

# CHAPTER 1

## **Introductory**

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### **1.1 INTRODUCTION**

New and innovative technologies are rapidly appearing in today's fast-paced world, and these advancements have become integral to our daily lives. Technological advance is a term that refers to developing and improving technology, tools, machines, and techniques to accomplish tasks or solve problems. It involves creating new knowledge, products, and services that enable individuals and organizations to be more productive, efficient, and effective in their operations. Technological advances can come in the form of improvements to existing technology, the creation of new products or processes, or entirely new fields of technology. It includes the development of computers, the internet, mobile devices, renewable energy sources, and medical advancements such as vaccines and disease treatments. These advances have profoundly impacted people's lives, transforming how people work, communicate, and interact with the world. Agriculture, education, and healthcare are just a few of the many industries that have benefited from technological development. One of the technological advances in the agriculture sector is called smart farming. Smart farming refers to adopting information and communication technologies to enhance, monitor and automate agricultural processes and operations (Sadiku et al., 2020). The technologies include in smart farming are the Internet of Things (IoT). The IoT in agriculture can increase the product's quality, quantity, and cost-effectiveness,

which can also meet the food demands in the coming years. Sensors can also be used in agriculture to collect information such as soil moisture, fertilization, temperature, and humidity so that the farmer can use that data to channel their water resources (Walter et al., 2017). In addition, autonomous system, robotic and artificial intelligence techniques have been developed at different agricultural production levels, such as mechanical weeding, fertilizer, or harvesting crops (Sadiku et al., 2020).

Furthermore, technological advances in education have been gaining attention for the past few years. According to research by Korostelev et al. (2019), students' levels of independent work, an essential part of the learning process, increase dramatically after using multimedia simulators in the classroom. A study from Ahir et al. (2020) describes the various applications of Virtual Reality (VR) as technological advancement in different fields such as education, military, and sports (Ahir et al., 2020). VR provides a safe environment for dealing with more significant risks without fear. Using video games-based technology in the classroom increases the students' focus and understanding.

Consistently with technological developments, the healthcare sector has undergone rapid and profound change in recent years. New technological innovations, such as electronic health records and wearable health trackers, offer promising paths toward better patient care and lower overall healthcare costs. Healthcare will likely become even more cutting-edge and innovative as providers continue to investigate the potential of technology. Technological advances have provided opportunities to improve patient outcomes, increase efficiency, and reduce costs.

Information and communication technology, which has been expanding rapidly since the turn of the 21st century, has

helped remove many barriers to providing healthcare services and bringing them to people in underdeveloped regions. E-health, the emerging paradigm in healthcare delivery, seeks to enhance both individual and community health by fully utilizing the possibilities presented by modern Information and Communication Technologies (ICT) (Günaydin et al., 2016). A researcher has stated that using ICT tools will be beneficial to establish new healthcare services which all people can reach. This solution is practical in low and middle-income countries where the access to healthcare services, the quality, and cost of the service is a problem (Lewis et al., 2012).

One of the examples of healthcare technology is telemedicine. Telemedicine has become an increasingly popular method of providing healthcare services. Research shows telemedicine can improve patient access to healthcare, reduce healthcare costs, and improve patient satisfaction (Bashshur et al., 2016). WHO describes telemedicine as conducting diagnosis, treatment, and prevention of diseases via information exchange through information and communication technologies with all health personnel. It also increases the health quality of individuals and the public by maintaining the continuous training of the providers of health services (Vitacca et al., 2009). In other words, telemedicine applications aim to provide clinical support, enable individuals living far away from each other to overcome geographical obstacles via communication and improve health outputs using different information and communication technologies.

This edited book will further explore the potential implementation of emerging technologies to solve different problems in medical and healthcare application problems. The topics covered mobile human-computer interaction, human gait identification, hand rehabilitation, machine learning in