Editorial

As digital connectivity, cybersecurity, and sustainable energy systems become increasingly intertwined with everyday life, research is moving beyond conceptual proposals toward deployable, user-friendly, and evaluative frameworks. The three papers highlighted in this editorial exemplify this shift by addressing seamless private network connectivity for mobile users, methodological rigor in assessing DDoS defenses, and intelligent optimization of renewable energy infrastructure. Together, they reflect a broader emphasis on practicality, proportional response, and sustainability in modern engineering and networked systems.

The first paper explores an expanded role of mobile data services, positioning cellular networks as gateways to private local networks rather than mere Internet access providers. Targeting Small-Office and Home-Office users, the study recognizes the necessity of plug-and-play solutions that require minimal technical expertise. After examining conventional approaches for remote connectivity, the paper introduces an alternative concept based on surrogate devices using Linux MACVLAN interfaces, policy-based routing, and network address translation. Implemented on the widely adopted OpenWrt platform, the solution demonstrates how mobile devices can be seamlessly integrated into private networks. Results from a friendly-user trial confirm that the proposed approach effectively meets usability and deployment goals, highlighting its potential for broader commercial adoption [1].

The second contribution advances the field of network security by proposing a concrete severity classification and evaluation framework for Distributed Denial of Service attacks. Moving beyond binary detection models, the study introduces a quartile-based classification scheme that categorizes traffic severity using multidimensional thresholds derived from packet length, packet rate, and bandwidth consumption. This framework enables more nuanced and proportional defensive responses. Additionally, the paper provides a comparative evaluation of DDoS mitigation strategies deployed at different network levels, offering operational insights into their respective strengths and tradeoffs. By emphasizing methodological clarity and evaluative consistency, this work lays the groundwork for adaptive, programmable, and automated defense mechanisms in future network infrastructures [2].

The third paper addresses the urgent global challenge of energy efficiency and climate change through the optimization of smart and renewable energy systems. Focusing on transformer design, the study proposes a hybrid optimization framework that combines nonlinear programming with genetic algorithms to enhance efficiency while avoiding harmful radiation. The results demonstrate notable gains in energy savings and cost reduction, reinforcing the role of intelligent design optimization in sustainable power systems. By integrating AI-driven techniques with traditional optimization methods, the work contributes to the development of robust, environmentally responsible energy infrastructure [3].

Collectively, these studies highlight a common trajectory toward solutions that are not only technically sound but also user-centric, evaluative, and sustainability-driven. From enabling seamless private connectivity for non-technical users and introducing proportional, metrics-based cybersecurity defenses to optimizing smart energy components for efficiency and environmental responsibility, each contribution addresses real-world challenges with implementable frameworks. Together, they underscore the growing importance of practical innovation in shaping secure, efficient, and sustainable digital and energy ecosystems.

References:

[1] D. Henrici, A. Boose, "Connecting Mobile Devices Transparently with the Customer Network in a User-Friendly Manner," *Journal of Engineering Research and Sciences*, vol. 4, no. 10, pp. 1–8, 2025, doi:10.55708/js0410001.

[2] E. Eyadat, M. Eyadat, A. Alfaqih, "Unveiling the Evolving Threat Landscape of Distributed Denial-of-Service (DDoS) Attacks Methodology and Security Measures," *Journal of Engineering Research and Sciences*, vol. 4, no. 10, pp. 9–20, 2025, doi:10.55708/js0410002.

[3] S.O. Oboma, E. Lambart, "Energy-Optimized Smart Transformers for Renewable-Rich Grids," *Journal of Engineering Research and Sciences*, vol. 4, no. 10, pp. 21–28, 2025, doi:10.55708/js0410003.

Editor-in-chief

Dr. Jinhua Xiao