

# Healthcare, Medicines, and the Advancement in Robotics: Pitch the Vision of Smart Public Health

Bhupinder Singh<sup>1,\*</sup>

## Abstract

*Robots are revolutionizing medical procedures, optimizing supply delivery and disinfection processes, and allowing healthcare providers to dedicate more time to patient care and interaction. Intel offers a diverse array of technology solutions designed specifically for the advancement of medical robots, encompassing surgical aids, customizable modules, and self-governing mobile robots. Social robots are human-to-human communicators that may be used to monitor and socialize with patients in long-term care settings. They lessen caregiver burdens and improve patients' emotional well-being by encouraging treatment compliance, offering guidance to patients and visitors throughout hospital surroundings, and facilitating cognitive engagement. In research laboratories, robotics and automation are employed to mechanize labor-intensive, repetitive tasks performed on a large scale. This frees up technicians and scientists to focus on strategically important tasks that expedite discovery. Medical robots provide benefits in a number of sectors by streamlining processes and reducing risk. Robots, for example, can autonomously set up and clean patient rooms, which is especially useful in infectious illness wards where it is important to restrict human-to-person contact. This article explores the advancement in robotics concerning the field of healthcare and medicines.*

**Keywords:** Robotics, technologies, health, medicines, patient care

## INTRODUCTION

With managing time-consuming, repetitive, and administrative chores, robotics integration in healthcare settings enables firms to save labor costs and free up staff members to concentrate on other important, non-automated jobs. In healthcare, robotics expedites procedures, lessens the need for drawn-out consultations, shortens surgery times, enables individualized care, and raises surgical success rates. Robots in surgical settings promote surgeon comfort and ergonomics, which lowers fatigue and boosts procedural efficiency. They are also essential in reducing the possibility of human mistake during complicated operations [1].

A robot is a programmed machine that can execute tasks; robotics is the field that studies the development of robots and automation. Robots come in different levels of autonomy; they can be completely autonomous and work on their own, or they can be directed by humans to do tasks. As technology develops, robots' use grows, transforming medical surgery through the automation of duties like supply delivery and cleaning. Medical staff members have more time to interact directly with patients because of this technology [2].

### \*Author for Correspondence

Bhupinder Singh

E-mail: [bhupindersinghlaw19@gmail.com](mailto:bhupindersinghlaw19@gmail.com)

Professor, School of Law, Sharda University, Greater Noida, Gautam Budh Nagar, Uttar Pradesh, India

Received Date: April 10, 2024

Accepted Date: May 22, 2024

Published Date: July 05, 2024

**Citation:** Bhupinder Singh. Healthcare, Medicines, and the Advancement in Robotics: Pitch the Vision of Smart Public Health. Journal of Advancements in Robotics. 2024; 11(2): 26–29p.

## KINDS OF ROBOTS IN HEALTHCARE AND MEDICAL FACILITIES

To assist medical professionals and enhance patient care, robots are being used more and more in clinical settings outside of operating rooms.

---

Hospitals and clinics used robots for more tasks during the COVID-19 pandemic, reducing pathogen exposure and demonstrating the advantages of health robotics for risk reduction and operational efficiency. In general, there are several benefits to using robots in healthcare [3].

Surgical Support Robots are intended to enhance current surgical techniques, including orthopedic and minimally invasive operations. They can do procedures including hip and knee replacements, as well as bariatric surgery. Prosthetic limbs and therapeutic exoskeleton robots are examples of modular robots that help people recover from illnesses including multiple sclerosis, stroke, paralysis, and traumatic brain injury. These robots can evaluate range of motion, monitor a patient's posture during workouts, and monitor the patient's progress toward recuperation.

Service robots help hospital staff with standard administrative duties, including setting up patient rooms, ordering, keeping track of supplies, refilling medicine cabinets, and bringing linens to and from laundromats. They provide reports after finishing assignments.

Mobile robots follow pre-established pathways or lines to perform a variety of activities in hospitals and clinics. Conversely, doctors operate autonomous robots from a distance. In long-term care facilities, social robots are being used more and more to engage with patients and guests. In addition to providing information to patients and visitors within healthcare institutions, they also give cognitive stimulation, encourage adherence to treatment procedures, and raise patient morale [4].

### **ROBOTICS IN HEALTH AND MEDICAL CARE**

Robotics and automation are used in research laboratories to automate high-volume, repetitive, manual processes. This frees up technicians and scientists to focus on strategically important tasks that expedite discovery. Medical robots provide benefit in a number of sectors by streamlining processes and reducing risk. Robots, for example, can autonomously set up and clean patient rooms, which is especially useful in infectious illness wards where it is important to restrict human-to-person contact [5]. The hospital medication delivery, matching, and identification are sped up by robots outfitted with AI-enabled pharmaceutical identifier software. Robots will become more autonomous as technology develops and eventually be able to do certain jobs on their own. As a result, medical staff members such as physicians and nurses will have more time to personally oversee patient care. Three major obstacles stand in the way of the healthcare industry's broad use of robots: patient mistrust, a lack of qualified personnel, and safety concerns. About one-third of dental patients say they would be reluctant to give a robot their regular teeth cleaning, and two-thirds say they would be reluctant to give a robot their root canal.

Healthcare professionals must effectively communicate the advantages of robotic applications in medicine to build patient trust in robotic treatments. In spite of the growing need for graduates with expertise in robotics, cybersecurity, and artificial intelligence, the healthcare sector struggles to find enough qualified workers. The healthcare sector has to aggressively encourage students and healthcare professionals to seek education in robotics and related fields in order to meet the expectations of robotics in the future. In order to reduce the particular safety risks associated with the use of robotics in healthcare, especially in light of the large volume of data that healthcare robots gather, store, and analyze, healthcare facilities need to assign specialized roles in charge of managing the use and cybersecurity of robots [6].

### **ADVANCEMENT IN ROBOTICS: HEALTH AND MEDICAL FACILITIES**

The success of surgeries depends on a surgeon's competence in both surgical and diagnostic procedures. In the past, robotic procedures have proven to be successful. Robots have historically been shown to be very useful during surgical operations because of their quick operation and regulated environment [7]. There are several ways in which the importance of robots in healthcare is apparent AS- Ensuring patients receive the right care and attention: Robots improve the quality of care by

facilitating routine check-ups and reporting to physicians and the patient's family. Also, they show patients more empathy, which promotes long-term healing. Healthcare workers' workload can be reduced, and a safe atmosphere can be upheld: robots can move heavy things, which takes the strain off of healthcare professionals [8]. By lowering the possibility of damage during physical handling, they help to provide a safer atmosphere for patients. Moreover, because they are immune to disease and do not present a danger of transmission, robots are particularly useful in scenarios where healthcare staff are at risk of infection. Increasing productivity and schedule adherence: In medical environments, robots are able to carefully follow preset timetables, completing tasks promptly. They provide complete and damage-free area sanitization, raising requirements for hygiene [9].

## **ADVANTAGES OF ROBOTICS IN HEALTHCARE**

Healthcare robots offer several benefits, such as improved patient care, streamlined clinical processes, and the creation of a secure environment for patients and healthcare personnel [10].

### **Better Patient Care**

Intelligent medicines, frequent and tailored monitoring for patients with chronic illnesses, minimally invasive operations, and social interaction for senior patients are all made possible by robotic technology. Robots reduce workloads so that nurses and other caregivers may provide patients with more human connection and empathy, which improves patients' long-term health [11].

### **Clinical Workflows Streamlined**

Autonomous mobile robots (AMRs) guarantee more consistent operations, ease repetitive labor, and put less physical pressure on human workers. By keeping track of inventories and scheduling orders on time to guarantee that supplies, tools, and medication are always accessible, these robots assist in addressing personnel shortages. Furthermore, AMRs for cleaning and disinfection speed up room sanitization, freeing up healthcare staff to concentrate on patient-centered duties.

### **Robots Assisting in Surgery**

As motion control technologies have advanced, surgical aid robots have grown more accurate. These robotic devices, which frequently have AI and computer vision capabilities, let surgeons perform intricate procedures with greater speed and accuracy. They enable minimally invasive operations that lead to quicker recovery periods and fewer problems for a variety of treatments, including bariatric surgery, prostatectomy, and hysterectomy.

### **Modular Robots**

Patients recovering from neurological or physical disability benefit from the use of modular robots, such as prosthetic arms and legs and therapeutic exoskeleton robots. Compared to human observation alone, these robots help patients conduct exercises and measure their development more precisely.

### **Autonomous Mobile Robots**

By helping with telepresence, drug distribution, and cleaning duties, AMRs contribute significantly to healthcare by making surroundings safer and freeing up healthcare personnel to devote more time to patient care. With the use of visual compute and LiDAR systems, AMRs may self-navigate in hospital environments and go with physicians on patient rounds, allowing for remote consultations and diagnoses.

### **Service Robots**

With doing repetitive logistical duties on their own, service robots reduce the everyday workload of healthcare personnel. With organizing patient rooms, monitoring supplies, replenishing medicine cabinets, and carrying linens, these robots free up healthcare staff to attend to patients' urgent needs. Also, by performing cleaning and disinfection duties, service robots help keep healthcare facilities hygienic and clean.

In hospital environments where pathogen exposure is a problem, AMRs are used to move supplies and linens, improving worker safety. Robots for cleaning and disinfection can lower hospital-acquired infections by minimizing pathogen exposure. AMRs, or social robots, help with heavy lifting and other duties so that healthcare personnel do not have to exert as much physical effort.

## CONCLUSION

Robots are becoming an essential part of human existence in the digital era, significantly increasing convenience and ease of use. Robots are more precise than humans in performing some activities, especially in the healthcare industry. In the healthcare industry, inexpensive robotic services enable nurses to effectively monitor several patients at once and notify them when medical assistance from a human physician is required. Robots are also very useful in the healthcare sector since they help lower the dangers involved in surgical operations. Robots will become increasingly autonomous as technology develops, ultimately being able to do particular activities on their own. As a result, medical staff members such as doctors and nurses will have more time to provide direct patient care.

## REFERENCES

1. Sudha K, Balakrishnan C, Varun CM, Subramanian RS. Advancements in medical robotics and AI-assisted diagnostics: transforming the healthcare industry. In: Khang A, editor. *AI-driven innovations in digital healthcare: emerging trends, challenges, and applications*. Hershey, PA, USA: IGI Global; 2024. 23–46 p.
2. Singh B, Kaunert C, Vig K. Reinventing influence of artificial intelligence (AI) on digital consumer lensing transforming consumer recommendation model: exploring stimulus artificial intelligence on consumer shopping decisions. In: *AI impacts in digital consumer behavior*. Hershey, PA, USA: IGI Global; 2024. 141–169 p.
3. Khang A, editor. *Medical robotics and AI-assisted diagnostics for a high-tech healthcare industry*. Hershey, PA: IGI Global; 2024 Mar 4.
4. Singh B. Featuring consumer choices of consumable products for health benefits: evolving issues from tort and product liabilities. *J Law Tort Consum Prot*. 2024; 7 (1).
5. Karmakar S, Mishra A, Mishra AK, Srivastava JP. Robotics in medical science. In: *Mechanical engineering in biomedical applications: bio-3D printing, biofluid mechanics, implant design, biomaterials, computational biomechanics, tissue mechanics*. Hershey, PA, USA: IGI Global; 2024. 367–396 p.
6. Choshin M, Ghaffari A. An investigation of the impact of effective factors on the success of e-commerce in small-and medium-sized companies. *Comput Human Behav*. 2017; 66: 67–74.
7. Barua R, Datta S. The ongoing advancements in surgical robotics: transforming the landscape of surgery. In: Khang A, editor. *AI-driven innovations in digital healthcare: emerging trends, challenges, and applications*. Hershey, PA, USA: IGI Global; 2024. 288–303 p.
8. Singh B. Understanding legal frameworks concerning transgender healthcare in the age of dynamism. *Electron J Soc Strateg Stud*. 2022; 3: 56–65.
9. Ness S, Xuan TR, Oguntibeju OO. Influence of AI: robotics in healthcare. *Asian J Res Comput Sci*. 2024; 17 (5): 222–237.
10. Filip R, Gheorghita Puscaselu R, Anchidin-Norocel L, Dimian M, Savage WK. Global challenges to public health care systems during the COVID-19 pandemic: a review of pandemic measures and problems. *J Pers Med*. 2022; 12 (8): 1295.
11. Ma W. Profiling in public health. In: *The Routledge handbook of philosophy of public health*. London, England, United Kingdom: Routledge; 2022. 161–175 p.