Chapter 1
Assistive Technology and Secure Communication for AI-Based E-Learning

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ABSTRACT

Assistive systems are growing rapidly with assistive technology (AT) in all sectors and organizations around the world. To protect the content and resources of an assistive system, AT instructors need to ensure they are secure. The aim of this research is to enhance the learning capacity, training facility, self-learning, security of E-learning links, and reusability of e-learning tools. Here, the accessibility of these links and services for improving the assistive system depends on the emerging AT. The method proposed for this research is artificial intelligence (AI) which enhances all aspects of assistive systems. A virtual learning environment (VLE) is one of the academic E-learning tools integrated with AI which enhances the learning capacity and other required facilities. As a result, low-cost assistive tools with easily upgradable solutions according to the individual learning disability are identified. Further, the results attained are analyzed, discussed, and the performance of identified assistive tools with AI concepts is summarised.

INTRODUCTION

The term E-learning is introduced in the assistive systems to improve the learning facilities in some places where people are affected and disabled by many reasons

including war. With modern medical achievements and technology, future babies can be designed and delivered without any disability conditions. It means that the use of assistive tools may be decreasing but war and natural disasters create more disabled people. To improve the academic life of these people, the E-learning plans and VLE of the assistive tools can be developed for improving the assistive systems. Although several developments with AI and AT are considered in E-learning for securing VLE, the security issues within the assistive systems expect many challenges such as the cybersecurity of ChatGPT. These challenges will open many research directions involved with secure and proactive assistive systems.

Assistive AI models designed to support many sectors provide equal opportunities to all disabled employees and support clinicians in enhancing medical systems (Hubbard, Cox, & Redd, 2023). Integrating mixed reality and the Internet of Things (IoT) as an AT for elderly people simplifies the assistive systems with many services and facilities (de Belen, Bednarz, & Favero, 2019). Privacy and security in assistive systems support people with special care when they use web services dedicated to the disabled population (Zezulak, Tazi, & Das, 2023). Robots as AT tools support young children with autism spectrum disorder (Arshad et al., 2020) and they can be programmed to enhance cognitive abilities and foster valuable learning experiences when these children use E-learning facilities. Underpinning implications of instructional strategies on AT for learning disability (Thapliyal, & Ahuja, 2021) allow researchers to design secure AT-based tools and assistive AI models considered in the assistive systems.

Awareness of potential risks of cyber security in assistive systems needs to be modified with modern security technologies. Secure assistive systems enhance the environments of E-learning, improve the learning capacity and provide the availability of resources. Although 100% protection is not possible in the E-learning environment of the assistive systems, maximum protection which is better than the current risk of cybersecurity problems would be possible. Understanding the threats, handling security systems and use of cybersecurity policy is not enough because most of us are merely ignoring the public rules and orders. The majority of private and public educational sectors do not have proper cybersecurity policies and still use unlicensed software tools. Cybersecurity problems depend on the environments where all illegal activities and human behavior take serious consideration. However, more mature organizations such as universities and hospitals try to manage all systems with maximum protection but obvious problems which include environmental disasters, and human behaviors are still uncontrollable.

The cost of the current security solutions in E-learning and complicated situations such as cyberbullying in educational environments are motivating us to write this paper which focuses on maximum protections against potential risks within educational environments of assistive systems. Potential problems of the daily activities within the

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