Chapter 4
Smart Education Using Explainable Artificial Intelligence

Nikita Sharma
https://orcid.org/0000-0001-8044-9665
Poornima University, India

ABSTRACT

Explainable AI (XAI) is revolutionizing the field of education by improving the efficacy, transparency, and trustworthiness of AI-powered solutions. The theoretical underpinnings of XAI are examined in this chapter, along with a comparison between XAI and standard AI with an emphasis on the value of interpretability in educational settings. The potential of model-agnostic approaches like SHAP, LIME, and counterfactual explanations, as well as model-specific approaches like decision trees, attention mechanisms, and linear models, to improve the interpretability of AI judgments is examined. Saliency maps and rule extraction are two examples of rule-based and visually driven explanations that help achieve this objective. The chapter ends with a discussion of the potential of XAI in promoting fair, open, and efficient AI-driven learning environments, as well as the necessity of further research to address the related issues.

DOI: 10.4018/979-8-3693-8151-9.ch004

INTRODUCTION

Overview of Smart Education

Learning can now be done more conveniently, efficiently, effectively, and flexibly in light of the advent of new technologies. Through the use of smart devices, students can access digital materials via wireless networks and engage in individualized and seamless learning experiences. Considering "smart education", which characterizes instruction in the digital age, is becoming more and more popular [Zhu et al., 2016]; [Demir, 2021] define smart education is "the appropriate pedagogical approach combined with an effective and cohesive use of technologies for communication and information to reach an academic outcome". An alternative definition from [Zhu and He, 2012] states that "Building intelligent classrooms with smart technology is the cornerstone of smarter learning, so that innovative teaching methods can be facilitated as to provide specific learning services and empower students to develop skills of wisdom that have more powerful conduct ability, more refined thinking, and better value direction". In smart education, "smart" means perceptive, tailored, and flexible. "Smart" in the context of educational technology refers to the ability to carry out a task success- fully and economically [Spector, 2014]. Technology encompasses both software and hardware. When referring to hardware, "smart" means significantly more compact, inexpensive, and portable. Using smart gadgets (Google Glass, laptops, and smartphones) to facilitate learning at any time and from any location is a successful strategy. "Smart" in software refers to being versatile and adaptive. Personalized learning using adaptive learning technologies such as Big Data, Cloud Computing, Analytics for Learning, Adaptive Engines, and others is an effective way to meet each learner's unique needs. Smart education means learning anytime anywhere. Smart frameworks, smart gadgets, and smart technology offer academic and training institutions new and unparalleled opportunities in terms of innovative teaching and learning methods, services for both on-campus and remote/online pupils, and the configuration of cutting-edge labs and classrooms [Simon et al., 2004].

In the present scenario, use of technologies like Artificial Intelligence, Block Chain, 5G, Computational Intelligence, Internet of Behavior (IoB) etc. help in boost the productivity and attractiveness of the Smart Education and it add new experiences to learning, teaching, assessment, pedagogy and classroom management. With the help of technologies, smart education creates a digital environment which motivates and attracts pupils, teachers, parents and administrators for encouragement. In the context of smart education, the term "smart" represents the broad minded, effective decision making, innovation, learning methodology, use of technology, open communication and adaptability. Smart education is a way to change tradi-

Directional Multi-Scale Stationary Wavelet-Based Representation for Human Action Classification

M. N. Al-Berry, Mohammed A.-M. Salem, H. M. Ebeid, A. S. Husseinand Mohamed F. Tolba (2017). *Handbook of Research on Machine Learning Innovations and Trends (pp. 295-319).*

www.irma-international.org/chapter/directional-multi-scale-stationary-wavelet-based-representation-for-human-action-classification/180951