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MantaNet: A Novel MRFO-Based Routing Protocol for MANETs

Abir Betka[1], Naima Rahoua[2], Samia Noureddine[3], Abida Toumi[2],
Imane Ben guessoum[1], Rania Boughezala Hamad[1]

[1] Department of Electrical Engineering, University of El-Oued, Algeria

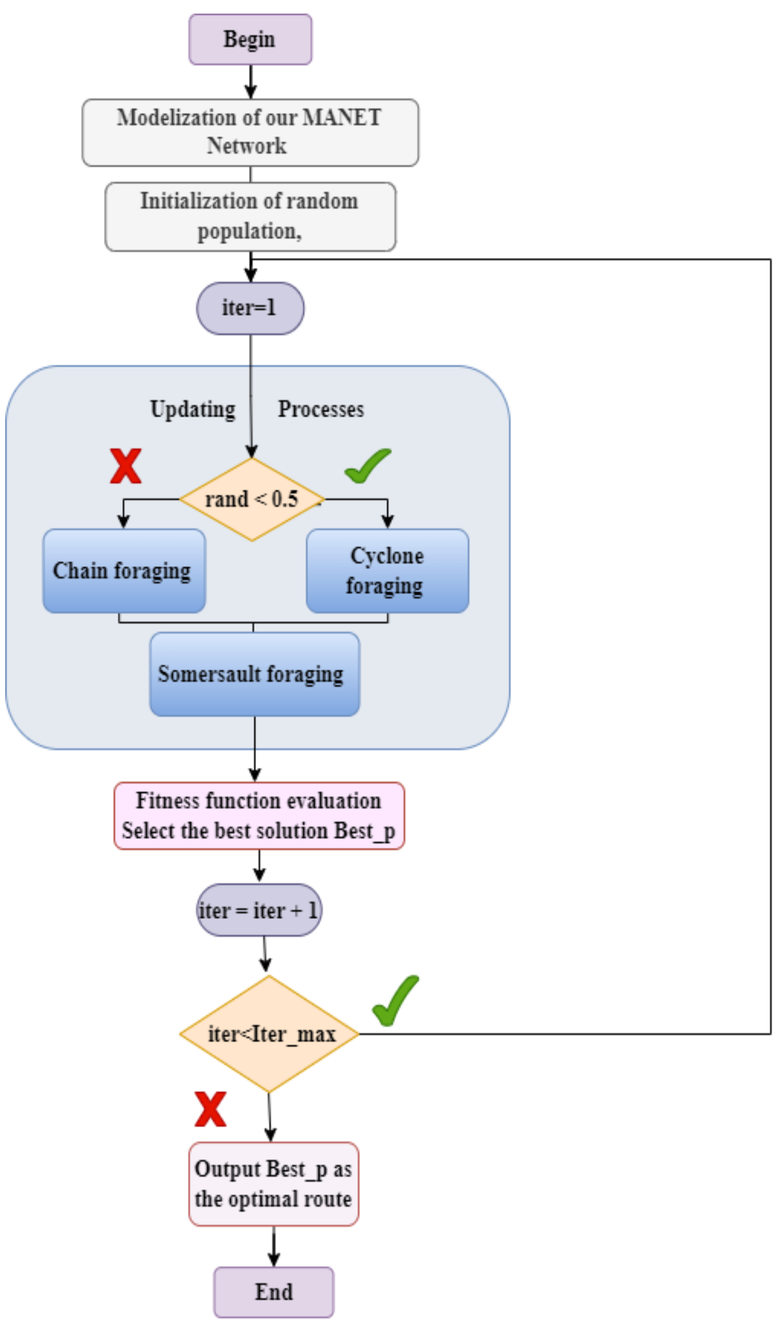
[2] Department of Electrical Engineering, University of Biskra, Algeria

[3] Department of Industrial Pharmacy, Faculty of Pharmacy; University Algiers 1

Abstract :

This study explores the Manta Ray Foraging Optimization (MRFO) algorithm for optimizing routing in Mobile Ad Hoc Networks (MANETs). MANETs are decentralized wireless networks where mobile nodes establish connections without infrastructure. We propose an enhanced MRFO-based routing protocol, MantaNet, to optimize data transmission by minimizing path distances, reducing energy consumption, and alleviating congestion. Simulations in MATLAB modeled dynamic node movement within a defined zone. The MantaNet algorithm evaluates and refines candidate routes through iterative MRFO processes. Results show MantaNet efficiently identifies optimal routes, maintaining robust performance across varying network sizes with minimal computational resources. This approach highlights MantaNet's potential for reliable and efficient MANET routing.

Manta ray foraging optimization (MRFO) Algorithm



Objective Function : *Minimization of disntace between nodes*

Simulation results

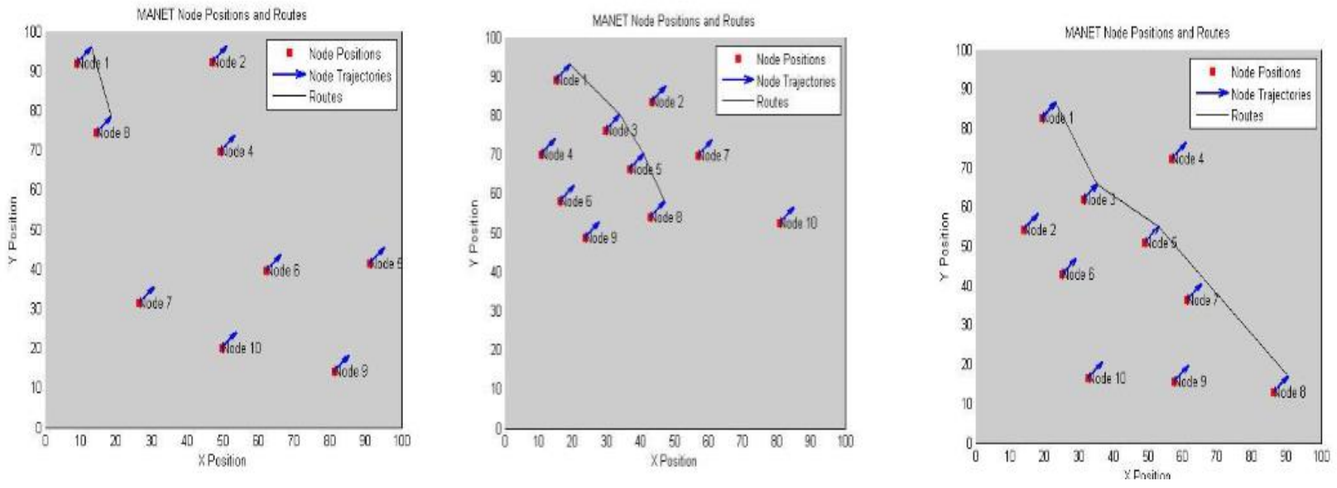


Figure 1: Network with different distance between Sender and Receiver

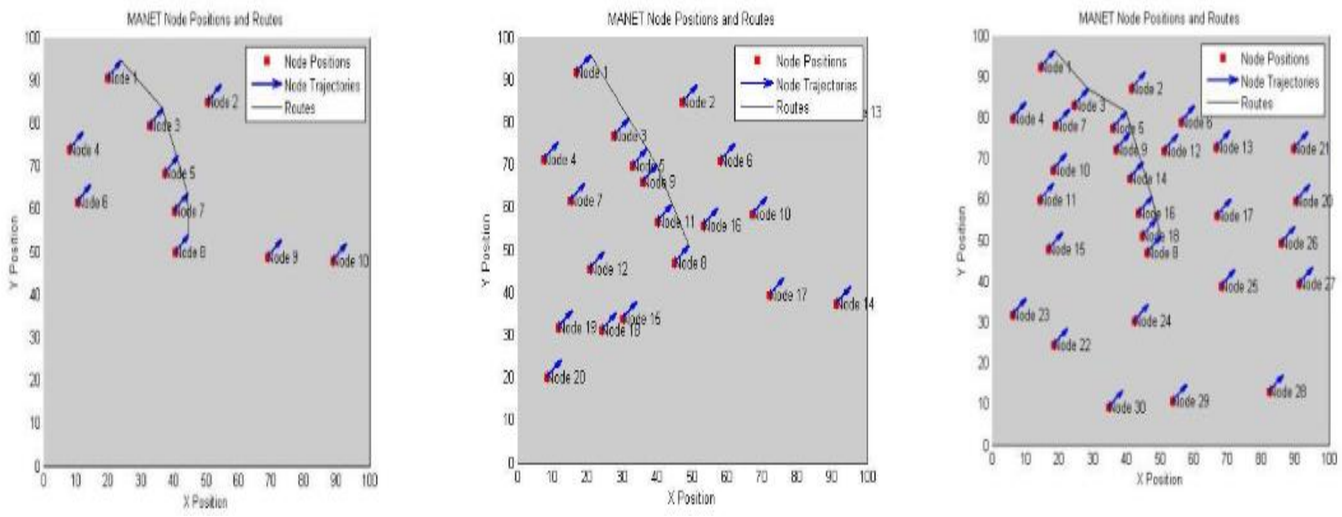


Figure 2: Network with different number of nodes

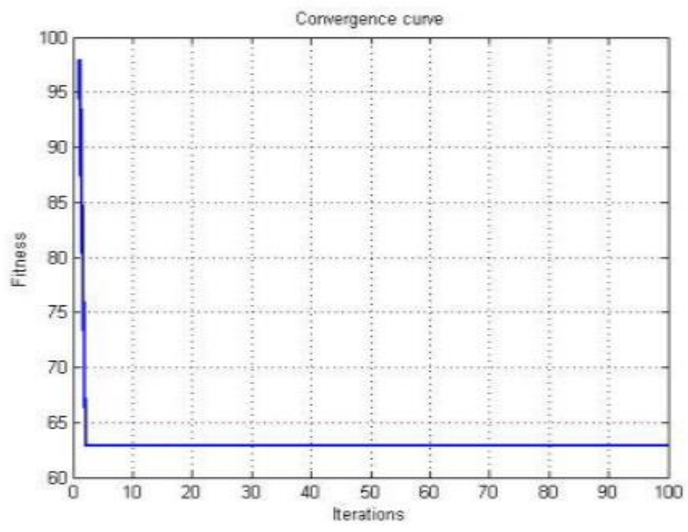


Figure 3: Convergence curves

Conclusion

The MantaNet algorithm demonstrates significant potential in optimizing routing for MANETs by efficiently minimizing path distances and reducing energy consumption and congestion. Its ability to maintain robust performance across varying network conditions, even with limited computational resources, highlights its promise as a reliable and efficient solution for dynamic, decentralized wireless networks.

References

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