Human Brain vs Artificial Intelligence

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Abstract - Psychology is one of the parent elements of artificial intelligence or we can also say that it is the main source for artificial intelligence. In this paper we are discussing about the theories of psychology used in AI. Since psychology is the study of human brain and its nature and AI is the branch which deals with the intelligence in machine, so for understanding the intelligence of a machine we have to compare with human intelligence because AI means the intelligence shown by a machine like a human being.

Keywords - Artificial Intelligence (AI), Psychology, Perception, Learning, Neural network, Cognitive Science, Human Computing Interaction (HCI).

I. INTRODUCTION

The definition of AI is based on the nature of the problems it tackles, namely those for which humans currently outperform computers. Perception involves interpreting sights, sounds, smells and touch. Action includes the ability to negative through the world and manipulate objects. In perception the environment is scanned by means of various sensory organs, real or artificial, and the scene is decomposed into separate objects in various spatial relationships. Analysis is complicated by the fact that an object may appear different depending on the angle from which it is viewed, the direction and intensity of illumination in the scene, and how much the object contrasts with the surrounding field.

II. HUMAN INTELLIGENCE

A study published in Neuron in February revealed that the variety of fat molecules found in the human neocortex, the brain region responsible for advanced cognitive functions such as language, evolved at an exceptionally fast rate after the human-ape split.

The researchers analyzed the concentrations of 5,713 different lipids, or fat molecules and their derivatives, present in samples of brain, kidney and muscle tissues taken from humans, chimpanzees, macaques and mice. Lipids have a variety of critical functions in all cells, including their role as the primary component of a cell's membrane. They are particularly important in the brain because they enable electrical signal transmission among neurons. Yet until this study, it was unknown whether the lipids in the human brain differed significantly from lipids in other mammals.

The team discovered that the levels of various lipids found in human brain samples, especially from the neocortex, stood out. Humans and chimps diverged from their common ancestor around the same time, according to much evolutionary evidence. Because the two species have had about the same amount of time to rack up changes to their lipid profiles, the investigators expected them to have roughly the same number of species-specific lipid concentrations, explains computational biologist and study leader Kasia Bozek of the Max Planck Institute for Evolutionary Anthropology in Leipzig, Germany. Indeed, lipid changes in the cerebellum, a primitive part of the brain similar in all vertebrates, were comparable between humans and chimps. But the human neocortex has accumulated about three times more lipid changes than the chimpanzee cortex has since we split from our common ancestor.

The results suggest that as human cognition evolved, the types and amounts of fat in key brain areas were rapidly shifting and mutating—and this growth was crucial to the development of our complex abilities. Genes tend to get the most attention, but they are only part of the story, the researchers explain. An enzyme encoded by a single gene, for example, can regulate the synthesis of many different lipids. “The significance of this study is that we're going to see more comparative studies of macromolecular concentrations—such as differences in proteins and lipids—which reveal things that can't be read out directly” from the genome, says Todd Preuss, a neuroscientist at Emory University who specializes in the evolution of the human brain and who was not involved in the study. Learning that lipids played an essential role in the evolution of human intelligence, he says, is “the tip of a very big iceberg.”

III. FUNCTIONING OF HUMAN BRAIN

1. Nerve impulses to and from the brain travel as fast as 170 miles per hour. Ever wonder how you can react so fast to things around you or why that stubbed toe hurts right away? It's due to the super-speedy movement of nerve impulses from your brain to the rest of your body and vice versa, bringing reactions at the speed of a high powered luxury sports car.
2. The brain operates on the same amount of power as 10-watt light bulb. The cartoon image of a light bulb over your head when a great thought occurs isn't too far off the mark. Your brain generates as much energy as a small light bulb even when you're sleeping.
3. The human brain cell can hold 5 times as much information as the Encyclopedia Britannica. Or any other encyclopedia for that matter. Scientists have yet to settle on a definitive amount, but the storage capacity of the brain in electronic terms is thought to be between 3 or even 1,000 terabytes. The National Archives of Britain, containing over 900 years of history, only takes up 70 terabytes, making your brain's memory power pretty darn impressive.
4. Your brain uses 20% of the oxygen that enters your bloodstream.The brain only makes up about 2% of our body mass, yet consumes more oxygen than any other organ in the body, making it extremely susceptible to damage related to oxygen deprivation. So breathe deep to keep your brain happy and swimming in oxygenated cells.
5. The brain is much more active at night than during the day.Logically, you would think that all the moving around, complicated calculations and tasks and general interaction we do on a daily basis during our working hours would take a lot more brain power than, say, lying in bed. Turns out, the opposite is true. When you turn off your brain turns on. Scientists don't yet know why this is but you can thank the hard work of your brain while you sleep for all those pleasant dreams.
6. Scientists say the higher your I.Q. the more you dream. While this may be true, don't take it as a sign you're mentally lacking if you can't recall your dreams. Most of us don't remember many of our dreams and the average length of most dreams is only 2-3 seconds–barely long enough to register.
7. Neurons continue to grow throughout human life. For years scientists and doctors thought that brain and neural tissue couldn't grow or regenerate. While it doesn't act in the same manner as tissues in many other parts of the body, neurons can and do grow throughout your life, adding a whole new dimension to the study of the brain and the illnesses that affect it.
8. Information travels at different speeds within different types of neurons. Not all neurons are the same. There are a few different types within the body and transmission along these different kinds can be as slow as 0.5 meters/sec or as fast as 120 meters/sec.
9. The brain itself cannot feel pain. While the brain might be the pain center when you cut your finger or burn yourself, the brain itself does not have pain receptors and cannot feel pain. That doesn't mean your head can't hurt. The brain is surrounded by loads of tissues, nerves and blood vessels that are plenty receptive to pain and can give you a pounding headache.
10. 80% of the brain is water. Your brain isn't the firm, gray mass you've seen on TV. Living brain tissue is a squishy, pink and jelly-like organ thanks to the loads of blood and high water content of the tissue. So the next time you're feeling dehydrated get a drink to keep your brain hydrated.

IV. ARTIFICIAL INTELLIGENCE

It is the field of computer science dedicated to developing machines that will be able to mimic and perform the same tasks just as a human would. AI researchers spend time on finding a feasible alternative to the human mind. The rapid development of computers after its arrival years ago has helped the researchers take great steps towards this goal of mimicking a human. Modern day applications like speech recognition, robots playing chess, table tennis and playing music have been making the dream of these researchers true. But according to AI philosophy, AI is considered to be divided in to two major types, namely Weak AI and Strong AI. Weak AI is the thinking focused towards the development of technology capable of carrying out pre-planned moves based on some rules and applying these to achieve a certain goal. Strong AI is developing technology that can think and function similar to humans, not just mimicking human behavior in a certain domain.

V. INTELLIGENCE AND CONSCIOUSNESS

Both words have their origin in the Latin language, and it may be useful for the rest of the discourse to say something about the classical meaning. The Webster's New Collegiate Dictionary gives for both words the following descriptions. Intelligence is derived from the Latin words intellectus and intellegere = to understand: the power of knowing as distinguished from the power to feel and to will, or the capacity for knowledge. The Latin intellegere comes from inter- + legere = to gather, select. Consciousness comes from the Latin conscius,

cum- = together with + scire = to know, and is the quality or state of being aware especially of something within oneself.

Both words have received a range of different meanings in the course of time, but in this article the words will predominantly be used in their classical meaning, because it can help us to understand the peculiarities and differences of human and artificial intelligence. At a first glance the word intelligence can and may be used for both human and artificial intelligence, because both are capable “to gather” indeed all kinds of information, provided if sensors, senses and measuring devices are present and operational. With consciousness it is more difficult, since only by humans artificial intelligence tools can have an awareness of something in themselves. But in cases artificial tools have received and developed learning properties, there is at least an awareness present that is capable to make quantitative and qualitative distinctions in the collected and processed data. And also when artificial systems do possess properties of fault tolerance and redundancy we can speak of a certain awareness of something in themselves, since in such situations the system can decide which operation is correct or not.

If we only stay on the plane of mental thinking and the associated consciousness then it is clear that consciousness is directly related with interconnectivity, because any system with a high interconnectivity is able to collect and memorize much more information.The criteria for intelligence is : (i) the ability to respond to external stimuli; (ii) the ability to form memories of experiences; (iii) the ability to perform tasks without supervision; (iv) the ability to adapt, or learn, as a result of experience; and (v) the ability to anticipate future developments, and make mistakes. And they identify consciousness pragmatically as a combination of awareness, implying the attention given to sensory impressions and other elements of short-term memory; and volition, implying the decision making that guides the direction given to a train of thought, or the performance of a sequence of voluntary motor actions.

VI. CONCLUSION

I have discussed in this paper about human brain nervous system and about human brain, facts of human brain, difference between human intelligence and Artificial intelligence. Based on Artificial Intelligence ordinary people can improve their own human intelligence. So that common man can express his thoughts more clearly and coherently, and it can help them to select better choices. I believe that the application of such techniques is a fruitful direction of research for the future, and a promising area for collaboration between researchers in AI and researchers in more humanistic disciplines.

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