Course Material (E-Content) of Psychology

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ARTIFICIAL INTELLIGENCE

Artificial intelligence, also known as machine intelligence, is a branch of computer science that aims to imbue software with the ability to analyze its environment using either predetermined rules and search algorithms, or pattern recognizing machine learning models, and then make decisions based on those analyses.

In this way, Artificial intelligence attempts to mimic biological intelligence to allow the software application or system to act with varying degrees of autonomy, thereby reducing manual human intervention for a wide range of functions.

While Artificial intelligence often invokes images of the sentient computer overlord of science fiction, the current reality is far different. At its heart, Artificial Intelligence uses the same basic algorithmic functions that drive traditional software, but applies them in a different way.

A standard warehouse management system, for example, can show the current levels of various products, while an intelligent one could identify shortages, analyze the cause and its effect on the overall supply chain, and even take steps to correct it.

Artificial intelligence can be allowed to replace a whole system, making all decisions end-to-end, or it can be used to enhance a specific process.

For example, analyzing video footage to recognize gestures, or replacing peripheral devices (keyboard, mouse, touchscreen) with a speech to text system., giving the impression that one is interacting with a sentient being.

History of Artificial Intelligence

The term artificial intelligence was coined in 1956, but Artificial intelligence has become more popular today thanks to increased data volumes, advanced algorithms, and improvements in computing power and storage.

Early Artificial intelligence research in the 1950s explored topics like problem solving and symbolic methods. In the 1960s, the US Department of Defense took interest in this type of work and began training computers to mimic basic human reasoning. For example, the Defense Advanced Research Projects Agency (DARPA) completed street mapping projects

in the 1970s. And DARPA produced intelligent personal assistants in 2003, long before Siri, Alexa or Cortana were household names.

This early work paved the way for the automation and formal reasoning that we see in computers today, including decision support systems and smart search systems that can be designed to complement and augment human abilities.

While movies and science fiction novels depict Artificial intelligence as human-like robots that take over the world, the current evolution of Artificial Intelligence technologies isn't that scary – or quite that smart. Instead, Artificial intelligence has evolved to provide many specific benefits in every industry.

Stages of Artificial Intelligence

1. Artificial Narrow Intelligence (ANI) - Also known as Weak AI, ANI is the stage of Artificial Intelligence involving machines that can perform only a narrowly defined set of specific tasks. At this stage, the machine does not possess any thinking ability, it just performs a set of pre-defined functions.

Examples of Weak AI include Siri, Alexa, Self-driving cars, Alpha-Go, Sophia the humanoid and so on. Almost all the AI-based systems built till this date fall under the category of Weak AI.

2. Artificial General Intelligence (AGI) - Also known as Strong AI, AGI is the stage in the evolution of Artificial Intelligence wherein machines will possess the ability to think and make decisions just like us humans.

There are currently no existing examples of Strong AI, however, it is believed that we will soon be able to create machines that are as smart as humans.

Strong AI is considered a threat to human existence by many scientists, including Stephen Hawking who stated that:"The development of full artificial intelligence could spell the end of the human race…. It would take off on its own, and re-design itself at an ever-increasing rate. Humans, who are limited by slow biological evolution, couldn't compete and would be superseded."

3. Artificial Super Intelligence (ASI) - Artificial Super Intelligence is the stage of Artificial Intelligence when the capability of computers will surpass human beings. ASI is currently a hypothetical situation as depicted in movies and science fiction books, where machines have taken over the world.

Types of Artificial Intelligence

1. Reactive Machines: This is one of the basic forms of AI. It doesn't have past memory and cannot use past information to information for the future actions. Example:- IBM chess program that beat Garry Kasparov in the 1990s.

2. Limited Memory: AI systems can use past experiences to inform future decisions. Some of the decision-making functions in self-driving cars have been designed this way. Observations used to inform actions happening in the not so distant future, such as a car that has changed lanes. These observations are not stored permanently .

3.Theory of Mind: This type of AI should be able to understand people's emotions,belief, thoughts and be able to interact socially. Even though a lot of improvements are there in this field this kind of AI is not complete yet.

4. Self-awareness: An AI that has it's own conscious, super intelligent, self-awareness and sentient (In simple words **a complete human being**). Of course, this kind of bot also doesn't exist and if achieved it will be one of the milestones in the field of AI.

How Artificial Intelligence Is Being Used

Every industry has a high demand for Artificial intelligence capabilities – especially question answering systems that can be used for legal assistance, patent searches, risk notification and medical research. Other uses of Artificial intelligence include:

Health Care - AI applications can provide personalized medicine and X-ray readings. Personal health care assistants can act as life coaches, reminding you to take your pills, exercise or eat healthier.

Retail -AI provides virtual shopping capabilities that offer personalized recommendations and discuss purchase options with the consumer. Stock management and site layout technologies will also be improved with AI.

Manufacturing - AI can analyze factory IoT data as it streams from connected equipment to forecast expected load and demand using recurrent networks, a specific type of deep learning network used with sequence data.

Banking- Artificial Intelligence enhances the speed, precision and effectiveness of human efforts. In financial institutions, AI techniques can be used to identify which transactions are likely to be fraudulent, adopt fast and accurate credit scoring, as well as automate manually intense data management tasks.