Top robotic applications in medicine

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The medical robotics market is expected to grow to $20 billion by the end of 2023. Rehabilitative and surgery robotics have gained an immense popularity in the recent few years. On the other hand, there are companies that have successfully managed to bring robotics to medication and pharma management, bring paralysed patients to walk again with the help of robotic exoskeletons, and overcome doctor shortage through telepresence robots. Soon there will be a time when the elderly will be able to avoid major health problems due to alienation and loneliness by opting for a robotic companion.

Healthcare systems around the world continue to evolve to deliver better services to patients. Over the period of last few years, a special attention has been paid to bring automation into healthcare systems. It is believed that automation of healthcare delivery systems empowered by robotic technology and artificial intelligence will ensure its long-term sustainability.

The automation of healthcare services is a great way to solve some of the biggest problems of the industry today. For example, the workforce in the healthcare industry has a lot to do manually apart from just taking care of the patients. Additionally, there is a great shortage of doctors around the world. A report published by the Association of American Medical Colleges predicts the shortage of doctors to grow worse in the US in the coming years. The report estimates a shortfall of 34,600 to 88,000 doctors by the year 2025 in the US.

Then there are ever increasing the cost of medical care, the demand for home-based solutions for the aging population, longer waiting time for to seek treatment, and the shortage of manpower. This may have a great impact on patient care if nobody comes up with an innovative and sustainable solution to tackle some of the biggest problems of the healthcare industry today.

Robotics and artificial intelligence are two disruptive technologies that have already started to revolutionise the way how healthcare is delivered to patients across the globe. According to a report published by Credence Research, the global medical robotics market was valued at $7.24 billion in the year 2015. It is expected to nearly triple and grow over $20 million in the next five years.

This isn't surprising at all – robotic applications take care of some of the long-standing problems in the field of healthcare. It not only takes over monotonous tasks off the plate of the healthcare workers but also makes patient's life easier and more comfortable.

It is, in fact, amazing to see how not only healthcare delivery systems but the innovations in the field of medical robotic technology have changed over the last few years. Gone are the days when surgical robotics was the big thing in the field of medicine. A number of companies have now come up with novel robotic solutions that intend to change the lives of the healthcare professionals and patients in the most transparent, dramatic, and efficient manner.

This post talks about some of the most recent robotic applications in the field of medicine, idealised and made available by leading companies in the world. There are a huge number of robots with varied applications in the field of medicine. However, this article addresses some of them with great applications in surgery, pharmacy, clinical management, and the elderly care.

Robotic applications for surgery

The global medical robotic system market was valued at $5.48 billion in the year 2013. The same is expected to cross the $13 billion mark this year. As expected, surgical robots will have the largest revenue share in this shift.

Surgical robots entered the operating theatres quite sooner than any other robotic application entered any area of medicine. Almost all globally renowned hospitals now make use of the most popular da Vinci Surgical System, which was introduced almost 15 years ago. This novel technology, launched by the company Intuitive Surgical, was first approved by the Food and Drug Administration (FDA) in the US for general laparoscopic surgery.

The robotic system, fully controlled by the surgeon in the operating room, is now used to conduct surgeries across several specialties. In fact, robotic surgery for knee replacement, hernia repair, cancer removal, and colon resection is now offered across the globe.

Soon, da Vinci Surgical System will be taken over by a "better surgical robot" named Verb Surgical being built collaboratively by Google and Johnson&Johnson. It is expected to be a cheaper surgical robot (most of the surgical robots are priced dearly) that is just 20 percent the size of the da Vinci System.

The CyberKnife System launched by Accuray has gained quick popularity as well, after da Vinci System. It is now available at more than 150 different hospitals across the globe. This system is designed to target inoperable and complex tumours with precise and accurate amounts of radiation. It is a great option for patients who are looking for an alternative to surgery if it cannot be performed because of the critical location of the tumour.

The Flex Robotic System by Medrobotics receives FDA back in 2015. This has an exquisite snake-like design that allows the surgeons to access the hard-to-reach areas such as throat, nose, and ear to conduct minimally invasive surgery. Another technology called Senhance Robotic Surgical System, launched by Transentrix, has already been approved in Europe. The company is trying to get the technology approved in the US as well.

California-based Hansen Medical, on the other hand, manufactures a special type of surgical robotic technologies – catheter-based robotic system for electrophysiology procedures and Magellan Robotic System for vascular diseases.

Robotic applications for pharmacy

Automation not only makes the lives of the surgeons easier but of all people across the healthcare spectrum. Pharmacists and nurses are no different. Robotics has, so far, been able to tackle two of the biggest monotonous duties that may burden the supporting staff – workflow and medication management.

The TUG Robot, launches by Aethon in 2004, is capable of carrying more than 992 pounds worth of medications, laboratory specimens, and other material by carrying multiple racks. This special robot is being used across 140 different hospitals in the US and makes over 50,000 deliveries each week.

Pharmacy automation was further given a boost by Innovation Associates in the 1990s. So far, the company has come up with a number of pharmacy automation technologies but PharmaASSIST ROBOTx continues to remain the favourite one across hospitals. It comes with a robotic medical dispenser system and data mining capabilities that enables the staff to look into its efficiency as and when required.

Exoskeletons such as Ekso Bionics, WAM Arm, HAL Robot, and ReWalk Robotics are essentially wearable suits that can allow people to lift huge weights or help with the proper movement of specific body parts. The availability of these exoskeletons has made it possible for people with paralysed arms and legs to lift things and walk again perfectly.

Robotic applications for clinical management

The shortage of clinical staff – doctors and surgeons – is a worldwide phenomenon. According to the World Health Organization (WHO), there is a shortage of more than 4.3 million physicians around the world. Training enough number of people at the same time to curb that shortfall seems like a distant possibility and this is where the usefulness of telepresence robots come into play.

[Intouch Health](#) is one such novel solution that provides access to medical care to people in remote locations and to those who cannot have access to emergency and high-quality medical care. This technology works the other way around as well. Through Intouch Health, physicians and surgeons in remote areas can have access to specialty services to treat people within a remote community.

VGo Communications is yet another technology that lets doctors and nurses monitor their patients in hospitals, nursing units, or in their home. It allows video communication with the patient and is an extremely useful patient engagement solution for healthcare.

Robotic applications for elderly care

It has been observed that loneliness among the elderly can cause a number of major health problems, including depression. The feeling of alienation can now be well-tackled with the help of robotic companions, specially designed to connect with the elderly and make their lives easier and enjoyable.

[Sam the robot](#), launched for testing among the senior community in Washington D.C. by Luvozo PBZ in 2015, is a human-sized robot. It can provide companionship and non-medical care for people living in the long-term care settings. It can not only deliver care but also improve patient satisfaction scores among the elderly by being there for them around the clock.

In the year 2006, Honda launched a full humanoid robot named ASIMO. It can not only walk but also push a cart, climb steps, run, recognize faces, and comprehend and respond to simple voice commands. It remains one of the most advanced humanoid robots.

Pets have long been regarded as human's best and loyal friend that can reduce stress and anxiety and eliminate loneliness. Along the same principles, Japanese company AIST launched an interactive robot PARO, which comes in the shape of a seal with artificial fur. It is a therapeutic robot that makes people feel comfortable as if they are being accompanied by a real animal.

The robotic industry is continuously evolving and so is its applications in the medical industry. Soon there will be a time when the medical staff could totally divert their attention to just patient care as efficient and cost-effective robots take over the monotonous and manual jobs that they keep themselves invested in.

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