ACADEMICIA

ISSN: 2249-7137 Vol. 11, Issue 10, October 2021 Impact Factor: SJIF 2021 = 7.492

ACADEMICIA
An International Multidisciplinary Research Journal
(Double Blind Refereed & Peer Reviewed Journal)

DOI: 10.5958/2249-7137.2021.02087.5

A REVIEW PAPER ON ARTIFICIAL INTELLIGENCE

Dr. Ajay Rana*; Dr. Niraj Singhal**

*Shobhit Institute of Engineering and Technology,
(Deemed to be University), Meerut, INDIA
Email id: ajay.rana@shobhituniversity.ac.in,

**School of Computer Science and Engineering,
Faculty of Engineering and Technology,
Shobhit Institute of Engineering and Technology,
(Deemed to be University), Meerut, INDIA
Email id: niraj@shobhituniversity.ac.in

ABSTRACT

This article examines the topic of artificial intelligence, with an emphasis on embodied AI. It also examines artificial consciousness models, agent-based artificial intelligence, and artificial intelligence philosophical commentary. It concludes that there is virtually no agreement or formalism in the area, and that the field's accomplishments are limited. The large percentage of recommended plans versus suggestions that have been implemented in the literature is an unusual characteristic. For a number of reasons, including cost and a lack of knowledge in the area, professionals in the field are reluctant to build robots. Because of its skills in the image and semantic domains, AI has many potential applications in medical imaging. As a result, the major issues facing AI in radiology include improving healthcare safety and quality (personalized and participatory radiology), improving workflow (and therefore medical imaging accessibility), and developing medical imaging for screening and public health (predictive and preventive radiology).

KEYWORDS: *Artificial, Consciousness, Embodied Intelligence, Intelligence, Machine Intelligence*

1. INTRODUCTION

There have been numerous literature surveys during the fifty years that artificial intelligence (AI) has been a recognized and active subject. However, encapsulating the field chronologically or conceptually is very challenging. The reason for this, we believe, is that there has never been a groundswell of effort that has resulted in a recognized accomplishment. Nonetheless, the novice must learn a substantial body of material before trying to deal with what has so far shown to be a hydra-headed monster. This review tries to organize the literature in a comprehensible manner. Figure 1 shows the global Artificial Intelligence[1]–[6].

Figure 1: The above figure shows the global Artificial Intelligence [weforum].

A historical narrative is presented, followed by a discussion of various apparent themes. For general AI, two methods were developed: the "top down" approach, which began with higher-level functions and implemented them, and the "bottom up" approach, which began at the neuron level and worked its way up to higher-level functions. Allen Newell created the "Logic Theorist," a theorem-proving software, in 1956.

Artificial intelligence (AI) is changing service by performing a variety of activities, posing a significant source of innovation while also posing a danger to human employment. To address this double-edged effect, we propose a theory of AI job substitution. The idea identifies four intelligences that are needed for service activities—mechanical, analytical, intuitive, and empathetic—and explains how businesses should choose between people and robots to do those duties. Mechanical intelligence comes before analytical intelligence, analytical intelligence comes before intuitive intelligence, and intuitive intelligence comes before empathic intelligence, in a predictable sequence. According to the hypothesis, AI job replacement happens at the task level rather than at the job level, and that it happens first for "lower" (easier for AI) intelligence tasks. AI replaces part of a service job's duties at first, a step known as augmentation, and then proceeds to completely replacing human labor once it has the capacity to do so. As AI replaces lower-level intelligences with higher-level intelligences, the relative relevance of intelligences for service workers changes over time. An significant consequence of our hypothesis is that, as

AI takes over more analytical jobs, analytical abilities will become less essential, emphasizing the need of "softer" intuitive and empathic skills for service workers[7]–[10].

AI will eventually be capable of executing intuitive and empathic activities, allowing for new forms of human–machine collaboration in service delivery but simultaneously posing a serious threat to human employment. By the 1980s, AI researchers had realized that developing artificial intelligence was much more difficult than they had anticipated. As a result, Brooks came to think that the way ahead in consciousness was for researchers to concentrate on developing separate modules based on various elements of the human brain, such as a planning module, a memory module, and so on, which could then be integrated to produce intelligence. With the advancement of computer and robotics technology in recent years, there has been a widespread effort to create embodied intelligences. However, because to the unique nature of this area, the many efforts are nearly completely unrelated. Because creating actual robots is difficult and unsuccessful, there has been a trend toward computer simulation, dubbed "Artificial General Intelligence," in which virtual agents in a virtual reality environment try to attain intelligent behavior.

Artificial intelligence (AI) refers to intelligence shown by machines rather than natural intelligence expressed by people or animals. Leading AI textbooks describe AI as the study of "intelligent agents," or systems that understand their surroundings and take actions that increase their chances of accomplishing their objectives. However, most AI researchers reject this definition, which uses the term "artificial intelligence" to denote computers that imitate "cognitive" activities that people identify with the human mind, such as "learning" and "problem solving."Advanced online search engines (such as Google), recommendation systems (like YouTube, Amazon, and Netflix), comprehending human speech (like Siri or Alexa), self-driving vehicles (like Tesla), and competing at the top level in strategic gaming systems are all examples of AI uses (such as chess and Go). The AI effect is a phenomenon that occurs when computers grow more competent and activities thought to need "intelligence" are frequently eliminated from the concept of AI. Optical character recognition, for example, is often left out of AI discussions despite the fact that it has become a commonplace technique.

Since its inception as an academic field in 1956, artificial intelligence has gone through many waves of optimism, disappointment, and funding cuts (known as an "AI winter"), followed by new methods, success, and renewed investment. Throughout its history, AI research has attempted and rejected a variety of methods, including replicating the brain, modelling human problem solving, formal logic, huge knowledge libraries, and copying animal behavior. Extremely mathematical statistical machine learning dominated the area in the early decades of the twenty-first century, and this approach has proven highly effective, helping to tackle many difficult issues in business and academics.

The different sub-fields of AI research are focused on specific objectives and the application of certain technologies. Reasoning, knowledge representation, planning, learning, natural language processing, vision, and the capacity to move and control things are all classic AI research objectives. One of the field's long-term objectives is general intelligence (the capacity to solve any issue). AI researchers utilize search and mathematical optimization, formal logic, artificial neural networks, and techniques based on statistics, probability, and economics to address these issues. Computer science, psychology, linguistics, philosophy, and a variety of other disciplines are all used in AI.

1.1 Models of Consciousness:

It is impossible to examine this subject and abstract a narrative thread since there have been many suggestions for a structure of consciousness/control, nearly all of which have not been realized and are completely unconnected. As a result, there is no overarching organizational theme, and we are left to report on specific concepts. We accomplish this in a methodical and unobtrusive manner, despite the fact that many of them push the boundaries of plausibility and even believability. The rare instances when a simulation has been programmed will be noted. There is no evidence that the ideas will result in embodied intelligence.The challenge is to get a robot to think about the essential outcomes of actions without making it think about all the irrelevant outcomes.

Minsky, in his landmark work "Society of Mind," published in 1988 (with a nod to Brookes op. cit.), thinks that consciousness is the product of numerous tiny modules, which he refers to as agents. Each agent has no significant intellect on its own, but when they collaborate at various levels, they form a cognitive system.The Global Workspace Theory was originally suggested in 1988, and it is often characterized in terms of a theatre. A spotlight shines on one part of the stage in this metaphor, but numerous activities take place in the background outside the spotlighted region. This relates to awareness focusing on just one item at a time, while numerous other things are running in the background. Many other researchers have used this idea. This is one of the rare innovations that has gained widespread acceptance rather than fading into oblivion.Block (1994) tried to categorize several forms of awareness. The two most important distinctions are between Phenomenal Consciousness, which is concerned with our feelings and experiences, and Access Consciousness, which is concerned with information processing and behavioural control.

Chalmers (1995) distinguished between the "hard issue," namely, raw emotion, and the difficulty in implementing it, and the "easy problem," namely, the functional regions of consciousness such as planning, remembering, and so on.

Kitamura, Otsuka, and Nakao proposed an eight-level hierarchical model in 1995. Consciousness occurs at a level when activity at a lower level is blocked, allowing the higher-level job to be completed. This model's simulations are said to exhibit animal-like behavior.

CBA (Conscious Based Architecture) is a method for determining at what level an autonomous robot can function without the need to learn. CBD is divided into five levels, each of which corresponds to the various degrees of consciousness observed in living things ranging from single-celled organisms to primates. He got to the conclusion that at level three, learning ability becomes a necessity.The distinction between the narrative self and the minimum self the minimal self is solely concerned with what is going on right now, while the narrative self-needs memories of the past and is capable of planning.

1.2 How AI works:

Vendors have been rushing to advertise how their goods and services utilize AI as the buzz surrounding AI has grown. What they call AI is often only one component of AI, such as machine learning. For developing and training machine learning algorithms, AI needs a foundation of specialized hardware and software. Although no one programming language is associated with AI, a handful stand out, including Python, R, and Java.AI systems, in general, operate by consuming vast quantities of labelled training data, evaluating the data for correlations and patterns, and then utilizing these patterns to forecast future states. By analyzing millions of instances, a chatbots given examples of text conversations may learn to create realistic interactions with humans, and an image recognition program can learn to recognize and describe things in pictures.

1.3 Deep learning in medical imaging:

Deep neural networks are a kind of learning algorithm that has led to significant improvements in task performance, particularly in the area of medical imaging. Until recently, traditional pattern recognition learning systems were made up of two parts: a feature extractor that was hand-programmed and a machine-learning algorithm that classified the picture.The automated classification of a lung nodule as benign or malignant is a good example. The feature extraction step entails

- Segmenting the nodule.
- Choosing and extracting nodule characteristics such as borders, density, enhancement, roughness.

Entropy that are important for distinguishing between a benign and malignant tumour. These characteristics are organized into vectors. The machine-learning method for analyzing these vectors is chosen in the following step in order to properly identify the nodule.Image segmentation and the selection of essential features for extraction are very difficult processes that may lead to mistakes. It is almost difficult to demonstrate that the best characteristics for addressing the issue have been chosen. Convolutional neural networks are critical for overcoming this barrier because they combine the two stages, i.e., extracting the features and categorizing the picture, drastically changing the paradigm. To enable future categorization, the image features do not need to be extracted initially. Deep learning networks take the pixels in an image or an area of an image as input and convert them into a judgment or classification through many processing layers (thus the term "deep").The intermediate, or hidden, layers are in charge of extracting visual characteristics that were not explicitly coded by the network designer but learnt by the network via an examination of the handlabeled data given during the training phase. The procedure is carried out from start to finish, from raw data analysis to picture classification, with the network handling the intermediate stages. Figure 2 shows the Classical steps of machine learning.

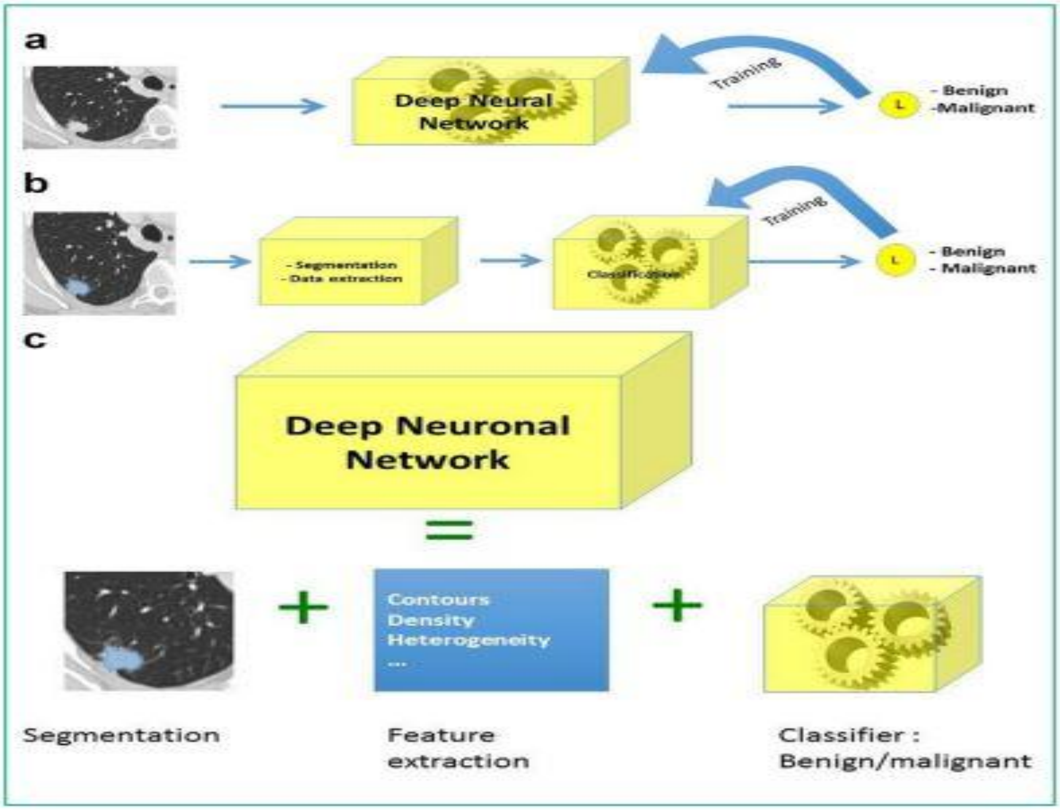

Figure 2: The above figure shows the Classical steps of machine learning.

1.4 Applications and future prospects:

Because of its skills in the image and semantic domains, AI has a lot of promise in medical imaging. As a result, healthcare safety and quality improvement (personalized and participatory radiology), workflow optimization (and therefore medical imaging accessibility), and the development of medical imaging for screening and public health are the major issues addressed by AI in radiology (predictive and preventive radiology).

2. DISCUSSION

Artificial intelligence (AI) is changing service by performing a variety of activities, becoming a significant source of innovation while also posing a danger to human employment. To address this double-edged effect, we propose a theory of AI job substitution. Mechanical, analytical, intuitive, and empathic intelligences are needed for service activities, according to the idea, and businesses should choose between people and robots to do those duties. Mechanical intelligence comes before analytical intelligence, analytical intelligence comes before intuitive intelligence, and intuitive intelligence comes before empathic intelligence. According to the idea, AI job replacement happens at the task level rather than at the job level, and that it occurs first for "lower" (easier for AI) intelligence tasks. AI replaces part of the duties of a service job at first, a stage known as augmentation, and then proceeds to completely replacing human labor once it has the capacity to take over all of the tasks of a job. As AI replaces lower-level intelligences with higher-level intelligences, the relative relevance of the intelligences for service workers changes over time. A significant consequence of our hypothesis is that as AI takes over more analytical jobs, analytical abilities will become less essential, emphasizing the need of "softer" intuitive and empathic skills for service workers.AI will eventually be capable of executing even intuitive and empathic activities, allowing for new forms of human–machine collaboration in service delivery but simultaneously posing a serious threat to human employment.

3. CONCLUSION

The author has discussed about the artificial intelligence, it focuses on the most of the work, especially in the field of embodied AI. The World of Warcraft is an example of a large field of agent-based systems, many of which are commercial. This has not been touched in a long time. The fragmented character of the claimed effort makes it difficult to comprehend, or maybe useless to comprehend. Perhaps the only two ideas that academics have agreed on are Baar's Global Workspace Theory, Brooks, and Minsky's agent-based model, which were developed separately. A peculiar feature of the literature is the high proportion of suggested plans versus proposals that have been executed. Practitioners in the field are hesitant to construct robots for a variety of reasons, including expense and a lack of competence in the subject. After digesting all of these documented attempts, two fundamental conclusions must be drawn: first, the researcher is free to move ahead unfettered since there is no existing formalism in the area; second, the researcher is free to go on unfettered because there is no existing formalism in the field. Second, despite a 33 million-fold (Moore's law) increase in computing, the area's accomplishments are disappointing - the industry is still a long way from creating a robot with the intelligence and functionality of a cockroach.

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