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**AI AND ROBOTICS: ROBOTICS ARE REVOLUTIONIZING HEALTHCARE,  
NO LONGER A SCIENCE FICTION**

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**ABSTRACT:** Artificial intelligence is becoming more and more adept at performing tasks that humans do, but faster, more cheaply, and with greater efficiency. AI and robotics have enormous potential in the medical field. AI and robotics are getting more and more integrated into our healthcare ecosystem, much like they are in our daily lives. Triclone scanners and Baymax-like robots are not science fiction. Around the world, homes, workplaces, and healthcare settings now have AI and robotics that assist, diagnose, and treat people. Our capacity to provide a more responsive healthcare system with better health outcomes over the next ten years will depend on how we use AI and robotics to supplement and improve present healthcare services while giving people greater control over their health needs at the same time. Since five different trends are coming together, AI and robotics will eventually define New Health. First and foremost, every nation in the world is dealing with a value dilemma. The quantity of health data that is currently at our disposal has increased dramatically during the last ten years. From products to services to solutions, information technology development in the healthcare industry has been progressing quickly (Frost & Sullivan, 2016). Lastly, there is now a critical mass of people who are willing to take a more active role in their own health and well-being.

The general public in Delhi and the NCR Region was surveyed to find out three things:

1. If there was a desire to use AI and robotics in healthcare;
2. The conditions that would lead to a higher or lower willingness to do so; and,
3. The alleged benefits and drawbacks of healthcare automation and artificial intelligence.

The data clearly shows that customers are becoming more eager to use new technologies in novel ways to meet their wellness and health needs.

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**KEYWORDS:** Artificial Intelligence, Robotics, Healthcare, Wearables, Robotic Surgery,

### **INTRODUCTION:**

Fiction has long dealt with AI and robots. We have long been captivated by the potential for machines that can comprehend, reason, learn and assist us in better using information—from Isaac Asimov's "I, Robot" in 1950 to Baymax, the care robot in "Big Hero 6."

Triclone scanners and Baymax-like robots are not science fiction. Around the world, homes, workplaces, and healthcare settings now have AI and robotics that assist, diagnose, and treat people. Over the next ten years, how we use AI and robotics to supplement and improve existing healthcare services will determine our capacity to provide a more responsive healthcare system with better health outcomes while also allowing individuals to take more control over their day-to-day health needs.

### **Five distinct trends are observed, which means AI and robotics will come to define New Health:**

1. First and foremost is the value dilemma that all nations are dealing with: rising expenses, an aging population, and a growing demand for long-term, chronic diseases, together with limited resources like money, workforce specialists, etc. However, we are still making investments in infrastructure and machinery that were not intended to meet this need and were constructed to address an entirely other set of healthcare requirements. When critically sick people need days or weeks of acute care, a hospital-centric system handles these situations very well. However, treating a huge number of patients with chronic, complicated illnesses that need long-term care was never its goal.
2. The amount of health data that we now have access to has increased dramatically over the last ten years. The amount of health-related data was predicted to be over four zettabytes in 2013 (10<sup>21</sup>), or four trillion gigabytes. According to certain projections, this exponential growth rate would increase to more than ten times that amount, by 2024, and even more, to yottabyte (10<sup>24</sup>) proportions. Additionally, 80% of this remarkable volume of data is unstructured, which means it isn't stored in a database or other kind of data structure. It is simply beyond the capabilities and intelligence of any human person to keep up with and have access to this data.
3. Developments are seen in Information Technology in products to services to solutions, the healthcare industry has been progressing quickly (Frost & Sullivan, 2016). The innovation offered by medical devices that provide evidence-based and historic care has been the focus

of previous decades. Real-time, outcome-based treatment is the focus of medical platforms in the current decade. The next ten years will see a shift in medical solutions, with an emphasis on collaborative, preventative care and the use of AI, robotics, and virtual and augmented reality to deliver intelligent solutions for both evidence- and outcome-based health. Precision medicine, down to the individual and family level, is becoming possible thanks to the convergence of technology-based products, platforms, and solutions. In the future, it might even be able to forecast and prevent disease.

4. Naturally, the impact of technology extends well beyond advancements in healthcare. The rapid advancement of technology, including wireless connectivity and digitally connected gadgets, has made healthcare more accessible to a wider range of people. Both iOS and Android already come with some of the most potent AI features built in. By using this technology, consumers are being given the data and knowledge they require to take charge of their own health and well-being and to work with their healthcare professionals to make better, more educated decisions.
5. Lastly, there is now a critical mass in the public's readiness to take a more active role in their own health and well-being. The Internet of Things (IoT) and the rapid advancement of technology are bringing forth innovations that are erasing healthcare barriers and enabling care anywhere and everywhere, as detailed in 2016 survey Care Anywhere In this research, it has been examined how this openness is spreading to the fields of robotics and artificial intelligence.
6. Robotics is highly favored in paratherapeutic end-of-life care. In settings like hospitals and long-term care institutions where real animals pose therapeutic or logistical challenges, patients can benefit from the proven advantages of animal therapy thanks to sophisticated interactive robots. They have been shown to enhance socialization, promote interaction, and lessen stress.  
Robots with amiable humanoid faces and wheels are being developed by Robot Era. Real-time data is collected and analyzed by the robot's sensors and cameras, and it is wirelessly transmitted to the cloud, where computers derive sophisticated information like if a person is exhibiting dementia symptoms. They can also monitor conditions over time and remind the elderly of crucial information and daily tasks, and track conditions over time. Zora Robotics is building AI software into Zora Bots. These bots patient-facing roles in hospitals, they are also training humanoid robots to hold conversations with the elderly.

### **Consumer apps and artificial intelligence for maintaining health**

Samsung Electronics provides customers with gadgets like activity trackers and smartwatches in addition to their Tizen open-source operating system. This enables users to monitor their fitness levels and access their mobile devices quickly

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### **Wearables and AI for early detection**

To enhance cardiac monitoring and rhythm management, Cardio Diagnostics has created a gadget that can remotely check its wearer for cardiac anomalies.

### **Making a diagnosis**

Google's DeepMind Health is collaborating with physicians, researchers, and patients to address the practical healthcare issues. The technique creates neural networks that resemble the human brain by fusing machine learning and systems neuroscience to create potent general-purpose learning algorithms.

### **AI and analytics platforms for decision-making**

The Quantum platform from Quest Diagnostics is a comprehensive set of predictive analytics and healthcare IT tools that analyzes test results and patient medical data to assist primary care physicians in identifying patients with dementia and early-onset memory loss.

### **Therapy**

By monitoring deviations and keeping abreast of post-acute patient requirements, Innovaccer's AI Assisted Care Coordination Platform ensures adherence to care plans while addressing ongoing care and connection difficulties.

### **Care toward the End of life**

Paro Therapeutic Advanced interactive robots make it possible to provide patients in hospitals and long-term care facilities where live humans pose medical or logistical challenge, Socialization, interaction, and stress reduction have all been reported to be enhanced by them. Robot Era is working on creating wheeled robots with amiable humanoid faces. The robot collects and analyses data in real time using its sensors and cameras. This data is then wirelessly transmitted to the cloud, where algorithms determine sophisticated information like whether a person is exhibiting dementia symptoms. In addition, they can monitor the elderly's status over time and remind them of crucial facts and everyday responsibilities.

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### **Newcomers, surgical robots with low invasiveness**

Using cutting-edge visualization, machine learning, data analytics, and networking, Verb Surgical is collaborating with Johnson & Johnson's Ethicon and Alphabet Inc.'s Verily to create the next generation of surgical robots. Spine surgery is being transformed from freehand to guided treatments by Mazor Robotics' Renaissance surgical guidance system. ADSs from Mazor are traded on the NASDAQ under the ticker MZOR.

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### **LITERATURE REVIEW**

According to Thomas Davenport (2019), there has been a lot of discussion about the fear that artificial intelligence (AI) would result in significant job automation and human displacement. AI has not resulted in the loss of any healthcare jobs. The minimal impact on employment has been caused in part by AI's slow market acceptance to far as well as the challenges associated with incorporating AI into healthcare practices and EHR systems.

Dutta (2016). A modern solution for maxillofacial surgery in the future is transoral robotic surgery. *Pathol J Oral Maxillofac Surg Med.* uses a surgical robot instead of more drastic methods to obtain conservative access through the oral canal to pharyngolaryngeal surgical sites. Improved visibility and minimally invasive access to surgical areas are potential benefits. This method can be used to overcome serious secondary morbidities such as loss of large volumes of muscular tissue and organs associated with open surgery, thus improving functional, cosmetic and oncologic outcomes.

Essani, R. (2016). Colorectal surgery with robots. *Surgical advancements.* The majority of laparoscopy's benefits are combined with extra features in robotic colorectal surgery, especially when it comes to colorectal surgery.

Fiber, L. (2016). To address diabetes, cancer, heart disease, brain disease, and eye health, medical imaging leaders are turning to IBM and Watson. A global project, the Watson Health Medical Imaging Collaborative is made up of over fifteen top health systems, university medical centers, ambulatory radiology providers, and imaging technology businesses. The partnership seeks to integrate cognitive imaging into routine practice to assist physicians in treating diabetes, eye health, brain disease, heart disease, and associated disorders including stroke, as well as cancers of the breast, lung, and other organs.

Fierce Biotech presents their concept for next-generation robotic surgery on September 28, 2016. Verb Surgical is developing what company refers to as "Surgery 4.0"—the next stage of surgery that integrates robotics, digital analytics, machine learning, sophisticated visualization, and connectivity. It anticipates that by bringing down the cost and decreasing the training level, its technology will enable actual access to surgery for billions of people worldwide who do not now have it.

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Freeman, S. (2012). Claims that robotic surgery has come into limelight since the first robot-assisted surgery was performed in 1985. Currently, the da Vinci Surgical System is the most widely used system. Surgeons may observe the 3D camera system on a screen, and it features robotic arms that can grip instruments within the patient's body.

Stone(2016). Training in healthcare is improved by virtual reality.([https://insights.samsung.com/2015/12/15/empowering training through virtual reality in healthcare](https://insights.samsung.com/2015/12/15/empowering-training-through-virtual-reality-in-healthcare)) Healthcare has long viewed robotics and artificial intelligence as promising fields. There is a huge gap that can only be filled by technology as a result of the data explosion in healthcare, the rise in demand from the world's aging populations, rising costs, and a shortage of supply. There is growing need for the number of healthcare professionals required to treat and care sick people with both the availability and access to a wider range of necessary services than ever before

Walsh (2016). The robot works within the world's eye first. According to the BBC's website, health-37246995 An Eindhoven University of Technology spin-out business in the Netherlands created the Preceyes surgical robot. A joystick is used by the surgeon, touch-screen is used to guide a thin needle into the eye, while progress is monitored through a microscope. The robot, which acts like a mechanical hand, has seven motors and is able to filter out hand tremors from the surgeon. Large movements of the joystick result in tiny movements of the robot, and if the surgeon releases their grip any movement is frozen.

(2016) Zhang, S. The article Why An Autonomous Robot Won't Replace Your Surgeon Anytime Soon (<http://www.wired.com/2016/05/robot-surgeon/>) claims that up until now, it has only been used for "robotic assisted surgery," which is entirely distinct from surgery that is done entirely by robots.

ZoraRobotics. (<http://www.wired.co.uk/article/hp-re-inventors-health-hospitals-of-the-future>). Among the many health care tasks that the Zora application has helped with are the elderly in residential care facilities, the young autistic children in schools, and the hotel industry, where the robot's presence provides guests with a novel experience.

Association for Biomedical Research in California. The process of developing new drugs.([CBRADrugDevelop.pdf/media-kit/fact-sheets/http://www.ca-biomed.org](http://www.ca-biomed.org/CBRADrugDevelop.pdf/media-kit/fact-sheets)) AI's more recent uses in healthcare include drug discovery and research. It may be possible to drastically reduce the time to market and cost of new medications by leveraging the most recent developments in artificial intelligence to optimize drug discovery and repurposing of medicine processes.

Captain, S. (2016). The upcoming AI healthcare boom, according to Paging Dr. Robot (<https://www.fastcompany.com>), will spare overworked doctors from some of the risky tiredness that can result in errors. The first workup may be completed by other staff members, such as nurse

practitioners who are almost doctors, before a specialist arrives to assess the findings and decide how to proceed. AI may prove particularly beneficial for healthcare facilities that lack the financial resources to afford a general cardiologist rather than a team with different subspecialties. This will make diagnosis and care available to all.

Brunker (2016). How information from web searches could aid in the early diagnosis of serious illness. (<https://blogs.microsoft.com/next/2016/06/07/how-websearch-Horvitz/>) an expert in artificial intelligence who has an MD and a Ph.D. from Stanford University, stated that the researchers discovered that questions asked to find answers regarding that set of symptoms can act as a precursor to the onset of illness. Robotics and AI will define New Health.

According to Pradeep Kumar, Yogesh K. Dwivedi, and Ambuj Anand (2021), patient consent moderates the relationship between ethical AI and value generation and market performance in the healthcare industry.

A four-brick structure for augmented reality marketing is identified by Philipp A. Rauchnabel et al. in their study on the definition, complexity, and future of the topic. There is currently no all-encompassing approach to AR, and AR marketing necessitates developing marketing resources especially for a particular business.

The degree of AI (voice recognition and synthesis using machine learning) connected to an augmented object improves consumer perceptions of novel experiences, MR enjoyment, and MR immersion related to spatial immersion, per a study by E.C. Sung et al. on consumer engagement via interactive artificial intelligence and mixed reality. When taken as a whole, these boost consumer interactions and favorably affect behavioral responses, such as propensities to purchase and tell others about their experiences. Overall, the findings of this research indicate that interactive AI and MR technologies create new opportunities to encourage customer involvement

Joachim Scholz and Andrew N. Smith claim that although augmented reality (AR) may be a useful tool in integrated marketing endeavors, there is a lack of knowledge regarding AR and how to effectively use AR campaigns in the real world. Using the concept ENTANGLE, they create eight practical suggestions that marketing managers may implement to create captivating augmented reality experiences that optimize customer engagement. The study "Revisiting the consumer Brand engagement concept," by O.O. Bilio et al.

Their research aims to reassess the validity of the CBE scale, which was first presented by Hollebeek, Glynn, and Brodie in 2014. By combining perspectives from marketing research and practice, O.O. Bilio et al. present a fresh engagement paradigm. They use this new conception to assess the CBE scale via this new conceptualization and find that, although it is a credible and trustworthy tool, it falls short in capturing the engagement concept. Lastly, they present and validate a new tool that better encapsulates the engagement idea. They evaluate the CBE scale and

find that, although it is a legitimate and trustworthy tool, it falls short in capturing the idea of engagement.

Russell, Luo Meiling Margaret, and Chen Ja-Shen K.H. Ching b & Chu-Chi Liu claim that virtual experience marketing affects VEM characteristics (Community relationship, Flow, Sense, Interaction and Pleasure), online browsing, and shopping orientation (economic, convenient, and IT usage). Customer loyalty is impacted by elements such as the intention to make an online purchase.

According to Saeed Shobeiria, Ebrahim Mazaherib, and Michel Laroche, customer ROI, service quality, website aesthetics, and fun can all increase user engagement.

According to Yogesh K. Dwivedi et al.'s paper "Setting the future of digital and social media marketing research: Perspectives and research propositions," social media platforms—both new and established—are dynamic, business-to-business (B2B) research is essential, and digital experiential marketing lacks a suitable measurement scale.

## RESEARCH METHODOLOGY

The general public in Delhi and the NCR Region was surveyed to learn three things:

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Primary data was used in the study, and respondents were chosen by random sampling. An online questionnaire is used in google form format. A questionnaire having 15 questions and covering Various items have been made see the viability of the study.

**The sampling technique** included simple random sampling. And the

**sample size:** 140 respondents.

## Measurement Scale

SERVE QUAL is used in the study (Parashuraman et al., 1998). The amount of items for assessing each variable, their sources, and the recent research that have validated these scales are listed in Table 1. 5 point Likert scale indicating: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5 = Strongly Agree.



**DATA ANALYSIS**

Empirical data analysis was used for analyzing the AI in Healthcare using CRM software and its feedback analysis. The research methodology used the SPSS method. Data analysis given below:

**Background**

Reliability

**Reliability Statistics**

Cronbach's Alpha	N of Items
.959	52

**Case Processing Summary**

	N	%
Valid	148	100.0
Cases Excluded <sup>a</sup>	0	.0
Total	148	100.0

a. Listwise deletion based on all variables in the procedure.

The above table 1.2. Shows that the reliability of the total items is 0.959 which is accepted as per Nunnaly (1995) which shows that if the reliability of the questionnaire is more than 0.5 and as above, it is acceptable.

**KMO and Bartlett's Test**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.884
Bartlett's Test of Sphericity	Approx. Chi-Square	5592.647
	df	1326
	Sig.	.000

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.669	9	.963	1.227	.283 <sup>b</sup>
	Residual	108.324	138	.785		
	Total	116.993	147			

a. Dependent Variable: reg\_health\_check

b. Predictors: (Constant), tech\_red\_time\_serv, real\_in\_person\_records, virtual\_clinic, tests\_ral\_mach, inf\_ai\_diagnosis, diag\_inperson, diagnosis\_real\_doc, comfort\_real\_clinic, real\_doctor\_checkup

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.806	.542		3.331	.001
	real_in_person_records	-.008	.105	-.008	-.077	.939
	real_doctor_checkup	-.050	.142	-.051	-.354	.724
	diagnosis_real_doc	-.026	.125	-.027	-.204	.839
	tests_ral_mach	.071	.142	.073	.498	.619
	diag_inperson	-.156	.110	-.162	-1.409	.161
	comfort_real_clinic	.046	.119	.050	.388	.699
	inf_ai_diagnosis	.209	.108	.180	1.936	.055
	virtual_clinic	.157	.095	.153	1.664	.098
	tech_red_time_serv	-.145	.111	-.119	-1.313	.191

a. Dependent Variable: reg\_health\_check

**FINDINGS AND DISCUSSIONS:**

The public is prepared and willing to replace humans with robotics and artificial intelligence.

1. If improved access to healthcare is the result, people are becoming more receptive to interacting with AI and robotics.
2. This attitude is mostly influenced by the speed and precision of diagnosis and treatment; wider use and adoption of the technology depend on trust; and the "human touch" is still an essential part of the healthcare experience.

3. Regardless of age, gender, or nation, all respondents generally express a remarkably high readiness to interact with AI and robots.
4. We discovered that customers from a variety of demographics are open to considering non-traditional choices for managing disorders ranging from minor and major surgery to diabetes and heart condition monitoring and advise, as well as exercise advice and treating their health.

## **CONCLUSION AND KEY RECOMMENDATIONS**

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The public is prepared to accept this new healthcare landscape, but certain things must occur first:

1. **For governments:** establish regulatory frameworks and quality standards that apply to and are required for the whole healthcare industry, together with suitable incentives for implementing innovative practices. Linking regulations to facilities or individuals, will naturally discourage adoption. Additionally, robotics and AI should be viewed as improving the affordability and accessibility of healthcare. These technologies run the risk of becoming the property of the wealthy.

2. **For healthcare workers:** be adaptable and aware of how AI and robotics can benefit and collaborate with them in a medical context and across the healthcare ecosystem. The medical professionals will have to be as good at monitoring, diagnosis, decision making or surgery, they have to be in unique role for the human, and how can they prepare for it?

3. **For patients and the public at large:** get more comfortable with robots and artificial intelligence and learn about its advantages for themselves. However, we have a suspicion that, similar to how individuals have already embraced AI in their daily lives, health technology will also be quickly adopted.

4. **The private sector's AI and robotics:** solutions must address the significant resource and demand challenges that every health system encounters. Essentially, the private sector has the chance to positively disrupt healthcare by offering AI and robotic-driven solutions.

5 **Healthcare institution decision-makers** should prioritize, build an evidence base, assess the new technology's efficacy and performance, adopt it gradually, and pay attention to what customers need and want. Our ability to rethink the way we provide healthcare to our citizens is largely dependent on innovation from AI and robotics. Governments and businesses must radically rethink how healthcare is accessible and provided; digitally enabled care is no longer a nice-to-have. Unprecedented opportunities are being created to change the way healthcare has historically been provided, which has been centered on the hospital, the physician, their legacy infrastructure, and incentives to keep things as they are. Robotics and AI represent the next phase of this change.

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