

# Trust-Based Energy Efficient Secure Multipath Routing Using Hybrid Algorithm Optimization Algorithm for MANET

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## Abstract:

A wireless Mobile Ad Hoc Network (MANET) is an autonomous system of mobile nodes connected by wireless links. MANET is infrastructure less and dynamic. As the nodes have limited battery power and communicate through a shared wireless channel, it is hard to design a secure and energy-efficient routing protocol in a MANET. Consequently, the article proposes a Trust-Based Energy-Efficient Secure Multi-Path Routing Protocol (TESMRP) supported by the MANET optimization algorithm. In this method, a scheme strives to predict a stable route by selecting the most stable neighbour relative to the transmitter of the route request message and nodes impending during the route discovery process. In multipath routing, a sender node waits for intermediate multiple paths to forward the ciphertext to the destination. In a routing discovery procedure, an SN broadcasts a route request (RREQ) message to discover the DN using a generic probabilistic-based route discovery procedure. After the DN has received the RREQ message, it will begin the routing reply process and will send a routing reply (RREP) message back to the SN. It also becomes essential to monitor the constraints in intermediate nodes (multi-hop routing). As a supplementary method to improve safe data delivery in a MANET, this research proposes and analyzes the cluster head (CH) selection and optimum multipath scheme utilizing an improved fuzzy C-means algorithm. The computation is based on the trust threshold worth nodes found in addition. From the CHs, the network of interconnected hops is included, and a selection of the best routes is established using a projected hybrid protocol, and this determines the best routes by the delay, throughput, along with connectivity within this course. To accomplish such challenging objectives, the AODV protocol computes a hybrid optimization algorithm of the Levy flight distribution algorithm for optimal path selection. In addition, high energy consumption is addressed by the Firefly Optimization Algorithm to find the optimal values/fitness function for the objective parameter (i.e. energy). The performance analysis and numerical results show that the proposed protocol achieves significant performance gains in terms of energy consumption, delay, throughput, and security of routing protocols respectively.

## Keywords:

Mobile Ad-Hoc Network, Multipath Routing, AODV, Fuzzy C-Means, Levy Flight Distribution, Optimal Path, Energy Efficiency.