

IJEAST

INTERNATIONAL JOURNAL
OF ENGINEERING APPLIED SCIENCE
AND TECHNOLOGY

VOLUME : 2 ISSUE : 4 Print / Issue Publication Date: 31-Mar-2017

ISSN : 2455-2143

Indexed In

Google SCHOLAR OPEN ACCESS doi Crossref

WWW.IJEAST.COM

editor@ijeast.com

International Journal of Engineering Applied Sciences and Technology, 2017
Vol. 2, Issue 4, ISSN No. 2455-2143, Pages 145-147
Published Online February-March 2017 in IJEAST (http://www.ijeast.com)



REVIEW ON ARTIFICIAL INTELLIGENCE

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***Abstract*—This paper reviews the field of Artificial Intelligence focusing on different faculties involved with intelligent behavior, ways of approaching Artificial Intelligence. It also consider a fair idea of the types of problems that can be currently solved by computers and those that are as yet beyond its ability.**

Keywords— **AI, agent, Intelligent agent, rational agent**

I. INTRODUCTION

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.

a. Intelligence
b. artificial device

What is intelligence?
– Is it that which characterize humans? Or is there an absolute standard of judgement?
– 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
– Secondly what type of behavior are we talking about?
–Are we looking at the thought process or reasoning ability of the system?
– Or are we only interested in the final manifestations of the system in terms of its actions?

Given this scenario different interpretations have been used by different researchers as defining the scope and view of Artificial Intelligence.

1. One view is that artificial intelligence is about designing systems that are as intelligent as humans. This view involves trying to understand human thought and an effort to build machines hat emulate the human thought process. This view is the cognitive science approach to AI.
2. The second approach is best embodied by the concept of the Turing Test. Turing held that in future computers can be programmed to acquire abilities rivaling human intelligence. As part of his argument Turing put forward the idea of an 'imitation game', in which a human being and a computer would be interrogated under conditions where the interrogator would not know which was which, the communication being entirely by textual messages. Turing argued that if the interrogator could not distinguish them by questioning, then it would be unreasonable not to call the computer intelligent. Turing's 'imitation game' is now usually called 'the Turing test' for intelligence.

II. LITERATURE REVIEW

A. AGENTS:-

An agent acts in an environment. An agent perceives its environment through sensors. The complete set of inputs at a given time is called a percept. The current percept, or a sequence of percepts can influence the actions of an agent. The agent can change the environment through actuators or effectors. An operation involving an effector is called an action. Actions can be grouped into action sequences. The agent can have goals which it tries to achieve.
An autonomous agent decides autonomously which action to take in the current situation to maximize progress towards its goals.

B. Agent Performance

The performance measure is a subjective measure to characterize how successful an agent is. The success can be measured in various ways. It can be measured in terms of speed or efficiency of the agent. It can be measured by the accuracy or the quality of the solutions achieved by the agent. It can also be measured by power usage, money, etc.

C. Agent Faculties

The fundamental faculties of intelligence are

- Acting
- Sensing
- Understanding, reasoning, learning

D. Intelligent Agents

An **Intelligent Agent** must sense, must act, must be autonomous. It also must be rational.
AI is about building rational agents. An agent is something that perceives and acts.

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A rational agent always does the right thing.

a. What are the functionalities (goals)?
b. What are the components?
c. How do we build them?

E. Rationality

Perfect Rationality assumes that the rational agent knows all and will take the action that maximizes her utility. Human beings do not satisfy this definition of rationality.

Rational Action is the action that maximizes the expected value of the performance measure given the percept sequence to date.

However, a rational agent is not omniscient. It does not know the actual outcome of its actions, and it may not know certain aspects of its environment. Therefore rationality must.

III. STATE-BASED AGENT OR MODEL-BASED REFLEX AGENT

State based agents differ from percept based agents in that such agents maintain some sort of state based on the percept sequence received so far. The state is updated regularly based on what the agent senses, and the agent's actions. Keeping track of the state requires that the agent has knowledge about how the world evolves, and how the agent's actions affect the world.

Thus a state based agent works as follows:

- information comes from sensors - percepts based on this, the agent changes the current state of the world.
- based on state of the world and knowledge it triggers actions through the effectors.

Goal-based Agent

The goal based agent has some goal which forms a basis of its actions such agents work as follows:

- information comes from sensors - percepts
- changes the agents current state of the world
- based on state of the world and knowledge(memory) and goals/intentions, it chooses actions and does them through the effectors.

Utility-based Agent

A utility based agent provides a more general agent framework. In case that the agent has multiple goals, this framework can accommodate different preferences for the different goals.

Learning Agent

Learning allows an agent to operate in initially unknown environments. The learning element modifies the performance element. Learning is required for true autonomy

IV. CONCLUSION

In conclusion AI is a truly fascinating field. It deals with exciting but hard problems. A goal of AI is to build intelligent agents that act so as to optimize performance.

- An agent perceives and acts in an environment, has an architecture, and is implemented by an agent program.
- An ideal agent always chooses the action which maximizes its expected performance, given its percept sequence so far.
- An autonomous agent uses its own experience rather than built-in knowledge of the environment by the designer.
- An agent program maps from percept to action and updates its internal state.
  - Reflex agents respond immediately to percepts.
- Goal-based agents act in order to achieve their goal(s).
- Utility-based agents maximize their own utility function.
- Representing knowledge is important for successful agent design.
- The most challenging environments are partially observable, stochastic, sequential, dynamic, and continuous, and contain multiple intelligent agents.

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2455-2143