19EET401 / AI TECHNIQUES IN ELECTRICAL ENGINEERING
IV YEAR / VII SEMESTER
UNIT-I: INTRODUCTION TO ARTIFICIAL INTELLIGENCE

3.ADVANTAGE, DISADVANTAGE, KNOWLEDGE

TOPIC OUTLINE

Advantage and Disadvantage

Knowledge

Interacting with Environment

History

Some Advantages of Artificial Intelligence

- more powerful and more useful computers
- new and improved interfaces
- solving new problems
- better handling of information
- relieves information overload
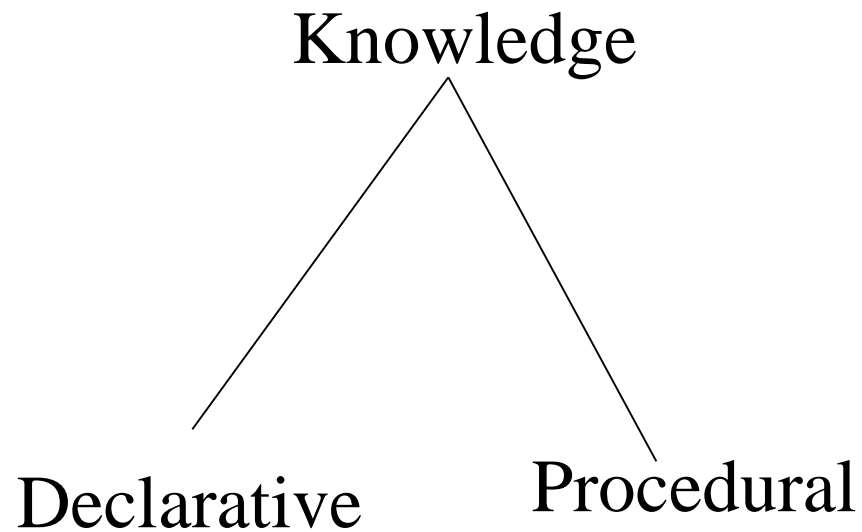- conversion of information into knowledge

The Disadvantages

- increased costs
- difficulty with software development - slow and expensive
- few experienced programmers
- few practical products have reached the market as yet.

Search

- *Search* is <u>the fundamental</u> technique of AI.
  - Possible answers, decisions or courses of action are structured into an abstract space, which we then search.
- Search is either "blind" or "uninformed":
  - blind
    - we move through the space without worrying about what is coming next, but recognising the answer if we see it
  - informed
    - we guess what is ahead, and use that information to decide where to look next.
- We may want to search for the first answer that satisfies our goal, or we may want to keep searching until we find the best answer.

Knowledge Representation & Reasoning

- The <u>second</u> most important concept in AI

- If we are going to act rationally in our environment, then we must have some way of describing that environment and drawing inferences from that representation.

  - how do we describe what we know about the world ?

  - how do we describe it *concisely* ?

  - how do we describe it so that we can get hold of the right piece of knowledge when we need it ?

  - how do we generate new pieces of knowledge ?

  - how do we deal with *uncertain* knowledge ?

Knowledge

Declarative   Procedural

• Declarative knowledge deals with factoid questions (what is the capital of India? Etc.)

• Procedural knowledge deals with "How"

• Procedural knowledge can be embedded in declarative knowledge

Planning

Given a set of goals, construct a sequence of actions that achieves those goals:

- often very large search space
- but most parts of the world are independent of most other parts
- often start with goals and connect them to actions
- no necessary connection between order of planning and order of execution
- what happens if the world changes as we execute the plan and/or our actions don't produce the expected results?

Learning

- If a system is going to act truly appropriately, then it must be able to change its actions in the light of experience:
  - how do we generate new facts from old ?
  - how do we generate new concepts ?
  - how do we learn to distinguish different situations in new environments ?

Interacting with the Environment

- In order to enable intelligent behaviour, we will have to interact with our environment.
- Properly intelligent systems may be expected to:
  - accept sensory input
    - vision, sound, …
  - interact with humans
    - understand language, recognise speech, generate text, speech and graphics, …
  - modify the environment
    - robotics

History of AI

- AI has a long history
  - Ancient Greece
    - Aristotle
  - Historical Figures Contributed
    - Ramon Lull
    - Al Khowarazmi
    - Leonardo da Vinci
    - David Hume
    - George Boole
    - Charles Babbage
    - John von Neuman
  - As old as electronic computers themselves (c1940)