the production of intelligent machines.
- **1956** A conference on artificial intelligence is held where amazing software and hardware are displayed.
- **1957** A complete model of the CNC eye network.
- **1961** Research on “Steps towards Artificial Intelligence”.
- **1980** The spread of artificial intelligence becomes more powerful and influential due to the success of systems of expertise.

AI Applications

- Natural Languages Processing
- Image and pattern Processing
- Voice Understanding
- Expert Systems
- Planning Robotics Activities
- Machine Learning
- Neural Networks
- Computer Games

Natural Languages Processing

It seeks to understand natural languages such as English, Arabic and others in order to teach the computer directly commands in that language and thus enable the computer to chat with people by answering specific question.

Image and Pattern Processing

- It means providing the computer with optical sensors that can identify the persons and forms in front of it.
- Image processing is a method to perform some operations on an image, in order to get an enhanced image or to extract some useful information from it.

Voice Understanding

Providing the computer with an understanding of human speech by receiving sounds from outside, reassembling and recognizing them, then responding to them

Expert Systems

They are programs that contain a huge amount of information owned by a human expert in a specific field of knowledge, and some of these programs have proven effective to confirm a possibility in this field

Robotic

It is an electromechanical machine that receives commands from its computer and does certain tasks by giving the robot the ability to move around, understand its surroundings, and respond to a number of external factors.

Machine Learning

Taking advantage of computer capabilities in the fields of education:

- **Automatic proof of theories**
- **Automated representation of knowledge**
- **Multimedia**

The latest smart education technologies include:

- **Virtual student technology.**
- **Smart education systems technology.**
- **Speech recognition technology that helps students learn to read**

A Neural Networks

- **A neural network is a type of machine learning which models itself after the human brain. This creates an artificial neural network that via an algorithm allows the computer to learn by incorporating new data.**
- **While there are plenty of artificial intelligence algorithms these days, neural networks are able to perform what has been termed deep learning. While the basic unit of the brain is the neuron, the essential building block of an artificial neural network is a perceptron which accomplishes simple signal processing, and these are then connected into a large mesh network.**

Computer Games

Developed programs capable of fencing in chess games and checkers, leading to the study of games such which develop technical methods to search for the best movement among a different set of possible moves, have produced long studies over several years chess programs capable of fencing at a high level.

AI Application Areas

- **Engineering Field:**
- **The medical Field:**
- **Military Field:**
- **Astronomical Field:**
- **Education Field:**
- **Field of Internet domain and networks**

Attributes of AI Systems

1. Symbolic Processing
2. Knowledge Representation
3. Inference Making
4. Sufficient Solutions
5. Meta-Knowledge
6. Knowledge representation languages
7. Knowledge Searching
8. Dynamic Knowledge

Symbolic Processing

It is the ability to deal with non-numerical

.symbols in addition to numerical ones

And therefore deal with knowledge in its

.natural form

Knowledge Representation

- **AI programs differ from other programs in that they have "representation of knowledge".**
- **The use of special structures to describe knowledge (Facts, Relationships, Rules, Frames) and is called the knowledge base.**

Inference Making

- **It is the ability of the program to devise possible solutions, especially for problems that traditional algorithms do not work to solve.**

- **This means that there is no series of specific steps (algorithmic solution) that follow to ensure a solution to the problem.**

Sufficient Solutions

It is not optimal or exact solutions as in traditional programming methods

Meta-Knowledge

It divides the problem into partial problems or divide the goals into partial goals. By solving partial problems or partial goals, the problem is solved or the overall goals are .reached

Knowledge Representation Languages

it are the languages that are used to represent knowledge and the conclusion processes.

Knowledge Searching

It includes procedures that can provide the system with the ability to reach specific targets

Dynamic Knowledge

The ability of the system to deal with renewable or dynamic knowledge that changes over time.

Languages of AI Programming

- Programming languages are important tools for building and designing AI applications.
- Languages that serve AI are languages that
- can process symbols

The most famous programming languages of AI

RITA programming language

Used in building systems of expertise to combat International terrorism

ROISE Language

Use in building systems of expertise for war planning

LISP (List Processing).

Natural language It is the most common languages to build expert systems because of its potential to deal with other languages such as C

PROLOG (programming in logic)

A logical language based on structure and branching and more widespread in Europe and Japan

Reference

Artificial Intelligence

structures and strategies for complex problem solving by George F Luger