

Lesson 5 Human-Centered Tech Innovations

Reading 1

The Future of Health Technology

Medical innovations have occurred through human history, constantly advancing our ability to treat diseases. Some of the most astonishing advancements include the first vaccine for smallpox in the 18th century, the discovery of antibiotics in the 1920s, and the first successful organ transplant a few decades later. Now, healthcare science is on the edge of a technological revolution that will fundamentally change the way we care for our bodies. Three of the most promising technologies that are likely to revolutionize healthcare include nanobots, 3D-printed organs, and internalized medical devices.

Nanobots

The concept of using tiny autonomous devices to prevent or cure diseases may sound like something out of a science-fiction story, but it is actually becoming a reality. Scientists have created robots that are no bigger than a human egg cell and as thin as a single hair. These minute robots can be designed to navigate through target body sectors such as specific blood vessels, cells, or organs and to carry out various tasks including disease diagnosis. It is hoped that these devices will evolve to travel through the body and diagnose diseases at an early stage by identifying specific viruses or abnormal cell activity.

Another promising application of nanobots is to deliver drugs and provide treatments. Nanobots are expected to transport drugs directly to affected areas within the body and release them in a controlled manner, thereby making treatments safer and more effective. Scientists also hope that they can be programmed to selectively target and destroy cancer cells while leaving healthy cells unaffected.

3D-Printed Organs

The global lack of organs available for transplants is a serious problem. More than a hundred thousand transplants involving kidneys, hearts, lungs, and other organs are performed each year. Unfortunately, this is only about 10 percent of what is needed. To combat this problem, researchers are developing biomaterials that can function like human cells in the hope of using 3D printers to create artificial human organs.

3D printing is a technology used to produce three-dimensional objects like product samples and artworks. This technology is useful in creating artificial organs thanks to its ability to recreate complex networks of blood vessels and organ systems.

Researchers have already created 3D-printed skin, bones, muscles, blood vessels, and even minute organs, but these printed organs still require approval for human use. However, scientists are working on a 3D printing process that uses the patients' own cells for growing organs so that the transplanted organs will not be rejected. Many researchers now believe that within the next 20 to 30 years it will be possible to 3D-print complete organs for transplantation into humans.

Internalized Medical Devices

When we think about medical devices, we usually imagine external objects like sensors and scanners. But medical devices can be inserted into our bodies. Internalized medical devices can monitor different aspects of how our bodies function and provide real-time data through the Internet of Things (IoT). These devices will be especially useful for a remote healthcare service that allows patients to consult with doctors and receive medical treatment from a distance. Currently, scientists are testing a tiny device that can be placed anywhere inside the body and wirelessly transmit real-time data about blood pressure and heart rate to an external system, which allows healthcare professionals to monitor patients remotely.

Internalized medical devices can also be placed into the human body to support organ functions. Such devices include pacemakers and deep-brain electrical stimulators. Pacemakers are implanted in the chest to regulate abnormal heart rhythms by using electrical impulses. Similarly, deep-brain electrical stimulators are implanted in the brain to reduce the symptoms of certain disorders. These devices help keep brain activity normal by delivering electrical impulses to specific areas of the brain.

Revolutionary technologies like these show how rapidly health science is now evolving and how researchers are actively exploring new ways to improve healthcare with the help of cutting-edge technologies. While scientific research involves lots of trials and setbacks, the scientific community is trying to bring these exciting new innovations into use in the coming decades. As we look to the near future, these advances are set to introduce a new era in which people live healthier and longer lives worldwide.

Reading 2

How AI Will Completely Change Our Lives

Artificial intelligence (AI) is the simulation of human intelligence in machines, often referring to their ability to interpret massive amounts of data and carry out tasks. From smartphones to chatbots, AI is already everywhere and is continuously redefining our lives.

AI-Powered Smart Cities

Today, cities are on the edge of their most revolutionary transformation ever with the integration of AI and urban infrastructure. In a smart city, everything talks to everything else. Picture this: Traffic lights adjust in real time based on traffic flow, streetlights become dull when no one is around, and security cameras respond dynamically to unusual events. Cars, too, instantly alert one another about sudden stops or changes in direction. Roads thus become safer, and AI optimizes routes in real time.

All of this is possible because of a vast network of sensors and devices that continuously monitor the environment and transmit data to each other. At the core of this hyper-connectivity is AI. Using the immense amount of data generated by urban systems, AI identifies patterns and trends, which provides the foundation for a data-based urban infrastructure.

The Future of Personalized Healthcare with AI

AI will redefine healthcare as a data-driven industry. By collecting healthcare data ranging from patient records to DNA sequences, AI can help doctors provide truly personalized healthcare. Indeed, AI can assist in diagnosing diseases and providing personalized treatments, based on an individual's genetic information and medical history. As a personal health guardian, an AI system can even predict potential issues and send out alerts at the earliest sign of trouble. Therefore, AI promises a future where healthcare is optimized for disease prevention and treatments for each individual and thus ensures the highest standards of patient care.

AI Assistants in the Workplace

AI can assist professionals such as researchers, analysts, lawyers, and journalists in swiftly searching for and gathering relevant data. AI assistants can also schedule meetings, manage planners, and even draft basic documents. These AI-driven changes will enable professionals to redirect their energy to making decisions about more complex issues and achieving innovation.

In the hazardous environments of mines, AI-powered machines can perform dangerous tasks like digging and transporting materials. AI sensors and cameras can protect human workers from dangers by monitoring mines for signs of structural weakness or potential collapse. In warehouses, automatic forklifts and warehouse systems powered by AI can ensure that products are efficiently stored and accessed. AI can predict needs and optimize space while robots can pack and sort products faster than humans.

The rapid development of AI technology has triggered concerns that AI will one day replace humans in the workplace. AI will indeed replace some jobs that involve mechanical and repeated tasks. However, it is unlikely that AI will completely replace humans in areas that require empathy and cooperation. AI will complement human capabilities and foster human creativity. We should therefore ask ourselves how we can work with AI to achieve higher levels of productivity and innovation.

There are also concerns that AI systems could be manipulated for harmful purposes and that the personal data collected by AI could be leaked. However, many AI researchers and developers are actively working on creating AI systems that guarantee transparency and human control. They are striving to take strong privacy protection measures, which involve making data unidentifiable and acquiring consent for how the data is used. They are also incorporating strong security measures to protect AI systems from unauthorized access. Above all, it is crucial that industries and governments collaborate closely to develop and share guidelines on the ethical use of AI. Only then can we look forward to a future in which AI inspires trust and is embraced for the benefits it provides.