Chapter 5
AI in 6G Network Security and Management

Deepak Varadam
https://orcid.org/0000-0002-6079-4805
Ramaiah University of Applied Sciences, India

Sahana P. Shankar
https://orcid.org/0000-0001-8977-9898
Ramaiah University of Applied Sciences, India

Nidhi N. P.
Ramaiah University of Applied Sciences, India

Vinay Dubey
Ramaiah University of Applied Sciences, India

Aaditi Jadwani
Ramaiah University of Applied Sciences, India

Shaik Falak Taj
Ramaiah University of Applied Sciences, India

Sahil C. T. Uthappa
Ramaiah University of Applied Sciences, India

Aryan Bharadwaj
Ramaiah University of Applied Sciences, India

ABSTRACT

Various global institutions are exploring the potentials and hurdles of 6G communication networks to address the security shortcomings of existing 5G networks while capitalizing on the promises of 6G for heightened privacy and dependability. Artificial intelligence (AI) emerges as a solution with minimal drawbacks and reduced expenses. This chapter delves into diverse applications where AI integration can prove advantageous. AI has undergone substantial evolution, transitioning from network diagnosis and monitoring to optimizing large-scale systems. Advanced

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algorithms bolster network security by continuously updating and identifying vulnerabilities. Furthermore, AI facilitates the creation of innovative networking models like intent-based networking, streamlining network configuration based on user needs. The integration of AI with networks has witnessed increased usage, such as cost reduction in managing IoT data and enhanced efficiency in healthcare systems through fuzzy classifiers.

INTRODUCTION

Various global institutions are exploring the potentials and hurdles of 6G communication networks to address the security shortcomings of existing 5G networks while capitalizing on the promises of 6G for heightened privacy and dependability. Artificial Intelligence (AI) emerges as a solution with minimal drawbacks and reduced expenses. This article delves into diverse applications where AI integration can prove advantageous.

AI has undergone substantial evolution, transitioning from network diagnosis and monitoring to optimizing large-scale systems. Advanced algorithms bolster network security by continuously updating and identifying vulnerabilities. Furthermore, AI facilitates the creation of innovative networking models like Intent-Based Networking, streamlining network configuration based on user needs.

The integration of AI with networks has witnessed increased usage, such as cost reduction in managing IoT data and enhanced efficiency in healthcare systems through fuzzy classifiers. Nonetheless, manual network configuration remains a bottleneck for extensive and intricate networks, underscoring the necessity for future technologies like 6G, promising AI-driven solutions to surmount current limitations.

Despite the advent of 5G, its societal impacts remain largely uncharted, with limited research elucidating its architecture and services. Edge AI emerges as a pivotal component of both 5G and 6G technologies, optimizing bandwidth and latency by distributing computations between the cloud and network components. However, integrating AI with edge computing poses challenges due to inherent disparities in their architectures.

AI systems excel in pinpointing network issues and optimizing resource allocation, particularly in managing large-scale IoT systems where edge computing offers decentralized control and context awareness. Challenges persist in coordinating communication and resource usage for concurrent applications, necessitating AI-driven algorithms for decentralized system control and resource sharing.

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