ABSTRACT

Mobile ad-hoc network networks, known for their dynamic routing, require effective routing mechanisms to ensure optimal performance. One of the main challenges in mobile ad-hoc network networks is how to efficiently discover and maintain routes due to their dynamic nature and frequent topology changes. This study aims to address this issue by developing a machine learning-based routing mechanism, specifically using Q-learning, to optimize route discovery in mobile ad-hoc network networks.

The solution proposed in this study is the implementation of Q-learning as a routing mechanism for mobile ad-hoc network networks. Q-learning was chosen for its capability in experience-based learning, allowing for more adaptive and efficient route determination compared to conventional routing algorithms. By integrating Q-learning, it is expected to achieve improvements in throughput, jitter, and delay in mobile ad-hoc network networks compared to traditional routing protocols such as AODV, DSDV, and OLSR.

The research findings indicate that Q-learning provides better performance in route determination in mobile ad-hoc network networks. The tests were conducted using the NS3 simulator, comparing AODV, DSDV, and OLSR protocols in various scenarios, including variations in the number of nodes (20-100), node speed (1-5 m/s), and node pause time (5-25 seconds). Quantitative data analysis revealed that Q-learning significantly improves throughput, reduces jitter, and decreases delay compared to conventional routing algorithms like Dijkstra and Bellman-Ford. In conclusion, Q-learning is a more effective solution for routing mechanisms in mobile ad-hoc network networks.

Keywords : mobile ad-hoc network networks, Q-learning, routing, machine learning, NS3