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A DESCRIPTIVE STUDY ON ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEM

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Abstract:

Humankind has given itself the scientific name homo sapiens--man the wise--because our mental capacities are so important to our everyday lives and our sense of self. The field of artificial intelligence, or AI, attempts to understand intelligent entities. Thus, one reason to study it is to learn more about ourselves. But unlike philosophy and psychology, which are also concerned with intelligence, AI strives to build intelligent entities as well as understand them. Another reason to study AI is that these constructed intelligent entities are interesting and useful in their own right.

***Keywords**: Artificial Intelligence, Expert System*

Introduction to Artificial Intelligence and Expert System

AI has produced many significant and impressive products even at this early stage in its development. Although no one can predict the future in detail, it is clear that computers with human-level intelligence (or better) would have a huge impact on our everyday lives and on the future course of civilization.

AI addresses one of the ultimate puzzles. How is it possible for a slow, tiny brain{brain}, whether biological or electronic, to perceive, understand, predict, and manipulate a world far larger and more complicated than itself? How do we go about making something with those properties? These are hard questions, but unlike the search for faster-than-light travel or an antigravity device, the researcher in AI has solid evidence that the quest is possible. All the researcher has to do is look in the mirror to see an example of an intelligent system.

AI is one of the newest disciplines. It was formally initiated in 1956, when the name was coined, although at that point work had been under way for about five years. Along with modern genetics, it is regularly cited as the ``field I would most like to be in'' by scientists in other disciplines. A student in physics might reasonably feel that all the good ideas have already been taken by Galileo, Newton, Einstein, and the rest, and that it takes many years of study before one can contribute new ideas. AI, on the other hand, still has openings for a full-time Einstein.

The study of intelligence is also one of the oldest disciplines. For over 2000 years, philosophers have tried to understand how seeing, learning, remembering, and reasoning could, or should, be done. The advent of usable computers in the early 1950s turned the learned but armchair speculation concerning these mental faculties into a real experimental and theoretical discipline. Many felt that the new ``Electronic Super-Brains'' had unlimited potential for intelligence. ``Faster Than Einstein'' was a typical headline. But as well as providing a vehicle for creating artificially intelligent entities, the computer provides a tool for testing theories of intelligence, and many theories failed to withstand the test--a case of ``out of the armchair, into the fire.'' AI has turned out to be more difficult than many at first imagined, and modern ideas are much richer, more subtle, and more interesting as a result.

AI currently encompasses a huge variety of subfields, from general-purpose areas such as perception and logical reasoning, to specific tasks such as playing chess, proving mathematical theorems, writing poetry{poetry}, and diagnosing diseases. Often, scientists in other fields move gradually into artificial intelligence, where they find the tools and vocabulary to systematize and automate the intellectual tasks on which they have been working all their lives. Similarly, workers in AI can choose to apply their methods to any area of human intellectual endeavor. In this sense, it is truly a universal field.

What is AI?

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We have now explained why AI is exciting, but we have not said what it is. We could just say, ``Well, it has to do with smart programs, so let's get on and write some." But the history of science shows that it is helpful to aim at the right goals. In simple terms AI is defined as "Making the computer system to think and act like a human"

Expert System

An expert system is an application that seeks to mimic the knowledge and experience of a human expert. An expert system is designed to provide reasonable answers when given a set of conditions about the problem in hand.

For example, a design engineer may be an expert in designing car parts using CAD - they know the capabilities of the materials available and they know what is possible.

There are experts in all types of fields

- Medical specialists
- Financial services
- Engineering designers
- Repair technicians

Uses of Expert System

Here are some uses for an expert system

- Diagnostic tool for fixing machinery and vehicles
- Online medical system for diagnosing a problem
- Telephone based help desk
- Finance firm making loan / credit decisions
- Government services such as working out tax and benefits

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In each case, the expert system is designed to provide a reasonable answer with some systems also giving a reason for each answer.

Acting humanly: The Turing Test approach

The Turing Test, proposed by Alan Turing (Turing, 1950), was designed to provide a satisfactory operational definition of intelligence. Turing defined intelligent behavior as the ability to achieve human-level performance in all cognitive tasks, sufficient to fool an interrogator. Roughly speaking, the test he proposed is that the computer should be interrogated by a human via a teletype, and passes the test if the interrogator cannot tell if there is a computer or a human at the other end. Chapter 26 discusses the details of the test, and whether or not a computer is really intelligent if it passes. For now, programming a computer to pass the test provides plenty to work on. The computer would need to possess the following capabilities:

- natural language processing to enable it to communicate successfully in English (or some other human language);
- knowledge representation to store information provided before or during the interrogation;
- automated reasoning to use the stored information to answer questions and to draw new conclusions;
- machine learning to adapt to new circumstances and to detect and extrapolate patterns.

Turing's test deliberately avoided direct physical interaction between the interrogator and the computer, because physical simulation of a person is unnecessary for intelligence. However, the so-called total Turing Testincludes a video signal so that the interrogator can test the subject's perceptual abilities, as well as the opportunity for the interrogator to pass physical objects ``through the hatch.'' To pass the total Turing Test, the computer will need

- computer vision to perceive objects, and
- robotics to move them about.

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Within AI, there has not been a big effort to try to pass the Turing test. The issue of acting like a human comes up primarily when AI programs have to interact with people, as when an expert system explains how it came to its diagnosis, or a natural language processing system has a dialogue with a user. These programs must behave according to certain normal conventions of human interaction in order to make themselves understood.

Thinking humanly: The cognitive modeling approach

If we are going to say that a given program thinks like a human, we must have some way of determining how humans think. We need to get inside the actual workings of human minds. There are two ways to do this: through introspection--trying to catch our own thoughts as they go by--or through psychological experiments. Once we have a sufficiently precise theory of the mind, it becomes possible to express the theory as a computer program. If the program's input/output and timing behavior matches human behavior, that is evidence that some of the program's mechanisms may also be operating in humans. For example, Newell and Simon, who developed GPS, the ``General Problem Solver'' (Newell and Simon, 1961), were not content to have their program correctly solve problems. They were more concerned with comparing the trace of its reasoning steps to traces of human subjects solving the same problems.

Thinking rationally: The laws of thought approach

The Greek philosopher Aristotle was one of the first to attempt to codify ``right thinking,'' that is, irrefutable reasoning processes. His famous syllogisms provided patterns for argument structures that always gave correct conclusions given correct premises. For example, ``Socrates is a man; all men are mortal; therefore Socrates is mortal.'' These laws of thought were supposed to govern the operation of the mind, and initiated the field of logic.

The development of formal logic in the late nineteenth and early twentieth centuries, which we describe in more detail in Chapter 6, provided a precise notation for statements about all kinds of things in the world and the relations between them. (Contrast this with ordinary arithmetic notation, which provides mainly for equality and inequality statements about numbers.) By 1965, programs existed that could, given enough time and memory, take a

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description of a problem in logical notation and find the solution to the problem, if one exists. (If there is no solution, the program might never stop looking for it.) The so-called logicist tradition within artificial intelligence hopes to build on such programs to create intelligent systems.

There are two main obstacles to this approach. First, it is not easy to take informal knowledge and state it in the formal terms required by logical notation, particularly when the knowledge is less than 100% certain. Second, there is a big difference between being able to solve a problem ``in principle'' and doing so in practice. Even problems with just a few dozen facts can exhaust the computational resources of any computer unless it has some guidance as to which reasoning steps to try first. Although both of these obstacles apply to any attempt to build computational reasoning systems, they appeared first in the logicist tradition because the power of the representation and reasoning systems are well-defined and fairly well understood.

Acting rationally: The rational agent approach

Acting rationally means acting so as to achieve one's goals, given one's beliefs. An agent is just something that perceives and acts. (This may be an unusual use of the word, but you will get used to it.) In this approach, AI is viewed as the study and construction of rational agents.

In the ``laws of thought'' approach to AI, the whole emphasis was on correct inferences. Making correct inferences is sometimes part of being a rational agent, because one way to act rationally is to reason logically to the conclusion that a given action will achieve one's goals, and then to act on that conclusion. On the other hand, correct inference is not all of rationality, because there are often situations where there is no provably correct thing to do, yet something must still be done.

Conclusion

The study of AI as rational agent design therefore has two advantages. First, it is more general than the ``laws of thought'' approach, because correct inference is only a useful mechanism for achieving rationality, and not a necessary one. Second, it is more amenable to scientific development than approaches based on human behavior or human thought, because the standard of rationality is clearly defined and completely general. Human behavior, on the other hand, is well-adapted for one specific environment and is the product, in part, of a complicated and largely unknown evolutionary process that still may be far from achieving perfection.

Reference

1. http://www.cs.berkeley.edu/~russell/intro.html
2. http://www.teachict.com/as_a2_ict_new/ocr/A2_G063/334_applications_ict/expert_systems/miniweb/pg7.htm
3. artint.info/html/ArtInt_3.html
4. Own Comments