Chapter 16
Leveraging AI-Driven Cloud Services for Secure and Sustainable Enterprise Application Development in Technical and Vocational Education

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ABSTRACT

The integration of AI-driven Cloud services in enterprise application development has revolutionized how businesses build secure, scalable, and intelligent solutions. Simultaneously, sustainability in technical and vocational education (TVE) has become crucial in preparing future professionals with the necessary skills to develop and maintain eco-friendly, technology-driven solutions. This chapter explores the convergence of these two domains, emphasizing how AI-powered cloud services enhance security, automation, and efficiency in enterprise applications while fostering sustainable educational practices in TVE. It discusses the role of AI-enabled services such as cloud-based machine learning platforms, security management tools, and AI-powered DevOps solutions—in building resilient enterprise systems. Furthermore, the chapter highlights strategies for integrating cloud-based AI applications into TVE curricula to promote sustainability, cost-effectiveness, and accessibility in technology education.

INTRODUCTION

The rapid advancements in cloud computing and artificial intelligence (AI) have transformed the landscape of enterprise application development. Organizations across industries are leveraging AI-driven cloud services to enhance security, efficiency, and scalability. At the same time, sustainability has

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emerged as a crucial factor in shaping technical and vocational education (TVE), ensuring that future professionals are equipped with the skills to develop and maintain responsible, eco-friendly digital solution. The intersection of AI-driven Cloud services and sustainable education presents a unique opportunity to revolutionize enterprise application development while fostering greener and more accessible educational practices. This chapter explores how AI-powered Cloud services contribute to secure and intelligent enterprise applications and how these technologies can be integrated into TVE to promote sustainability and innovation.

Overview of AI-Driven Cloud Services

Cloud Services has pioneered the integration of AI and machine learning (ML) into cloud computing, offering a suite of services that automate decision-making, enhance security, and optimize application performance. AI-driven cloud services—such as platforms for machine learning model development, cloud-native security management, and intelligent DevOps tools, enable enterprises to build intelligent, self-optimizing applications. These services not only streamline the software development lifecycle but also introduce a proactive approach to security and resource management.

AI-driven Cloud services also extend beyond enterprise solutions, offering tools that improve cloud infrastructure sustainability. Intelligent monitoring solutions detect operational anomalies, while AI-powered automation optimizes workloads to reduce energy consumption and carbon footprint. By leveraging AI-based analytics and automation, enterprises can enhance application security, improve efficiency, and contribute to sustainable cloud computing practices.

Importance of Security in Enterprise Application Development

Security remains a top priority in enterprise application development, particularly as organizations increasingly rely on cloud infrastructure. Cybersecurity threats such as data breaches, unauthorized access, and AI-driven cyberattacks pose significant risks to businesses and end-users. AI-driven security solutions in Cloud provide enterprises with intelligent threat detection, real-time monitoring, and automated remediation strategies.

Cloud services like identity and access management and threat intelligence platforms offer AI- powered security controls that help organizations enforce compliance, detect anomalies, and prevent unauthorized access. AI-driven security automation also minimizes human error, ensuring that applications remain resilient against emerging cyber threats. By integrating AI into enterprise security strategies, organizations can build more robust, self-healing applications that adapt to evolving security challenges.

Sustainability in Technical and Vocational Education (TVE)

The growing emphasis on sustainability in education has reshaped the way technical and vocational education institutions prepare students for the workforce. With digital transformation becoming a key focus, TVE must adapt to equip students with the skills required for cloud computing, AI, and cyber security. Sustainable education practices emphasize digital learning, cloud-based training labs, and AI- driven simulations, reducing reliance on physical infrastructure and minimizing environmental impact. Cloud supports sustainability in TVE through cloud-based learning platforms, AI-driven skill assessments, and virtualized training environments. Cloud based education programs provide students

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