

Psychology in an Artificial intelligence stance

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Abstract

This review discusses a role for psychology in the development in the sector of artificial intelligence. Cognitive science bestows the scientific basis for advancement in the realm of artificial intelligence. Gleaning a high tech machine that can think ,learn, reason, experience and can function autarchic bereft of supervision is one of the pivotal grails in all of computer science. Studies posit that higher education in psychology can smooth the path for reasoning about general issues. With a prodigiously autarchic, learning ,reasoning,artificially intelligent system comes with a need to possess hardware and software that transcribes processes and subsystems that subsist within a human brain including intuitive and emotional concepts. The idea of interweaving these two immense realms: the complexities of psychology and vitality of artificial intelligence has gained escalation in recent times. This review focuses on how computer implementation and psychological tools bring enhancement in the field of artificial intelligence.

Keywords : Psychology, Artificial intelligence, Artificial psychology, cognition

Introduction

“Psychology is the study of mental processes and behaviour of an individual” (NCERT). Artificial intelligence is a multifaceted science with varied approaches, concerned with forging smart machines capable of performing tasks that as in usual requires human intelligence. It is about the artificial cognition requisite for an artificially intelligent ens to be intellectual,cognizance, autarchic and self developing.(Crowder, J.A, Friess, 2010). Psychology when leagued together with artificial intelligence introduced a new discipline, artificial psychology. Artificial psychology is a theoretical discipline which was first proposed by **Dan curtis (1963)**. As different discipline of psychology like cognitive psychology that focuses how the brain thinks and work(**davis M,Whalen PJ 2001,Eichenbaum h 2002**) or developmental psychology which focuses how an individual contrives and flux during different developmental stages (**LeDoux JE 1996,2000**) and many more. So Artificial psychology contains artificially mental processes determined necessary to craft intellectual, autonomous, self evolving, artificially cognitive systems. Artificially intelligent systems must impersonate human processes in order to be intelligent as they are considered to be in the top most in the hierarchie. The theory of artificial psychology states that an artificially intelligent machines can only be achieved when it can reach the level of human complexity and when it attains the three top most condition required for it

- The AIS (artificially intelligent system)should make all of its decisions autonomously without stewardship and should be capable of making decisions based on information that is new, abstract and incomplete.
- The AIS should be proficient enough of reprogramming based on the information available and could be able to handle its own programming issues even with incomplete information.
- If the above mentioned conditions were fulfilled which were not foreseen in the design and initial implementation then the possibility will be there that the AIS will have the ability to reach a conclusion on newly procured information or have already been stored.

(Crowder, J.A, Friess,s 2010, 2011)

To design a system that understands how it must interact , cooperate and come together to form a whole system one must have the knowledge about how this all functions within the brain of a human system so that it could be translated into the artificially recreated brain. If the system has to possess an artificial consciousness then we must understand cognition ,intuition and other capabilities that humans possess. **(Miller Ek , Freedman, Wallis JD 2002, Newell,A 2003)**

This include that the artificial intelligent system should be able to make value based decision referring to values that it have created for itself (**James, Shelli 2003**)

The propensity of the artificially intelligent machines to reprogram or self evolve through the process of self analysis and the ability to make decision of its own with amount of information provided with cannot provide the mechanism to to be at the level of intelligence we expect it to be without the adaption of psychological construct to AIS methods and strategies and therefore need of artificial psychology just increases.**(medium.com)**

The theory of artificial psychology does not abode the specifics of the complex system that must be to attain the conditions. And also the question of whether or not the the inteclluate is actually conscious or not.**(Crowder,J.A, Friess,S 2013)**

The founder of psychology **Wilhelm Wundt (1832-1920)** who engaged in empirical approaches and fascinated the world through all of his scientific work. The main aim of the scientific world is to marionette human wandering which raises a different question from the human race : how can we clear up psychological, human issues with artificial intelligence methods?**(Tahan, zygoulis 2020)**

What is cognition?

Cognition is about thinking. According to **Ashcroft (1997)** cognition is the mental processes and activities used in perceiving, thinking and understanding and also how and when these processes are brought into action. But as in terms of artificial psychology the term differs from cognition to artificial cognition which represents a living intelligent system.

Artificial cognition is how a machine learns, integrates , memorizes and the information that it has captured through the learning processes.**(Kosko,G, LaBarKS and Cabeza 2006).**

It is arduous at its apex to create an artificially intelligent system as complex as human cognition. The better understanding of human cognition will help to create a truly intelligent machine and would also be an escalation to a new field of artificial cognitive science(Ashcroft 1997).

What is intuition?

Intuition is asking questions to your conscience or what it means to trust your gut feeling. It is considered as a way to solve a problem but not as the same way of using logic. Same as the human intuition term when reaching to artificial psychology changes to artificial intuition.

According to **Monica Anderson 2007** artificial intuition isn't a high level model so there is less chance of getting confused between constantly changing conditions , paradoxes and many more such things.

She also stated that it doesn't give any guarantee that sufficient misinformation won't lead the systems into making wrong predictions which also means that an intelligent machine doesn't need all information to be appropriate to operate. Intuitions are not reliable and misinformation captured on a regular basis can cause failure more likely to happen.

If a system is more likely to be relied on the system experience then it can fall prey to the anchoring and heuristic. This conveys the need to be given the initial data and the use of the heuristic to help during the conceptual development of making an intellectual machine.

The pretension of an artificial intelligent system is to provide cognitive intuition in real time and in an autarchic way. To create a system in such a way the AIS have to deal with conflicting information having a lot of ambiguity that will help the system create a cognitive gut to deal with paradoxes faced or adapt into the changing world. According to (**wired.com**) an Israeli high tech firm has developed an artificial intuition software that can scan a large document in arabic language and other different languages too, it checks whether the document contains any content related to terrorist nature or any useful data that might be required and provided to the first tier intelligence analysis report. So in a cut short way it can be said that if we equip the AIS with the intuition gut it also needs to know how to regulate emotion and make decisions accordingly.

What are emotions?

According to **Marvin Minsky 2006** each emotional state is a different style of thinking. They can also be explained in a way the brain consciously explains what happens at a subconscious level in a state of arousal state. Therefore in AIS an emotion produced is a reflection of the type of situation the system is surrounded with.

For Artificially intellutal entities emotion is just a state of being. According to **Bolte**, the effects of emotional state on making an intuitive judgement. He also found that there is a clear connection between emotions and ability to exhibit intuition.

Given the studies cited, the question that arises from this discussion is how would an artificially intelligent system that has an emotional response perceive humans and their emotional responses?

Theory of artificial psychology

The theory of artificial psychology is based on information science which is the overarching of the computation and algorithms of human cognitive and psychological behaviour and activities. Application of this theory includes the production of artificially intelligent machines with feelings, emotion and intelligence similar to that of the human brain.

This stage of creating an artificially intelligent being is considered to be the most sophisticated stage. Artificial intelligence and artificial psychology exemplify a relation which in great proportion promotes to development and also to set up a coordinated man to man and man to machine environment(**M.J. Smith, G. Salvendy,2007**).

There were certain research content of the artificial psychology which are as:

1. To prepare the theoretical system of artificial psychology and make sure to break the limitation of definition and denotation and to conform with the moral values of humans.
2. To establish a good rapport between artificial intelligence and artificial psychology.
3. To develop a set of machine learning algorithms to restrain from the negative emotion by keeping in mind the rules of artificial psychology.
4. To mathematically measure the psychological information and the activities of a human.
5. To make sure in creating a control mode of every sense, emotion a human experience.
6. To build up a programming language for artificial intelligence which includes computation of divergent thinking and hazy provocation.
7. To make sure to create an emotion regulation computation similar to that of a human brain.
8. Ability of machines to realize the need of scintillation.

(**Wang, Z., Xie, L,1999**)

The researchers are on their way to create a unified model using certain mathematical equations. Under certain given conditions, the model has been forged making sure it can human emotions, intelligence and many other factors on which intelligence could be made connational to the human brain and their activities or reactions to certain stimuli. The general aim of the researchers are as follows:

1. To create smaller models/ nodes/subordinates of a big unified model.
2. The unified model can describe the whole human psychology but whereas the smaller model or the nodes are allocated with certain individual activities.
3. Small model includes the progress of control and the unified model consists of the collaborative decisions by the small nodes.

(Zhiliang wang, 2007)

Human vs artificial intelligence

Humans have applied mindless social rules and expectations from computers (nass ,moon 2008).

In their article they illustrated three concept to consider when thinking about human perception

- How human use social categories by applying gender stereotypes and ethically identifying computers
- How people engage in and learn social behavior such as politeness etc.
- Cognitive commitments by how humans respond to labelling

Considering how different authors perceive one would like to conclude that how an AI is presented to the world will affect their perseverance. There is much research to be done on how an artificially intelligent machine could be presented to the world that could be best as best.

AI may require humans to acquire knowledge about technology in order to be able to interface.as we see with cell technology there was a delay in acceptance but now it is in trend to use it. Thus as with anything it may take time for humans to accept the AIS on a daily basis.

Reluctance and counter arguments

Rehashing the supreme argument in three parts.

- As we all say that there is a difference between the natural being and an artificial mechanism but eventually all the things in this universe are made up of matter and energy and are overseen by universal physical laws.
- So as to achieve the goals and to get the understanding of the system one must be aware of the description ,prediction,explanation and its application and control.
- And third one, which was most considered was that the systems which are exact or ascetically equivalent to the original one should evince indistinguishable behaviour.

(Bringsjord,1992)

The incompleteness reluctance

According to studies of Sydney, H.Robert and John in 2002 which was on a caenorhabditis elegans worms which explicitly defined physiology of the creature where its function and the location of the neural structure where recorded but which proved out to be insufficient promulgation to recast an artificially self same creature with the same behavioural repertoire. So as to recast a human brain with all the decision making ability and its various aspects of its function and to know everything about its system may not be possible and to predict what a person might do in certain situation depends on his/her experiences which might be unique, being able to understand and accurately reproduce a humans history may not be possible.

Another incompleteness issue posed by the *formal descriptive system* by Godel,1930 which described that there may always be some fraction of the brain or the bodily function that a logical or mathematical analysis won't be able to explain.

The perplexity reluctance

A perplex system is one of those systems of which the properties are not fully explicated just by the understanding of its components parts. Certain points that clarifies perplexity as a reluctance

- A system having a complex mechanism can make them sensitive to changes and especially when within the starting condition the changes can propagate through the system and can produce unanticipated results.
- More complex the system the more the difficulty to understand, predict or control and also there will be a higher possibility of multiple interaction between the different components. So when compared with a human brain and human physiology which is considered way more complex it would be difficult to inculcate.
- This perplexing reluctance can be reduced in future by having a proper mathematical modelling to simplify and unravel all or some of the aspects of the complex system like a human being.

(Goldenfeld & Kadanoff, 1999)

The quantum vagueness reluctance

Quantum theory or quantum mechanism is a theory of physics which is used to describe a small scale phenomena which happens at an atomic and subatomic level(**Charles Mann and Robert Crease,1996**). According to quantum physics a certain character of a particle of a matter like their momentum or position cannot be figured out with certainty, and this theory implies some events don't actually exist or fail to exist. They are mostly in a state of indeterminacy or probability until being observed, at which they are made certain.(**Calaprice & Dyson, 2005**)

A quantum theory of consciousness (**Hameroff & penrose,2011**) suggests that conscious acumen is the quotient of quantum flux taking place inside a neuron. If it depended on phenomena there was a chance to create quantum based engineering techniques to create consciousness. Quantum computers have already been created so as to use the quantum properties to portray and perform certain operations on the data served.(**Nielsen & Chuang , 2000**)

The engineering constraint reluctance

The engineering constraint reluctance states that there might be a possibility of lack of ability to ever produce an artificially intelligent being, as it might require an extremely perplexing technology which might be beyond our reach. Just by replicating and reproducing the design of an actual person functionally is possible but an artificially intelligent being is not possible architecturally equivalent. As human physiology is made up of organic material,to give a great start to the artificially intelligent beings we could engineer things. As a good example to this the field of DNA computing is there in which molecules can be used as the unambiguous abstract

data processors to solve certain types of issues more snappily than the traditional computing technique.(Amos,2005)

A difference between a nature made and artificially made system is that a naturally made being is formed as a product of evolution and can even evolve more if needed according to the environmental requirements, and from a scientific point of view there is no proper plan or purpose behind them. Where on another hand artificially made systems are artifacts, they are the products of thinking and an outcome of an appropriate planning and certain conceptions. So they can't be introduced to certain evolution as many of them are intricate processes playing out over billions of years and those can't be engineered.(Dennett, 1997)

Conclusions

Artificial psychology is a new emergence into both the field of computation as well as psychology which is still paving a way to many more researches. Even after being in the primary stage it has made its existence with an exciting perspective.

There is some serious concern that the future might be about. There have been ethical guidelines for science to follow as to create a system. It makes sense to stop and consider ethics and human reaction to Artificial intelligence. after all this is heading to a superhuman technology

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