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APPLICATIONS & USES OF ARTIFICIAL INTELLIGENCE

Nikhil P[1], Shreedhar[2]

[1,2]Electronics & communication Eng. Dept. T John institute of technology, India.

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ABSTRACT

This paper reviews the meaning of artificial intelligence and its various advantages and disadvantages including its applications. It also considers the current progressof this technology in the real world and discusses the applicationsof AI in the fields of heavy industries, gaming, aviation, weather forecasting, expert systems with the focus being on expert systems. The paper concludes by analyzing the future potential of Artificial Intelligence.

Keywords- Turing Test, Gaming Industry, WeatherPredictions, Expert System

1. INTRODUCTION

ARTI ICIAL intelligence (AI) is defined as intelligence exhibited by an artificial entity to solve complex F problems and such a system is generally assumedto be a computer or machine. Artificial Intelligence is anintegration of computer science and physiology Intelligencein simple language is the computational part of the ability toachieve goals in the world. Intelligence is the ability to thinkto imagine creating memorizing and understanding, recognizing patterns, making choices adapting to change andlearn from experience. Artificial intelligence concerned withmaking computers behave like humans more human likefashion and in much less time then a human takes. Hence itis called as Artificial Intelligence. Artificial intelligence can

be divided into parts according to philosophy of AI.

a) Strong AI b) Weak AI

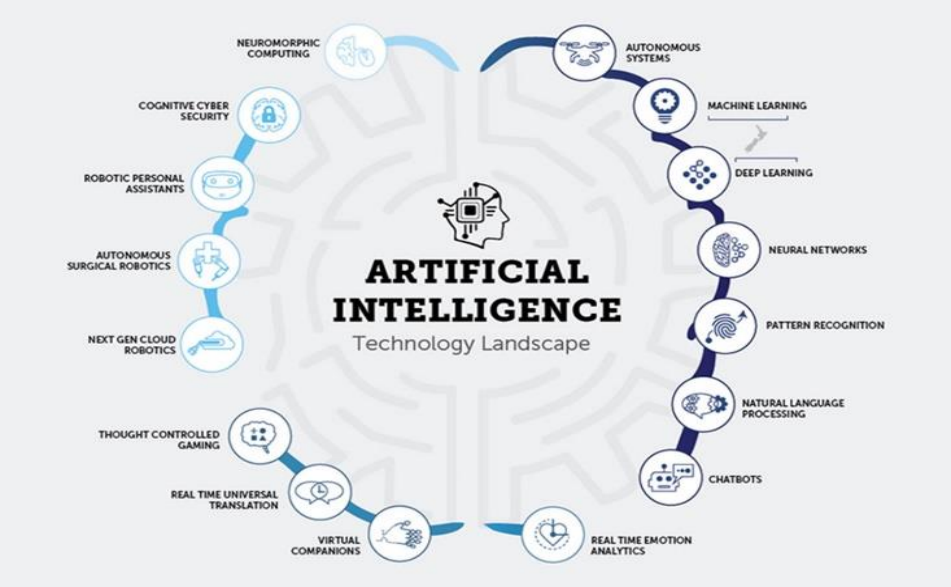

Fig. 1

Strong AI

The principle behind Strong AI is that the machines could bemade to think or in other words could represent human minds in the future. Thus Strong AI claims that in nearfuture we will be surrounded by such kinds of machinewhich can completely works like human being and machine could have human level intelligence. If that is the case, those machines will have the ability to reason, think and do all functions that a human is capable of doing. Current research is nowhere near creating strong AI, and a lively debate is ongoing as to whether this is even possible .

Weak AI

The principle behind Weak AI is simply the fact thatmachines can be made to act as if they are intelligent. WeakAI simply states that thinking like features can be easilyadded to computer to make them more useful tools and this already started to happen. For example, when a humanplayer plays chess against a computer, the human player may feel as if the computer is actually making impressivemoves. But the chess application is not thinking and planning at all. All the moves it makes are previously fed into the computer by a human and that is how it is ensured thatthe software will make the right moves at the right times.More examples of Weak AI are witness expert systems,

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drive by wires cars and speech recognisation systems Artificial Intelligence (abbreviated as AI) is the capability of a device to perform activities, which would otherwiseonly be expected of the human brain. These activitiesinclude the capacity for knowledge and the ability to acquireit. It also comprises of the ability to judge, understandrelationships and last but not least produce original thoughts.

Intelligence = perceive + Analyse + React

Also, there is a huge different between short term memory and RAM. Short-term memory holds pointers to thelong-term memory where all the information is actually stored while RAM stores data that is isomorphic to data being held on a hard disk. Also, RAM has a memory limit while there seems to be no capacity limit when it comes to short-term memory.

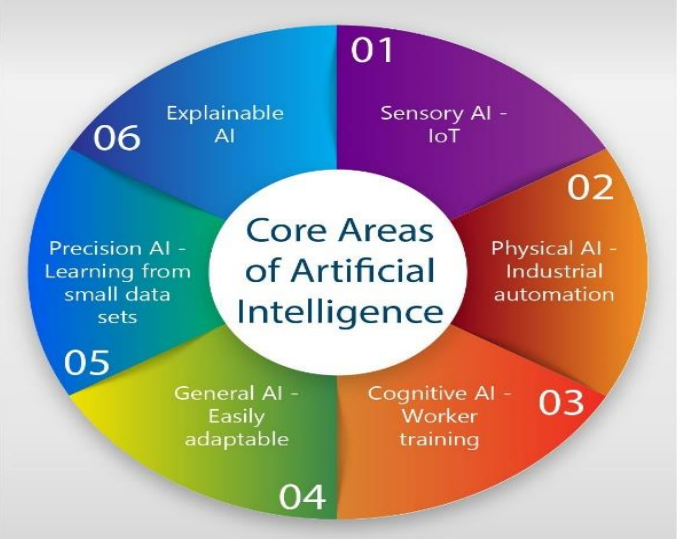

Fig 2. Areas of Artificial Intelligence

Turing Test: The Turing test is a test of a machine's ability to exhibit intelligent behavior. The test was introduced by Alan Turing in his 1950 paper Computing Machinery and Intelligence. The original question behind this test was "Can machines think? ". The test proceeds as follows a human judge engages in a natural language conversation with one human and one machine, each of which tries to appear human. All participants are placed in isolated locations. If the judge cannot reliably tell the machine from the human, the machine is said to have passed the test. In order to test the machine's intelligence rather thanits ability to render words into audio, the conversation is limited to a text-only channel such as a computer keyboard and screen." Sufficiently many interrogators are unable to distinguish the computer from the human being then it is to be concluded that the computer thinks.

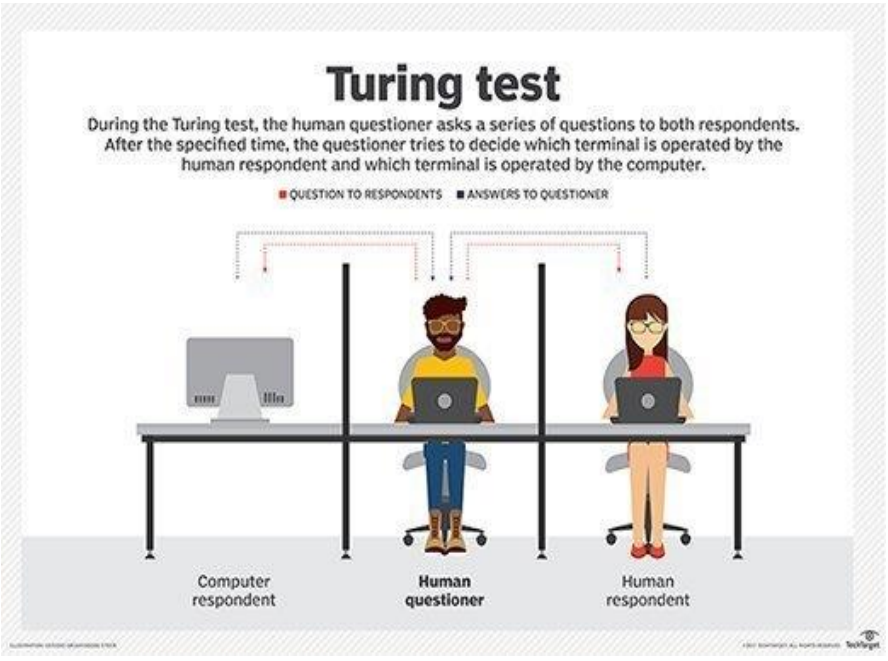

Fig 3 Turing test for checking machine intelligence

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Roots of AI

Artificial Intelligence has identifiable roots in a number ofolder disciplines, particularly

- Philosophy
- Logic/Mathematics
- Computation
- Psychology/Cognitive Science
- Biology/Neuroscience

There is inevitably much overlap Example, betweenphilosophy and logic, or between mathematics and computation. By looking at each of these in turn, we can gain a better understanding of their role in AI, and how these underlying disciplines have developed to play that role.

2. BACKGROUND OF ARTIFICIAL INTELLIGENCE

The process of giving a computer, a robot under computer control, or software the ability to think intelligently and similarly to intelligent humans is known as artificial intelligence. The process of creating artificial intelligence (AI) involves first understanding how the human brain functions and how people learn, make decisions, and collaborate to solve problems. The results of this research are then used to create intelligent software and systems. The capacity to acquire knowledge and use that knowledge to reason in order to solve complicated issues is a frequent definition of intelligence. Intelligent machines will soon take the place of humans in many tasks. The study and creation of intelligent hardware and software that can reason, learn, acquire information, communicate, operate, and see things is known as artificial intelligence.

In 1956, John McCarthy first used the phrase to refer to the area of computer science that focuses on programming computers to behave like people. Perceiving and acting on reason is made possible by the study of computation. Artificial intelligence is distinct from psychology because to its focus on computing, but computer science differs from it in that it emphasizes perception, reasoning, and action.

It gives machines more intelligence and utility. This section provides a quick summary of learning algorithms, which are fundamental ideas in artificial intelligence. It also provides a brief overview of some of the AI subfields that are commonly used in the field of cybersecurity, including expert systems, machine learning, deep learning, and biologically inspired computation. Machines may be trained using learning algorithms, which also help humans perform better by allowing humans to learn from their mistakes. Based on the definition provided by Mitchel. For the purpose of teaching machines, there are three comm

3. ADVANTAGES AND DISADVANTAGES

- One of the major advantages of artificial intelligence isthat its decisions are based on facts rather than emotions. Even after our utmost efforts, it is a well- known fact that human decisions are always affected ina negative way by our emotions
- Unlike humans, machines with artificial intelligence do not need any sleep, thus overcoming the inherent disadvantage of tiredness in humans
- Easier spreading of knowledge. Once an artificial mindis trained for something, it can be very easily copied to the others reducing the time wasted in otherwise passing on knowledge to other humans through training .
- Lack of creativity in responses
- Inability to explain the logic and reasoning behind a certain decision
- Current development is at a stage where the AI cannot know when there is no solution to a particular problem
- Any malfunctioning can lead to the AI producing wrong solutions and since it cannot explain the reasoning behind its answer, blind reliance on AI can lead to problems

have been used by Mercedes Benz and other auto manufacturers in the design of vehicle components, subway systems in Washington, D.C. use expert system softwarecontrollers to cause subway trains to stop within 3 inches of the right spot on the platform.

These trains have motormen primarily to reassure passengers. AI has filtered into general applications in these fields and has become so common thatit is not referred to as Artificial Intelligence anymore. Blind supporters of AI would point to the time when AI Deep BlueII defeated chess master Garry Kasparov to prove that Artificial Intelligence can in fact be smarter than humans. Though there is no doubt that the AI Deep Blue II won that game, it is still probably one of the dumbest software alive.

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The operators were programming the AI in every rounddepending on the opposition's last move. Also, the Deep Blue II had studied all of Kasparov‟ s previous games while the latter wasn‟ t given the same benefit. One can safely say that even though the Deep Blue II AI defeated Kasparov, it was never a fair fight to begin with. Latest technologies like Xbox 360‟ s Kinect and iPhone‟ s Siri use algorithms based on Artificial Intelligence, but it is a well-known fact that these technologies are a long way from being perfect.

Thus we cansafely conclude that though Artificial Intelligence has madea lot of progress in the past few decades, it is not at a level where in one can confidently state that it is now ready to completely replace the human mind. That being said, large- scale research is now being conducted into the field of proper simulation of the human brain. Cortex is a project by Artificial Development Inc. and Swiss government's IBM sponsored Blue Brain Project, are two main ventures, whose goal is to simulate the human brain.

4. APPLICATIONS

Artificial Intelligence in the form of neural networks and expert systems has applications in almost all humanactivities. The combination of high precision and low computation time makes AI a cutting edge technology. Robot ES‟ s are already taking over workshop level jobs in large industries, thus side lining humans into a more supervisory role. Stock brokerage firms are now using Artificial Intelligence to analyze data, make analysis and buyor sell stocks without the interference of any human beings. Some of the applications of Artificial Intelligence are asfollows-

A. Gaming Industry

One of the most commonly known applications of AI in the gaming industry is its use in chess. Even though these machines are not as intelligent as humans, they use brute force algorithms and scan 100‟ s of positions every second so as to determine the next move. As stated earlier, AI is also being used in Microsoft Xbox 360‟ s Kinect for body motion detection. But it is still in its infancy and requires a lot more advancement for it to be used in day-to-day applications.

B. Heavy industries-

Artificial Intelligence robots have become very common in heavy industries and are employed in jobs that are otherwise considered dangerous for humans. These robots also increase the efficiency, as they do not need any break while working thus overcoming the inherent disadvantage of tiredness in humans.

C. Weather Forecasting-

Neural networks are nowadays being used for predictingweather conditions. Past data is provided to the neural network, which then analyses the data for patterns and predicts the future weather conditions.

D. Expert Systems-

Expert Systems are machines that are trained to have total expertise in specific areas of interest. They are developed to solve the problems in niche areas. These systems use statistical analysis and data mining to solve these problems by deducing the solutions through a logical flow of yes-no questions. An expert system is made up of 3 parts-

- Knowledge base- It stores all the information, rules,data and relationships that are needed by the expert system to have total expertise in its area of interest
- Inference engine- It seeks information from the knowledge base on being presented with a query, analyses it and responds with a solution or recommendation in the waya human expert would
- Rule- It is a conditional statement that links the given conditions to the final solution

E. Data Mining or Knowledge Extraction:

Data mining is a fast-growing area. Data mining is a part ofa process called KDD knowledge discovery in databases. This process consists basically of steps that are performed before carrying out data mining such as data selection, data cleaning, pre-processing of data, and data transformation.

"Data Mining is the use of computer algorithms to discover hidden patterns and unsuspected relationships among elements in a large data set.

AI is a broader area than machine learning. AI systems are knowledge processing systems. Knowledge representation, knowledge acquisition, and inference including search and control, are threefundamental techniques in AI

F. Knowledge representation:

Data mining seeks to discover interesting patterns from largevolumes of Data. These patterns can take various forms, such as association rules, classification rules, and decision trees, and therefore, knowledge representation becomes an issue of interest in data mining.

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5. CONCLUSION

The computing world has a lot to gain or benefits from various AI approaches. Their ability to learn by example makes them very flexible and powerful. Furthermore there isno need to devise an algorithm in order to perform a specific task i.e. there is no need to understand the internal mechanisms of that task. They are also very well suited for real time systems because of their fast response and computational times which are due to their parallel architecture. The goal of artificial intelligence is to create computers whose intelligence equals or surpasses humans. Achieving this goal is the famous "AI problem from last decade researchers are trying to close the gap between human intelligence and artificial intelligence.

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