REVIEWED ARTICLE: ARTIFICIAL INTELLIGENCE (AI) AND HEALTH CARE

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Abstract

Artificial intelligence touches nearly every part of our day. The main functions of artificial intelligence areto create expert systems and to implement human intelligence in machines. Artificial intelligence has played a significant role in various fields such as gaming, natural language processing, expert systems, vision systems, speech recognition, hand writing recognition and intelligent robots. Artificial intelligence in healthcare can help cut costs of on-going health operations and impact the quality of care for clients everywhere.AI can also improve client's outcomes by diagnosing diseases early. Artificial intelligence can be helpful in reducing human errors, increasing productivity, making faster decision-making processes, reducing cost of goods and services, excellent handling of repetitive and frequent tasks, excellent handling of low-level tasks, transformation in healthcare for betterment and improves security. Artificial intelligence can have certain disadvantages also such as loss of jobs, risk to humanity, possibility to be wrong, costly to develop, lack of original creativity, difficulty in handling highly intelligent tasks, lack of explanation and loss of skills etc. McCarthy has observed that today's nurses spend time doing low level tasks that can be performed by someone else with different skills. Nurses play an important role in every facet of patient care starting from the cost of health care to the overall patient's experience during hospital stay. Within this spectrum of responsibility lies the prospect for a number of different technologies to use the computing power of Artificial intelligence to assist with quality nursing care.

Keywords : Artificial Intelligence, health care and quality nursing care

INTRODUCTION:

Intelligence is a capability of a system to calculate, reason, understand relationships and analogies, learn from expertise, store and retrieve information from memory, solve issues, comprehend complicated concepts, use of linguistic communication fluently, classify, generalize and adapt new things.

TYPES OF INTELLIGENCE

According to Howard Gardner, types of intelligence are as follows;

1. **Linguistic intelligence–**Linguistic intelligence is an ability to speak, recognize, and use mechanisms of phonology (speech sounds), syntax (grammar), and semantics (meaning). Examples, narrators, orators etc.

2. **Musical intelligence-**Musical intelligence is an ability to create, communicate with, and understand meanings made of sound,pitch and rhythm. Examples, musicians, singers, composers etc.

3. **Logical-mathematical intelligence-**It is an ability of use and understand relationships in the absence of action or objects. Understanding complex and abstract ideas. Examples, mathematicians, scientists etc.

4. **Spatial intelligence-**Spatial intelligence is an ability to perceive visual or spatial information, change it, and re-create visual images without reference to the objects, construct 3D images, and to move and rotate them. Examples, map readers, astronauts, physicists etc.

5. **Bodily-Kinesthetic intelligence-** It is an ability to use complete or part of the body to solve problems or fashion products, control over fine and coarse motor skills, and manipulate the objects. Examples, players, dancers etc.

6. **Intra-personal intelligence-** It is an ability to distinguish among one's own feelings, intentions, and motivations. Examples, meditations, introspection, intuition etc.

7. **Interpersonal intelligence-** It is an ability to recognize and make distinctions among other people's feelings, beliefs, and intentions. Examples, mass communicators, interviewers etc.

COMPOSITION OF INTELLIGENCE

The intelligence is intangible. It is composed of 5 components and these are as follows;

1. **Reasoning–**Reasoning is to draw deductive or inductive inferences appropriate to the situation.

2. **Learning-** There are a number of different forms of learning as applied to artificial intelligence. The simplest form of learning is learning by trial and error method.

3. **Problem Solving-** Problem solving, particularly in artificial intelligence, may be characterized as a systematic search through a range of possible actions in order to reach some pre-defined goal or solution.

4. **Perception-** 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.

5. **Language-** A language is a system of signs having meaning by convention. For example, Traffic signs.
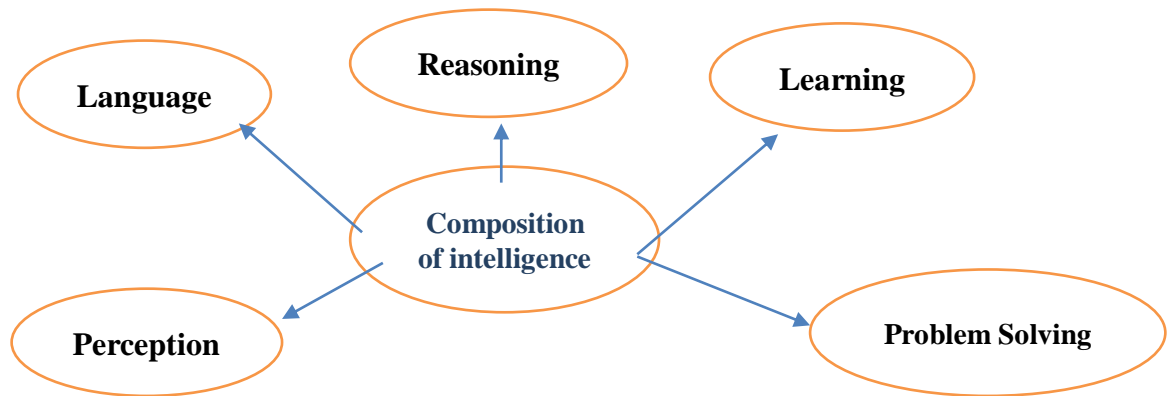
Figure: - Composition of intelligence

ARTIFICIAL INTELLIGENCE

Artificial intelligence is utilised in every part of our day to day activities. Artificial intelligence has in fact rapidly become a general-purpose technology in different areas such as industry management, traffic management system, health care industry etc. The ideal characteristic of artificial intelligence is an ability to rationalize and take actions that have the best chance of achieving a specific goal. Artificial intelligence is the science and engineering of making intelligent machines, especially intelligent computer programs". (John McCarthy)The father of Artificial Intelligence is John McCarthy. John McCarthy has coined the term 'Artificial Intelligence'.

FUNCTIONS OF ARTIFICIAL INTELLIGENCE

The main functions of artificial intelligence are as follows-

- **To create expert systems** –Artificial intelligence can assist in creating systems which exhibit intelligent behavior, learn, demonstrate, explain, and advice its users.

- **To implement human intelligence in machines** – Artificial intelligence can assist in creating systems that can understand, think, learn, and behave like humans.

DIFFERENCE BETWEEN HUMAN INTELLIGENCE AND ARTIFICIAL INTELLIGENCE

Human Intelligence	Artificial Intelligence
• Humans perceive by patterns	• Machines perceive by set of rules and data.
• Humans store and recall information by patterns. For example, number 50505050 is easy to remember, store, and recall as its	• Machines store and recall information by searching algorithms.

pattern is simple	
• Humans can figure out the complete object even if some part of it is missing or distorted	• Machines cannot figure out the complete object even if some part of it is missing or distorted

APPLICATIONS OF ARTIFICIAL INTELLIGENCE

Artificial intelligence has played a significant role in various fields such as –

- **Gaming** – Artificial intelligence can play important role in strategic games where machine can think of large number of possible positions based on heuristic knowledge such as chess, poker etc.

- **Natural Language Processing** –Artificial intelligence can be used to interact with the computer that understands natural language spoken by humans. Examples, spam filter on your email

- **Expert Systems** –**It** is an interactive and reliable computer-based decision-making system which uses both facts and heuristics to solve complex decision-making problems. Expert system is highest level of human intelligence and expertise used in various fields. Examples, Flight-tracking systems, Clinical systems such as **PXDES -** Expert system used to predict the degree and type of lung cancer etc.

- **Vision Systems** – Computer vision is a form of artificial intelligence where computers can "see" the world, analyse visual data and then make decisions from it or gain understanding about the environment and situation. For example, physician uses this technology in making diagnosis of patient.

- **Speech Recognition** – Recognition of speech or speech to text includes capturing and digitizing sound waves, transforming basic linguistic units or phonemes, building phonemic words, and contextually analyzing words to have words with correct spelling and same sound. For example, voice dialing hands-free use of mobile while driving.

- **Handwriting Recognition** – these software reads the text written on paper by a pen or on screen by a stylus.

- **Intelligent Robots** – Robots are equipped with sensors to detect physical data from the real world and are able to perform the tasks given by a human. Examples, use of robots in giving medicines and distributing foods to Covid-19 patients, use of robots in surgery etc.

ARTIFICIAL INTELLIGENCEIN HEALTHCARE

Artificial intelligence in healthcare can help **cut costs of on-going health operations** and impact the quality of care for clients everywhere. And by diagnosing diseases early, AI can also improve client's outcomes. No matter how we look at it, artificial intelligence has huge potential in healthcare.

USES OF ARTIFICIAL INTELLIGENCE IN HEALTHCARE

1. **Unifying mind and machine-** Using computers to communicate with the help of artificial intelligence is creating direct interfaces between technology and the human mind.Brain-computer interfaces (BCI) backed by artificial intelligence could restore those fundamental experiences. For example, patient with Neurological diseases and trauma to the nervous system can take away some patients' abilities to speak, move, and interact meaningfully with people and their environments.

2. **Development of new radiology tools -** Many diagnostic processes rely on physical tissue samples obtained through biopsies, which carry risks including the potential for infection. Artificial intelligence will enable radiology tools that are accurate and detailed enough to replace the need for tissue samples in some cases.

3. **Expanding access to life-savingcare-**Shortages of trained healthcare providers, including doctors, nurses and technicians can significantly limit access to life-saving care in developing countries. Artificial intelligence could help mitigate the impacts of this shortage of qualified clinical staff by taking over some of the duties typically allocated to humans.

4. **Reducing the burdens of EHR usage-Electronic Health Record (HER)**have played an instrumental role in the healthcare industry's journey towards digitalization, but the switch has brought various problems associated with cognitive overload, endless documentation, and burnout at the end of users. Artificial intelligence can help them to create more intuitive interfaces and automate some of the routine processes that consume so much of a user's time.

5. **Reducing the risks of Multi Drug Resistance (MDR) -**Multi-drug resistant organisms can wreak havoc in the hospital setting, and claim thousands of lives every year. Electronic Health Record data canbe helpful in identifying infection pattens and highlight patients at risk before they begin to show symptoms.

6. **Precise analytics for pathology images -**Artificial intelligence can screen through slides and direct us to the right thing to look at so we can assess what's important and what's not. It will increase the efficiency of the use of the pathologist and increases the value of the time they spend for each case.

7. **Smart devices critical monitoring-S**mart devices are very important for monitoring critical patients in the intensive care units or emergency settings. Use of artificial intelligence in these devices will help us to reduce cognitive burdens for health care professionals and ensuring timely and effective care.

8. **Advancing the use of immunotherapy -**Immunotherapy is one of the most promising avenues for treating cancer patients. AI is helpful in illuminating new options for target therapy to an individual patient's genetic makeup.

9. **Turning the Electronic Health Record (HER) into a reliable risk predictor -** Electronic health records are a goldmine of patient data, but extracting and analyzing that wealth of information with accuracy, reliability and timely is an ongoing challenge for health care providers. Artificial intelligence can help turning Electronic Health Records in to a reliable risk predictor which can prevent further complications.

10. **Powerful clinical decision making -**Artificial intelligence can be helpful in providing powerful predictive analysis and clinical decision support tool. AI can be helpful in having early intimation about certain conditions such as seizures which often require immediate attention.

11. **Monitoring health through smart devices -**From smartphones with step trackers to wearables devices that can track a heartbeat around the clock, a growing proportion of health-related data is generated on the go. Artificial intelligence will help us to initiate action based on the data collected by these smart devices.

ADVANTAGES OF ARTIFICIAL INTELLIGENCE

1. **Decrease in human errors**- The application of Artificial intelligence in various aspect of lives (like in self-driving cars) overtime will greatly reduce human errors.

2. **Increase inproductivity**- Artificial intelligence systems increase productivity in almost all areas of its application, partly because of its insane processing speed.

3. **Fasterdecision-making processes**- Artificial intelligence systems can speedily consider all the major factors by analyzing hundreds-trillions of data and helping us make better **informed decisions.**

4. **Reduces cost of goods and services**- In the long run artificial intelligence is going to greatly reduce the cost of goods and services.

5. **Excellent handling ofrepetitive and frequent tasks**- Artificial intelligence systems are greatly efficient and effective in carrying out repetitive tasks, as it is machine based.

6. **Excellent handling of low-level tasks -**Low-level tasks such as cleaning can be handled effectively by Artificial intelligence systems on autopilot, allowing us the time to focus on high-level tasks that requires genuine (human) intelligence.

7. **Transformation in Healthcare for betterment-** The use of artificial intelligence has great impact in the field of medicine and surgery and is saving many lives today.

8. **Undertake dangerous explorations-**Artificial intelligence robots can undergo dangerous explorations instead of humans, like in the exploration of mars and many scientific explorations.

9. **Improves security -** Artificial intelligence today is being deployed by security agencies to better protect lives and properties.

10. **Foster communication-**Artificial intelligence systems can effectively translate from one major human language to another, eliminating the need for an interpreter.

DISADVANTAGES OF ARTIFICIAL INTELLIGENCE

1. **Loss of Jobs–**Use of Artificial intelligence system is going to replace millions of jobs that are currently occupied by humans as these jobs can be easily done by machines equipped with artificial intelligence.

2. **Risk to humanity-** It simply means Artificial intelligence systems could potentially be intelligent and capacitated enough to destroy humanity.

3. **Possibility to be wrong-** The chances of accuracy are more but sometime it can be wrong and that can lead to heavy cost in terms of human life or security.

4. **Costly to develop-** The cost of developing artificial intelligencesystem is too expensive.

5. **Lack of original creativity-** Humans has the ability to create something from nowhere (or nothing) being originally creative but not an Artificial Intelligence system.

6. **Difficulty in handling highly intelligent tasks-**Highly intelligent tasks can only be handled by humans (Genuine intelligence) Artificial intelligence system is an intelligent system but it is far away from human standard.

7. **Lack of explanation**– Artificial intelligence can be helpful in doing the things but can't explain how the things are done.

8. **Loss of skills**- Artificial intelligence will not just take away people's job, it will also lead to loss of their respective skills.

APPLICATION OF AI IN NURSING CARE

McCarthy has observed that today's nurses spend time doing low level tasks that can be performed by someone else with different skills. In the future, Artificial intelligence system /

tools will help nurses to be relieved from these activities.It will enable them to focus their efforts on high level professional tasks/activities that utilize the full extent of their education, training, and experience.

Technology will change how nurses provide care to the patients, but the demand for nurses will remain. Nursing experience, knowledge, and skills can be utilized in high level tasks such as information integrator, health coach, and deliverer of human care, supported by Artificial intelligence technologies, not replaced by them.

Nurses play an important role in every facet of patient care starting from the cost of health care to the overall patient's experience during hospital stay. Within this spectrum of responsibility lies the prospect for a number of different technologies to use the computing power of Artificial intelligence to assist with quality nursing care.

AI system	Scope in Nursing
Visual recognition This AI system will identify and diagnose the patient's conditions with the help of computation of images and videos.	• Make an assess and formulate nursing diagnosis for skin and wound integrity. • Monitor breathing pattern. • Identify non-verbal cues for assessment of pain, anxiety and depression.
Voice assistance This AI system will use voice commands to identify the most relevant information for the movement.	• Retrieve information about current nursing policies. • Assist the patient in answering his questions/doubts such as when an upcoming test/therapy is scheduled. • Set timers and reminders for nursing care tasks to be performed on specific time.
Machine learning This AI system will process the information with the help of complex algorithms which in turn will improves automatically based on learning experiences.	• Identify a patient's course on their plan of care journey. • Initiate and completes tasks automatically such as schedule for follow up activities. • Sending results to team members who need to be informed.
Experts system This AI system solves complex problems by	• Prediction about the cost of care based on supplies used and type of services

reasoning through multiple sources to process decisions as accurate and quicker than human experts.	provided. • Can anticipate the population who area at risk for falls, Sepsis, readmission, relapse, financial hardship or increased length of stay.
Virtual reality Acomputer-generated image, environment or experience to interact with a seemingly real way.	• Patient support through virtual companions and educational assistive avatars. • Nurse education and simulation for mock learning exercise.

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