SOMNet: Self-Optimizing mobility management for resilient 5G heterogeneous networks	
Authors	**Abdulraqeb Alhammadi, Zool Hilmi Ismail, Ibraheem Shayea, Zaid Ahmed Shamsan, Majid Alsagabi, Sulaiman Al-Sowayan, Sawsan Ali Saad, Mohammad Alnakhli**
Publication Year	2024
Grant Number	IMSIU-RG23042
DOI link	10.1016/j.jestch.2024.101671

Abstract: Effective mobility management in heterogeneous networks is significant in ensuring seamless handovers (HOs) between diverse cell types, especially as users move between macrocells, small cells, and femtocells. The widespread and overlapping deployment of diverse cells raises the HO probability occurrence massively, particularly when users are on the move and connected to multiple cells simultaneously to ensure uninterrupted connectivity. This phenomenon leads to an increase in HO ping pong (HOPP) and HO failure (HOF) occurrences, ultimately degrading network performance. In this context, this paper proposes a self-optimization algorithm to address the contradiction in the optimization tasks of mobility robustness optimization (MRO) and load balancing optimization (LBO) functions. The algorithm aims to facilitate seamless user communication as individuals move across various deployment scenarios. The MRO function leverages two key parameters: the reference signal received power (RSRP) levels of serving and target cells, as well as user movement speed. On the other hand, the LBO function takes into account the traffic load of serving and target cells to determine the suitable values of HO control parameters. Moreover, our research contributes to the present network optimization challenges and positions itself as an enabler for the seamless integration of emerging technologies. As the wireless ecosystem continues to evolve, with the advent of edge computing and network slicing technologies, our self-optimization algorithm offers adaptability and scalability to meet the evolving demands of next-generation wireless networks. This forward-looking solution benefits network operators and end-users by providing robust and efficient mobility management. The proposed algorithm demonstrates its effectiveness through comprehensive simulations by significantly reducing HOPP and HOF compared to investigated methods selected from the literature, showcasing its potential to enhance network performance and user experience.

هـ _خوجه