

Vertical handover algorithm for telemedicine application in 5G heterogeneous wireless networks

ABSTRACT

In this fast-paced technology era, the advancement of telecommunication systems has made many advanced technologies possible. With the help of the 5G technology, more technologies will become a reality and telemedicine is one of them. Numerous studies have shown that the fatal rate of ischemic heart disease cases can be reduced by sending the real-time patient health data from an ambulance to the medical centre so that healthcare professionals can make early preparation and give immediate treatment in the golden hour. 5G technology offers a high data rate and low latency. However, the coverage of 5G is small compared to 4G. It will induce a high number of unnecessary handovers when an ambulance traverses the 5G networks at high speed and lead to degradation of services quality. Therefore, a fast and accurate vertical handover decision-making algorithm is needed to minimize unnecessary handover in high-speed scenarios. This paper proposes a handover algorithm that integrates the Travelling Time Estimation, Fuzzy Analytic Hierarchy Process (FAHP) and Technique for order of preference by similarity to ideal solution (TOPSIS) algorithms to reduce unnecessary handover in 5G heterogeneous networks. The simulation results show that the proposed algorithm has successfully reduced up to 80.3% of handovers compared to FAHP-TOPSIS based handover algorithm in the high-speed scenario. The proposed handover algorithm can improve the quality of telemedicine services in high-speed scenarios.