

Research evaluating the performance of the Ant-DYMO routing protocol integrated with the ACO algorithm.

Hoang Van Dai

Abstract: This study evaluates the performance of the Ant-DYMO routing protocol, which integrates an Ant Colony Optimization (ACO) algorithm into the Dynamic MANET On-demand (DYMO) protocol for mobile ad hoc networks. The proposed hybrid approach leverages ACO's metaheuristic capabilities to enhance route discovery and maintenance, addressing limitations in standard DYMO such as suboptimal path selection and high overhead in dynamic topologies. Through extensive simulations in NS-2, the Ant-DYMO protocol is compared against standard DYMO and AODV under varying node mobility, network density, and traffic loads. Key performance metrics include packet delivery ratio, end-to-end delay, routing overhead, and throughput. Results demonstrate that Ant-DYMO significantly improves route stability and adaptability, achieving higher packet delivery ratios and lower latency, particularly in high-mobility scenarios. However, the integration introduces a moderate increase in computational overhead. The findings confirm that ACO-based optimization effectively enhances DYMO's responsiveness to topological changes, making Ant-DYMO a viable solution for scalable and dynamic wireless networks. This research contributes to the advancement of bio-inspired routing protocols in MANETs.

Keywords: Ant-DYMO, ACO, routing, performance