Artificial Intelligence (CSC261)

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Nature of Course, Evaluation Scheme and Credit Hours:

- Nature of Course: Theory + lab
- Evaluation scheme: 60+20+20 (need to score 40% in each section to pass)
- Credit Hours: 3

Course Description

CSC261 Description

- The course introduces the concepts and techniques that comprise the principles and design of intelligent systems.
- It covers AI fundamentals and applications such as intelligent agent design, problem-solving, searching, probabilistic reasoning, etc.
- Moreover, this course also covers fundamental concepts regarding knowledge representation systems, concepts of ANN and ML, and NPL.

Course Objectives

CSC261 Objectives

- To introduce the fundamental concepts of AI.
- The general goals are to learn about intelligent systems, design intelligent agents, identify and solve fundamental AI problems, etc.
- Furthermore, it also covers how to design knowledge representation and expert systems, and design neural networks for problem-solving, etc.
- To enable learners to identify different machine learning paradigms and their practical applications.

Laboratory Works

Students are highly encouraged to implement the following as a part of the programming assignment using LISP, PROLOG, or another high-level language preferably Python.

- Design and implementation of intelligent agents and expert systems.
- Implementation of searching techniques, and knowledge representation systems.
- Design and implementation of ANN, Genetic algorithms, and machine learning techniques for solving some fundamental problems.

Outline

- Background
- Introduction to AI
- AI Perspectives:
  - Acting humanly
  - Thinking humanly
  - Acting rationally
  - Thinking rationally
- History of AI
- Foundations of AI
- Applications of AI

Background

- We call ourselves Homo sapiens.
  - The wise human: because of our intelligence.
- For thousands of years, people (especially: cognitive scientists) have tried to figure out
  - how we think, or
  - how a tiny matter can perceive, comprehend, predict, and manipulate a world far larger and more complex than itself.
- The domain of AI, goes even further, attempting not only to understand but also to build intelligent entities.

Background

- AI is one of the most recent interdisciplinary scientific and engineering fields.
- Work began in earnest shortly after World War II, and the name was coined in 1956.
- The motivation behind AI is like a physics student might reasonably believe that all of the good ideas have already been taken by Galileo, Newton, Einstein, and others.
- However, AI is still looking for full-time Einsteins and Newtons which might be "YOU".
- AI now includes a wide range of subfields,
  - from the general (learning and perception)
  - to the specific (playing chess, proving mathematical theorems, writing poetry, driving a car on a crowded street, and diagnosing diseases, etc.)
- AI is applicable to any intellectual task; it is truly a multidisciplinary domain.

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What is AI?

- Artificial Intelligence is concerned with the design of intelligence in an artificial device.
- The term was coined by McCarthy in 1956.
- There are two ideas in the definition:
  - first one is "Intelligence" and
  - second is "Artificial device"
- AI is applicable to any intellectual task; it is truly a multidisciplinary domain.

What is intelligence?

- Is it that which characterizes humans?
- Or is there an absolute standard of judgment?
- Accordingly there are two possibilities:
  - A system with intelligence is expected to behave as intelligently as a human.
  - A system with intelligence is expected to behave in the best possible manner.

What is intelligence?

- Secondly, what type of behavior are we talking about?
  - Are we looking at the system's thought process or reasoning ability?
  - Or are we only interested in the system's final indications in terms of its actions?
- Intelligence is:
  - the ability to reason, understand, create, Learn from the experience, and plan and execute complex tasks.
- Thus, AI can be defined as "Giving machines the ability to perform tasks normally associated with human intelligence."

Thanks