



# An Overview: Artificial Intelligence And Technology In Enhancing Quality Of Health

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**Abstract:** Artificial intelligence (AI) has had a profound impact on the healthcare industry, revolutionizing various aspects of patient care. This comprehensive study delves into the role of AI in healthcare, focusing on key areas such as medical imaging and diagnostics, virtual patient care, medical research and drug discovery, patient engagement and compliance, rehabilitation, and administrative applications. AI has proven to be instrumental in detecting clinical conditions through medical imaging and diagnostic services, enabling early diagnosis and control of diseases like COVID-19. It has also facilitated virtual patient care by leveraging AI-powered tools, allowing healthcare providers to remotely monitor and treat patients. Privacy, safety, the right to decide and try, costs, information and consent, access, and efficacy are among the key concerns that need to be addressed. Effective governance of AI applications is essential to ensure patient safety, accountability, and to instill confidence among healthcare professionals. The ongoing COVID-19 pandemic has further highlighted the significance of AI in healthcare, and its continued development holds great potential in meeting future healthcare needs.

**Keywords:** Artificial Intelligence, Technology, Cyber Security, Cyber Threats, Cyber Bulling, governance, healthcare.

## I. INTRODUCTION

The sustainability of health systems worldwide is being challenged by exponential healthcare cost developments that have outpaced GDP growth rates. This challenge has been further exacerbated by the emergence of the COVID-19 pandemic and the Ukraine war, which have put a strain on healthcare systems that were already struggling to cope with increased demand for service accessibility and availability. The COVID-19 pandemic has led to health system failures in some countries, such as India, Brazil, and Indonesia. Customer expectations.[1]

The advancement of biomedical science, encompassing genomics, digital medicine, artificial intelligence (AI), and its subset, machine learning (ML), sets the stage for the transformation healthcare. This transformation is accompanied by the emergence of innovative technologies, necessitating a new type of workforce and a revised standard of practice. Genomics, along with other technologies such as biometrics, tissue engineering, and the vaccine Potential to enhance and revolutionize various aspects of healthcare, diagnostics, therapeutics, care delivery, regenerative treatment, and precision medicine models.

Additionally, social media networks such as YouTube, Facebook, WhatsApp, Wikipedia, and other instant messaging applications (IMAs) are accessible to both professional and non-professionals. The integration of AI in healthcare within these digital modalities is rapidly advancing, particularly in the post-COVID-19 era Furthermore, the authors tackle several obstacles associated with the implementation of AI. These findings enhance the current body of literature, pushing the AI tools in healthcare to a new level.

## WHAT IS ARTIFICIAL INTELLIGENCE?

AI is the field of science and engineering that involves creating intelligent machines through the use of algorithms or a set of rules that enable the machine to mimic human cognitive functions, such as learning and problem-solving. AI systems have the potential to anticipate problems or deal with issues as they arise, operating in an intentional, intelligent, and adaptive manner. The strength of AI lies in its ability to learn and recognize patterns and relationships from large, multidimensional, and multimodal datasets. For instance, AI systems can translate a patient's entire medical record into a single number that represents a likely diagnosis. Additionally, AI systems are dynamic and autonomous, learning and adapting as more data become available.



AI is not a single, universal technology, but rather a collection of subfields, such as machine learning and deep learning, that add intelligence to applications. Machine learning, for example, involves the study of algorithms that allow computer programs to automatically improve through experience.

### Artificial intelligence applications in healthcare:

It is widely accepted that AI tools will serve to facilitate and enhance the work of healthcare professionals rather than replace them. AI has the potential to provide support to healthcare personnel in various tasks, ranging from administrative workflows and clinical documentation to patient outreach. Additionally, AI can offer specialized assistance in areas such as image analysis, medical device automation, and patient monitoring. There are differing viewpoints regarding the most advantageous applications of AI in healthcare. Forbes, in 2018, identified several crucial areas including administrative workflows, image analysis, robotic surgery, virtual assistants, and clinical decision support.

### Omics-Based Tests:

Involve the utilization of genetic information from a pool of individuals, combined with machine learning algorithms, to identify correlations and forecast treatment responses for individual patients. In addition to genetic information, other biomarkers such as protein expression, gut microbiome composition, and metabolic profiles are also incorporated into the analysis.

### How to build effective and trusted AI-augmented healthcare systems?

Despite more than a decade of significant focus, the use and adoption of AI in clinical practice remains limited, with many AI products for healthcare still at the design and develop stage.<sup>19–22</sup> While there are different ways to build AI systems for healthcare, far too often there are attempts to force square pegs into round holes i.e. find healthcare problems to apply AI solutions to without due consideration to local context (such as clinical workflows, user needs, trust, safety and ethical implications).

### Uses:

The healthcare industry is witnessing the widespread use of AI in various domains. This article delves into some of the most recent AI applications in 2020, including AI in

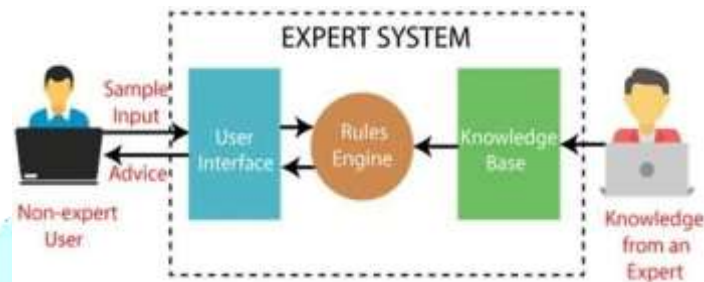
- diagnostics,
- medical imaging,
- pharmaceuticals and new drug development,
- hospital information systems,
- medical research,
- emergency room and surgery,

- mental health treatment,
- nutrition,
- virtual assistants, and
- wearables.

## AI & TECHNOLOGY IN HEALTHCARE:

Artificial intelligence encompasses a collection of various technologies rather than a single one. While many of these technologies have immediate relevance to healthcare, the specific processes and tasks they support can differ greatly. Among the AI technologies that are particularly important to healthcare are machine learning techniques such as neural networks and deep learning.

### I. Rule-Based Expert System:



During the 1980s, rule-based expert systems were the primary technology for AI and were widely used in commercial applications. In the healthcare industry, they were commonly utilized for clinical decision support purposes over the past few decades and are still prevalent today. Many electronic health record providers offer a set of rules with their systems.

### II. Cyber security and attacks:

For over twenty years, the Internet has played a crucial role in facilitating global communication and has progressively become more integrated into the daily lives of individuals worldwide. The advancements and affordability in this domain have greatly enhanced the accessibility, usage, and performance of the Internet, resulting in approximately 3 billion users globally (Tan et al., 2021). Moreover, the Internet has established an expansive global network that generates billions of dollars annually for the global economy (Judge et al., 2021). Currently, the majority of economic, commercial, cultural, social, and governmental activities and interactions, spanning from individuals to non-governmental organizations and government institutions, take place in the virtual realm (Aghajani and Ghadimi, 2018).

## TERMINOLOGY:

### a. Cyberspace:

It refers to the interconnected networks that encompass various components such as IT infrastructures, communication networks, computer systems, embedded processors, vital industry controllers, information virtual environment, and the interaction between this environment and human beings. Its purpose is to facilitate the production, processing, storage, exchange, retrieval, and exploitation of information.

### b. Cyber capital:

On the other hand, pertains to a crucial infrastructure of a country or a significant cyber system that holds key information or individuals belonging to a particular nation.

### c. Cyber Vulnerability:

When we talk about cyber vulnerability, we are referring to a weakness within an asset, security procedures, internal controls, or the implementation of a national cyber asset. These vulnerabilities can be exploited or activated by internal or external threats to conduct cyber warfare.

**d. Cyber Threats:**

It encompasses any event that has the potential to harm missions, tasks, images, national cyber assets, or personnel through an information system. These threats can manifest through unauthorized access, destruction, disclosure, alteration of information, or obstruction of service delivery.

**e. Cyber Threat:**

The cyber threat level indicates the extent to which cyber threats can impact national cyber assets. These threats can occur at various levels, including transnational, national, institutional, provincial, critical, and critical levels of infrastructure. The probability of cyber threats can be categorized as very high (imminent), high (probable), low (unlikely), or very low (very unlikely). The intensity of a cyber threat is determined by its impact and can be classified as very high (disaster), high (crisis), moderate (major security incident), low (security incident), or very low (security incident).

**f. Cyber Attack:**

Refers to any unauthorized cyber act that aims to violate the security policy of a cyber asset, causing damage, disruption, or interference with the services or access to information of the targeted national cyber asset. Additionally, the intentional use of a cyber weapon against an information system in a manner that leads to a cyber incident is also considered a cyber-attack.

**g. Cyber Weapon:**

It is a system specifically designed and manufactured to inflict damage or disrupt the structure or operation of other cyber systems. Examples of such systems include bot networks and logic bombs.

**Cyber Threats:<sup>[8]</sup>**

The pharmaceutical industry holds some of the most valuable information and valuable assets, making it a prime target for cybercriminals. Cybersecurity in the pharmaceutical industry is at risk as organizations have sensitive information about patients, patented drugs, clinical trials, research projects and new technologies.

Technological changes, the increase in electronic devices, and the use of third-party vendors have created cybersecurity challenges for pharmaceutical companies. One of the key challenges to information security in the pharmaceutical industry is the use of security systems and effective, robust strategies to protect digital assets and mitigate cyber-attacks on pharmaceutical companies. This will help prevent damaging information that could harm the pharmaceutical company's customer and patient trust, undermine its mission, and diminish its value.

**FUTURE ASPECT:**

Traditional pharmacies rely heavily on manual processes and human skills, which can lead to inefficiencies, errors, and delays. It involves many aspects of teaching, for example, administering medication, identifying the medication, prescribing it, and determining its dosage and frequency. This manual process is error prone and can be very time consuming. Additionally, traditional pharmacies do not have the ability to create personalized medicine for individual patients, which can reduce the effectiveness of medical treatment.

However, pharmacies can improve their operations and overcome these limitations by using AI-powered tools such as AI. Artificial intelligence can perform all aspects of pharmacy work, from interpretation of medications to dispensing of medications, reducing the risk of errors and increasing efficiency. Additionally, by analyzing multiple patient data, AI can help pharmacists create personalized medications to meet each patient's unique needs and medical history. Although traditional pharmacy successfully delivers necessary medications to patients, it is hampered by manual and impersonal processes. The use of smart tools such as artificial intelligence can solve these limitations, ensuring efficient, accurate and personalized pharmacy and ultimately improving patient outcomes.

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