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AI

Assignment-1

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1b What is AI ?

Ans - AI = Artificial Intelligence

- It is a study of how to make computers do things which, at moment people do better.
- AI can be viewed from variety of perspectives.
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- **Intelligence perspective**

- AI is making machines "intelligent" -- acting as we would expect people to act.

- The inability to distinguish computer responses from human responses is called the Turing test → A test where comp. is talking to human → if detected then FAIL & if not then PASS

- Intelligence requires knowledge.

- **Business perspective**

- AI is a set of very powerful tools, and methodologies for using those tools to solve business problem.

- **Programming perspective**

- AI includes the study of symbolic programming, problem solving, and search.

- Typically AI programs focus on symbols rather than numeric processing

- Problem solving i.e. to achieve a specific goal.

- Search - rarely access a solution directly. Search may include a variety of techniques

- It is the science and engineering of making intelligent machines, especially intelligent computer programs

3&2b What is AI problems ? write down tasks domain of AI.

Ans - Much of the early work in the field of AI focused on formal tasks, such as game playing and theorem proving

- Game playing and theorem proving share the property that people who do them well are considered to be displaying intelligence.

- Initially computers could perform well at those tasks simply by being fast at exploring a large number of solution paths and then selection the best one.

- Humans lear mudane (ordinary) tasks since their birth. They learn by perception, speaking, using language, and training. They learn Formal tasks first and Expert Task later.

- Another early foay into AI focused on commonsense reasoning, which includes reasoning about physical objects and their relationship to each other, as well as reasoning about actions and their consequences.

- As AI research progressed, techniques for handling large amount of world knowledge were developed.

- New tasks reasonably attempted such as perception (→opinion), natural language understanding and problem solving in specialized domains.

- Some of the task domains of artifical intelligence are presented in table given.

- Earlier, all work of AI was concentrated in the mudane task domain.

- later, it turned out that the machine requires more knowledge, complex knowledge representation, and complicated algorithms

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for handling mudane tasks.

Mudane Tasks	Formal Tasks	Expert Tasks
• Perception - Computer Vision - Speech, Voice	• Games - Go - chess (Deep Blue) - Checkers	• Engineering - Design - Fault Finding - Manufacturing - Monitoring
• Natural language Processing - Understanding - language generation - language translation	• Mathematics - Integration - Geometry - Logic - Differentiation	• Scientific Analysis
• Common Sense Reasoning • Planning • Robot Control	- Theorem Proving	• Financial Analysis • Medical Diagnosis

- This is the reason why AI work is more flourishing in the expert tasks domain now, as the expert task domain needs expert knowledge without common sense, which can be easier to represent and handle.

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4) What are AI techniques?

Ans AI problems span a very broad spectrum. They appear to have very little in common except that they are hard.

- AI research of earlier decades results into the fact that intelligence requires knowledge.

- Knowledge possess following properties:

  - It is voluminous (Large, very long)
  - It is not well-organized or well-formated
  - It is constantly changing.
  - It differs from data. And it is organized in a way that corresponds to its usage.

- AI technique is a method that exploits knowledge that sould be represented in such a way that:

  - knowledge captures generalization. Situations that share common properties are grouped together. Without this property, inordinate amount of memory and modifications will be required.

  - It can be understood by people who must provide it. Although bulk of data can

be acquired automatically, in many AI domains most of the knowledge must ultimately be provided by people in terms they understand.

- It can easily be modified to correct errors and to reflect changes in the world.
- It can be used in many situations even though it may not be totally accurate or complete
- It can be used to reduce its own volume by narrowing range of possibilites.

- There are three important AI techniques

1. Search -
   a. Provides a way of solving problems for which no direct approach is available.
   b. It also provides a framework into which any direct techniques that are available can be embedded.

2. Use of knowledge -
   a. Provides a way of solving complex problems by exploiting the structure of the objects that are involved.

3. Abstraction -

a. Provides a way of seperating important features and variations from many unimportant ones that would otherwise overwhelm any process.

5. Classification of AI ?

Ans - There are three types of classification of AI.

◉ WEAK AI :

- The study and design of machines that perform intelligent tasks.

- Not ~~connected~~ concerned with how tasks are performed, mostly concerned with performance and efficiency, such as solution that are reasonable for NP-complete problems.

↳ E.g., to make a flying machine, use logic & physics, don't mimic a bird.

◉ STRONG AI :

- The study and design of machines that simulate that human mind to perform intelligent ~~AA~~ tasks.

- Borrow many ideas from psychology, neuroscience. Goal is to perform tasks the way a human might do them - which makes sense, since we do have models of human thought and problem solving.

- Includes psychological ideas in STM, LTM, forgetting, language, genetics, etc. Assumes that the physical symbol hypothesis holds.

◉ Evolutionary AI :

- The study and design of machines that simulate simple creatures, and attempt to evolve and have higher level emergent behaviour.
  ↳ E.g., ants, bees, etc.

6) What are applications of AI ?

Ans - AI has been dominant in various fields such as -

- Gaming - AI plays vital role in strategic games such as chess, poker, tic-tac-toe, etc., where machine can think of large number of possible positions based on heuristic knowledge

Learn by discovering things by themselves

- **Natural language Processing** - It is possible to interact with the computer that understands natural language spoken by humans.

- **Expert Systems** - There are some applications which integrate machine, software, and special information to impact reasoning and advising. They provide explaination and advice to the users.

- **Computer Vision Systems** - These systems understand, interpret, and comprehend visual input on the computer.

- **Speech Recognition** - Some intelligent systems are capable of hearing and comprehending the language in terms of sentences and their meanings while a human talks to it. It can handle different accents, slang words, noise in the background, change in human's noise, etc.

- **Handwriting Recognition** - The handwriting recognition software reads the text written on paper by a pen or on screen by a stylus. It can recongnize the shapes of the letters and convert it into editable text.

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- Intelligent Robots - Robots are able to perform the tasks given by a human. They have sensors to detect physical data from the real world such as light, heat, temperature, movement, sound, bump, and pressure. They have efficient processors, multiple sensors and huge memory, to exhibit intelligence. In addition, they are capable of learning from their mistakes and they can adapt to the new environment.

7) What is Importance of AI ?

Ans
- AI is important because, for the first time, traditionally human capabilities can be undertaken in software inexpensively and at scale. AI can be applied to every sector to enable new possibilities and efficiencies.

- AI technology is important because it enables human capabilities - understanding, reasoning, planning, communication and perception - to be undertaken by software increasingly effectively, efficiently and at low cost.

- General analytical tasks, including finding patterns in data, that have been performed by software for many years can also be performed more

effectively using AI.

- The automation of these abilities creates new opportunities in most business sectors and consumer applications.

- Significant new products, services and capabilities enabled by AI include autonomus vehicles, automated medical diagnosis, voice input for human-computer interaction, intelligent agents, automated data synthesis and enhanced decision-making.

- AI has numerous, tangible use cases today that are enabling corporate revenue growth and cost savings in existing sectors.

- Applications will be most numerous in sectors in which a large proportion of time is spent collecting and synthesising data: financial service, retail and trade, professional services, manufacturing and healthcare.

- Applications of AI-powered computer vision will be particularly significant in the transport sector.

- Use cases are proliferating as AI's potential is understood. We describe 31 core use

cases across eight sectors: asset management, healthcare, insurance, law & compliance, manufacturing, retail, transport and utilities

- We illustrate how AI can be applied to multiple processes within a business function (human resources).