Understanding Interplay Role of Augmented Reality, Virtual Reality, Computer Vision, Artificial Intelligence and Human Psychology

Dr. Rima M. Kumar[1*], Dr. Varsha Telore[2]

[1]M. D. Homoeopathy Associate professor, Department of Human Physiology & Biochemistry, Bharati Vidyapeeth Deemed to be University, Homoeopathic Medical College, Pune, Maharashtra, India.*
[2]M. D. Homoeopathy Assistant Professor, Department of Human Physiology & Biochemistry, Bharati Vidyapeeth, Deemed to be University, Homoeopathic Medical College, Pune, Maharashtra, India.

Corresponding Email: [1]rima.kumar@bharatividyapeeth.edu*

Abstract: A very long ago since the origin of human life, vision is one of the essential and useful sense organ which is beautiful but complex. Simply it is co-related with machines for example computers. Some years ago it was very difficult to interpret vision process with the help of machines. Computer vision is the concept taken from human vision working mechanism. Likewise human eyes capture image or video, send signals to brain to process and then interpret, like physiology of pathway of vision, similarly computer vision is also captures image or video through camera send input for processing through special software algorithm and interpreted. This concept some years ago was dream but thanks to innovation in computer field. Many of scientist tried to work on it but few are successful. This computer vision takes the help of artificial intelligence to train computers to understand and to interpret the actual visual area or field. Basic concept of artificial intelligence is an intelligence used by "trained" machines verses an intelligence used "naturally" by animals and humans. Various innovative technologies are used to give better results in any sector. One of the most famous technology is used now a days is artificial intelligence for example in healthcare sectors. These all AR, VR, AI are used for better and bright future. Like for example early diagnosis and bad prognosis can be detected in early phases of disease course. The base concept of all such newer technologies are higher sense organs of human being like again for example computer vision is the concept innovated on the base of visual pathway of human eye. All of these process of vision and its interpretation or understanding and replying according to diagnosis shows involvement of psychology. This psychological aspect is taken as toolkit by many of researchers and they are developing modern technologies such as computer vision,

artificial intelligence. As all of these are modern technologies one has to use if wisely. It mostly depends upon the intentions of the person or industry or institution what net result they are giving to society.

Keywords: Artificial Intelligence, Computer Vision, Technology, Augmented Reality, Virtual Reality, Algorithm.

1. INTRODUCTION

Ultimate goal of computer vision is to give computer a better ability to catch hold and extract a high level understanding of the visual world in the form of digital images and videos. Now these days everyone has used smart phones, tablets which shows computer vision is better in capturing images and videos. This is one of day today example of innovation based on involvement of human psychology.
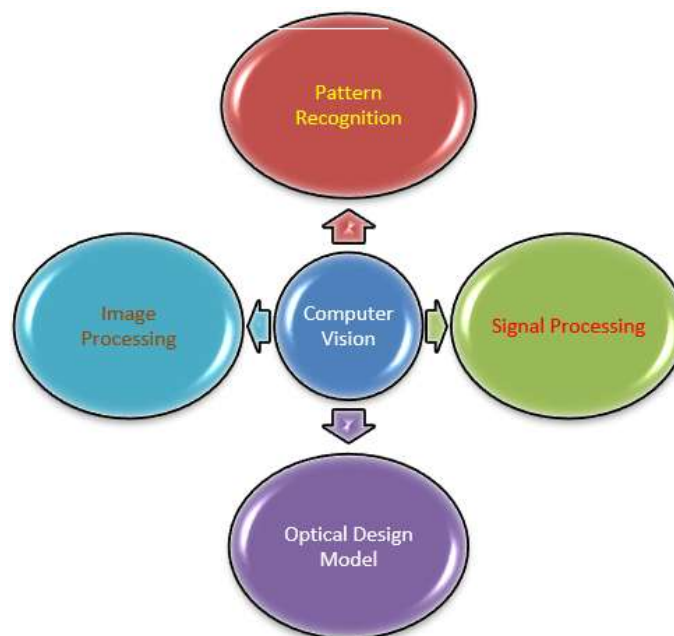

Fig 1. Computer Vision and Processing Factors

The underling concept of computer vision is give the possible inputs to computers to process an image and store it and represent whenever required. In technical terms its all possible through special software algorithm.
Augmented reality is concept based on combination of real things that actually exists in the world and virtual world. Now again it is based on different sense organs such as auditory, visual, somatosensory. That is why it is version of 3 D world along with virtual reality. For more better future we can think of installing augmented reality in smart phones and in laptops which helps in better interaction with surrounding world.
In many fields these all computer vision, artificial intelligence, augmented reality, virtual reality can be used. For improved customer satisfaction survey we can use these various

newer technologies in many sectors such as industries, E commerce, manufacturing companies, healthcare sectors, banking sectors, civil engineering and many more. Other example for this say for example in cosmetic field—lipsticks can be chosen by the customer online by checking it virtually, selection will be based on customer's skin tone, liking. This also increased customer satisfaction survey.

Advertisement will be sent on smart phone will be based on repeated search history of that customer this indirectly helps us guiding the likings of the customers, this ultimately increases financial turnover of that company or industry. All this is again based on concept of artificial intelligence.

Some of Elaborated Examples are as Follows:
Healthcare Sectors
The analysis of result of ultra sound, MRI, CT scan are made easy due to advance technologies such as computer vision and artificial intelligence. A lot of burden is reduced from human mind that is from healthcare workers due to this easy analysis of various diagnostic tools. But on cognitive bases there will be no replacement where doctors and that field expert person can only tell the explanation. Now the latest example is technology used during COVID 19 pandemic. Image segmentation in CT scan can helped physicians and healthcare workers.

Automobile Industry
Self-driven vehicles are the examples for combination of artificial intelligence and computer vision along with other expert systems. Let us take an example, algorithm on which the car is controlled must be always aware of the surroundings and environment at all times. These algorithm includes how road goes, what is positions of other vehicles near the car, what is speed of near by passing or overtaking car, what is distance of potential obstacles and objects. For all these reasons, that autonomous vehicle must be equipped with camera that is computer vision which captures videos and images for wide spread areas. The footage is then monitored for interpretation of image recognition algorithms. These algorithms are which can classify relevant objects not only in halting or static objects but also moving objects.

Fig 2. Equation Showing Better Future Destiny

Finger Identification Admission or Attendance
Traditional in previous years ago, how the attendance of the employee is taken as sign into that particular muster. After some years it has replaced by I-card recognition in machine. Now all these has been replaced by biometric attendance that is fingerprint identification or

retinal scan admissions started. This is more easier for HR to calculate the attendance as compared to previous traditional manual calculations. It became more authentic also.

Face Recognition
Unlocking any smart phone by face recognition, is the most common feature now a days. This face recognition feature is useful which secure your all data. Similarly it can be used on large scale like for example social sites, webpages.

Retinal Scan
It is also common in many institutions and industries for attendance of employees.

E Commerce
Depending upon the repeated search history analysis, in E commerce sector offers more offers on the products which customers are viewing the most. This is more easy with the help of AI. Because of various app the markets are open for customers 24X7. So according to convenience of customer's time, place, buying and selling became more easier. Even globally also this is applicable. Customer satisfaction surveys are also can be recorded by various means because of all these modern digitalization tools.

2. DISCUSSION

Artificial Intelligence
Artificial intelligence is concept which describes the ability of technology which is designed to perform specialized activities which requires human intelligence. Artificial intelligence is taken fast pace since last few decades. The algorithms which helps to programmed technology, now those technology will perform activity which requires involvement of cognition. Some decades ago it was dream but the constant efforts of scientist and researcher helped to evolve the concept of artificial intelligence. In simple term cognitive thinking is converted into algorithm and work will be done from various machines.
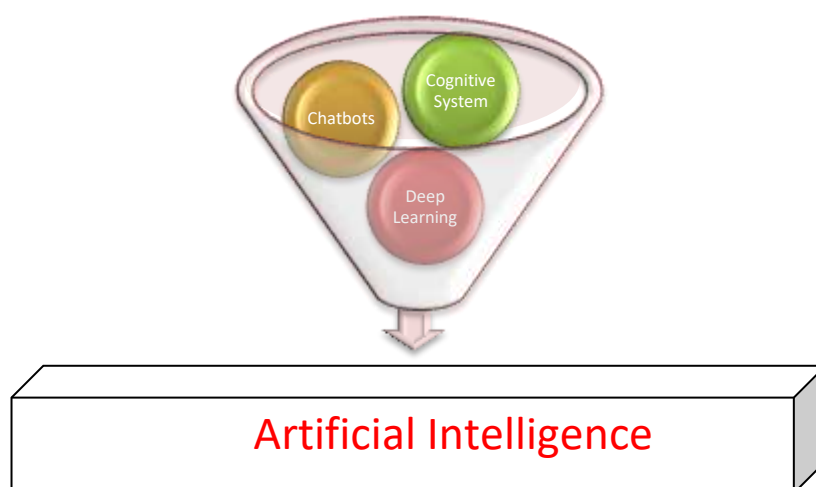

Fig 3. Diagram explaining combination for formation of AI

Traditionally few years ago large scale data was maintained manually but now because of artificial intelligence it became very quick and less time consuming and more of less possibility of making mistakes. There are many sectors in society where artificial intelligence is used very commonly like education, healthcare, industries, business, bank, E commerce etc. Along with augmented reality and virtual reality artificial intelligence all can be categorized under digitalization. Modern world is more dependent on digitalization. People have accepted soon this concept of digitalization.

Importance of AR & VR in the Field of Education
In health care sectors like or example medical college AR & VR plays immense very important role to understand the concept of the topics. Because of these it's very easy to show different anatomical and physiological process happening in body.
Not only in healthcare sectors but in school levels also like example during geography classes if teacher shows actual geography of that continent or ocean or mountain then it will be lifelong memory for that child though he or she has not visited actually.
Other example will be in case of field of astronomy, thought the candidate not visited actually but the training will be given on the base of AR & VR. This will be cost effective.

1. Gaining deep knowledgeable experience: To understand one topic if virtually its shown to students then it will be easily perceived by them. This will e a permanent memory.
2. Hands on learning: Actual frog dissection was done to demonstrate in biology practical, but this is not now done as we have adopted VR, which ultimately not disturbing our ecology too. It also maintains our health and hygiene by not spreading diseases.
3. Training sessions are made easy: Some of the professions are like that sending a person without actual training is dangerous for his life for example fire fighter. He will be definitely requiring the training based on simulations, as actually creating the fire scene is not possible logically and eco-friendly.
4. Field trips can be possible: At school level to make clear the concept of gravity and walking on moon its made easy, thanks to AR & VR. History lover students can visit many monuments, museums, other historical places. This all is possible because of augmented reality and virtual reality.

One has to use all these newer technologies with wise intelligence. It has other side of coin too. Use of all these will be boon to human mankind.

Usefulness of virtual reality and augmented reality in healthcare sector-
1. Finding vein for IV or for injections: to introduce the intravenous catheter one will require the exact location of vein so this made easy by AR, as we actually can see vein before puncturing body.
2. Best option in training of surgeries: surgeons are known for their precision and perfections. This precision and perfection is well maintained because of augmented reality and virtual reality. And one more plus point is no one is harmed, no shedding of blood, no mistakes so no legal matter is involved.
3. Study of anatomical structures and functioning of body physiology made easy:

Most inner portion of brain or spinal cord which actually difficult to show, but with the help of AR & VR its easily shown to medical students.

4. Augmented Reality in dentistry: making perfect crown or caps of tooth in the field of dentistry all these newer technologies are helping.

Impact of Modern Technology on Human Psychology

As we all know since last few decades modern technology has progressed with very fast rate. Smartphones, internet, cloud computing, computer vision, augmented reality, visual reality, and all types of other digitalization aspects are affecting and changing every angle of human life. These various angles of human life are industrialization, trading, E commerce, business, government, travelling, bank, agriculture, education etc. so the question may arise what about human psychology? So regarding this scientist are still working on it, and most of the studies are in very initial phase. There is little date available with us saying that technology is shaping the way we think. Modern technology is surely affecting the way we interact with entire world or the way forthcoming new generation brain development. Some of the areas are as follows:

Attentiveness and Attention

Many studies showed that we relay on internet and mobile phones for our many things which is decreasing our attention towards many subjects. We often miss conversation with person sitting next to us as we are busy and mesmerized with many other augmented and virtual reality things. Of course all these affects our attention span and it comes with its consequences.

Ability of Decision Making

Here we will take a simple example, if we are planning for dinner then what first in mind is open internet and start search for best restaurant near by me. Or other examples if we want to buy a car, again we go and search review for certain cars. It shows that instead of manual gathering of information is now very less role like previous and which is replaced by facts and knowledge for making the informed decisions.

Memory

Our life is being now a days dependent on our computers, smart phones, tablets. The reason for this is we simply relay on phonebook for phone number of of our near and dear ones. Shopping apps has add to cart so need not to memories what we will be requiring, imagination is reduced due to virtual reality and augmented reality. By taking thousands and millions of photo and saving it on internet made our memory dictionary easy but forgetful too. While typing because of auto correction basic spellings we are tending to forget.

Relationship

If we are with our family members for dinner, and we texting to our close friend in Canada and also making tweet acquaintances about activities in Japan, so in this case are we are giving our full involvement in any single relationship? Many thinks that internet is boon to us

but we have to awake before it makes our deep relationship uncomfortable or make isolated form close contacts. It mainly applicable to new upcoming generations.

Some of Disadvantages are as it is deadly combination of modern technologies, one has to use it wisely.it depends on the net result of total act of use, it varies from person to person.

3. CONCLUSION

From above discussion we can say that the concept of computer vision, augmented reality, virtual reality and artificial intelligence are based on human psychology. Cognitive behaviour of human is studied deeply and accordingly algorithms formed to invent new machines. Now these machines are performing at faster pace, requires little attention, accuracy rate is also higher. Many sectors have changed their traditional method of working and accepted the newer modern digitalized technologies. And results are much better.
 But along with advantages there are disadvantages also. But this depends on us how far we go along with digital world. Ethical use of all these technologies will be definitely help us in future. Because human being chooses which data to be used to train the artificial intelligence in machine, so after all it depend on human only. Because internet addiction is commonest example, despite of all these potential risks, there are certain regulations are coming up to use of all these modern technologies where cognitive process and technology are together used. Now this is one of the aspect but looking on other side, we have been blessed with all these modern technologies.

4. REFERENCES

1. Leading Digital Turning Technology Into Business Transformation—Harvard Business Review Press by George Westerman, Didier Bonnet, Andrew Mcafee
2. Digital Transformation-Build Your Organization's Future For The Innovation Age By Lindsay Herbert(Bloomsbury)
3. Driving Digital Strategy-A Guide to reimagining Your Business by Sunil Gupta
4. Driving Digital Transformation-Reshape The Future of Your Business by Raktim Singh
5. Guide To Digital Transformation by Philippe Assouline
6. The VR Book-Human Centered Design For Virtual Reality by Jason Jerald, PhD.
7. Augmented Reality And Virtual Reality-New rends In Immersive Technology by M Claudia tom Dieck, Timothy H. Jung, Sandra M. C. Loureiro
8. Artificial Intelligence for Business-A Modern Business Approach by John Medicine
9. Artificial Intelligence by Naresh Kumar and Sunil Kumar(Satya Prakashan)
10. Human Compaatible-Artificial Intelligence and The Problem Of Control by Stuart Russell
11. Artificial Intelligence In Healthcare By Adam Bohr, Kaveh Memarzadeh(First Edition June 21, 2020)
12. Cloud Computing-Principles and Paradigms edited By Rajkumar Buyya, James Broobeg, Andrzej Goscinski

13. Clod computing and Virtualization by Raghvendra Kumar, Jyotir Moy Chatterjee, Dac Nhuang Le, Gia Nhu Nguyen
14. https://www.inap.com/blog/7-incredible-examples-of-augmented-reality-technology/
15. https://innolytics-innovation.com/what-is-digitalization/