

1 Introduction

- Typical Network routing protocols find the shortest path by minimizing a cost over the paths. Number of hops is the most common metric to measure. Although routing in packet-switched networks using this cost metric works well, it is not guaranteed to have the same level of performance in mobile ad hoc networks (MANET) as nodes in MANET have limited resources and change their location frequently. In addition malicious nature of nodes augment the problem further.

2 Stability Problem ?

- Researchers have proposed different cost metrics like signal strength, locational stability of nodes to address the problem. However, these metrics provide a limited reliability of nodes. Therefore there is a need for more generic cost metric to find the optimal reliable path for forwarding the packets.
- There is an increase of the security concerns especially in the military sensor network

3 Requirements

- MANET has limited computation power >> New cost metric must be calculated from simple computation.
- Highly Dynamic Environments >> Nodes in MANET must adapt to the changes.
- Security Concern >> We need the most reliable path rather than the shortest path.

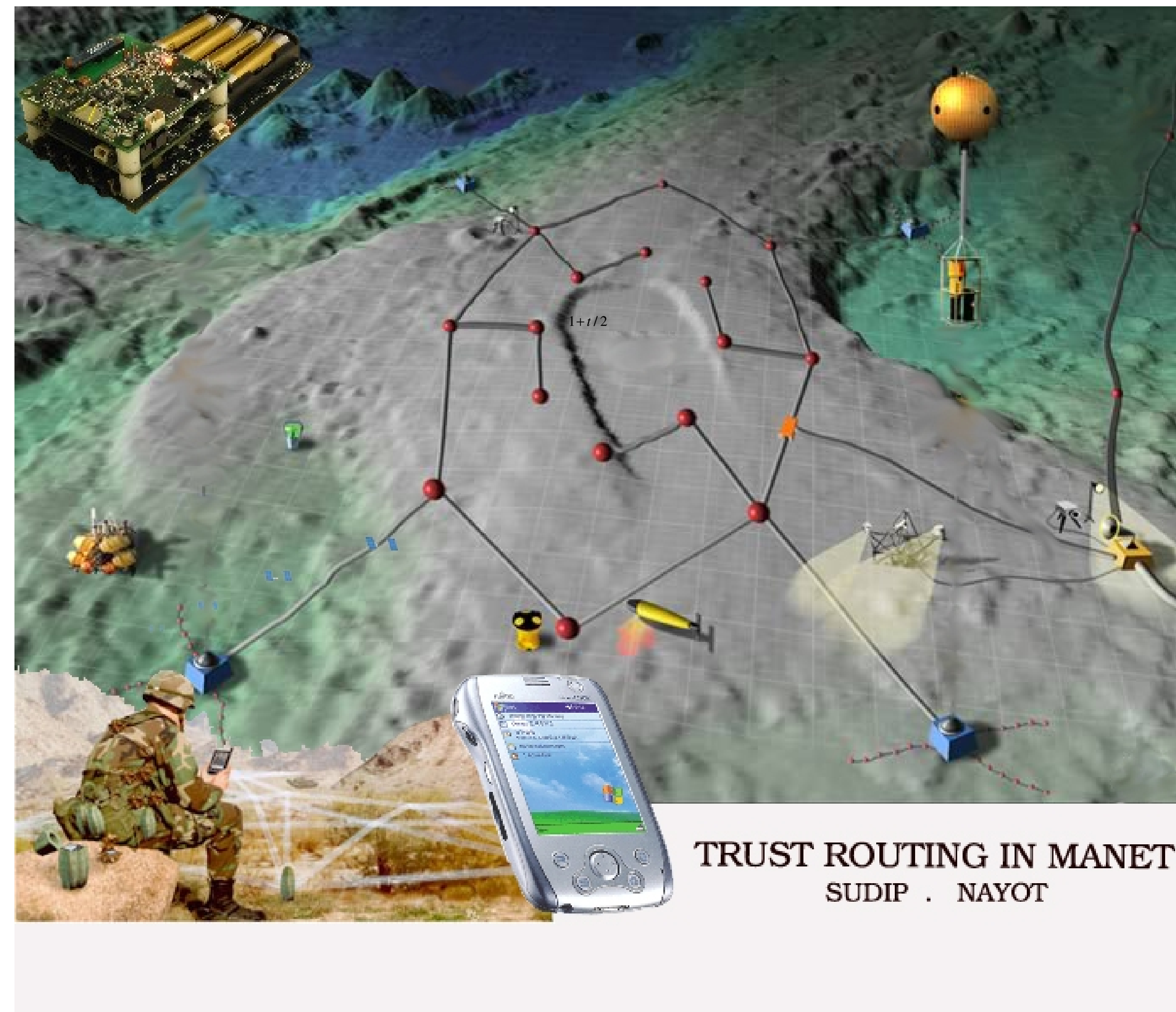
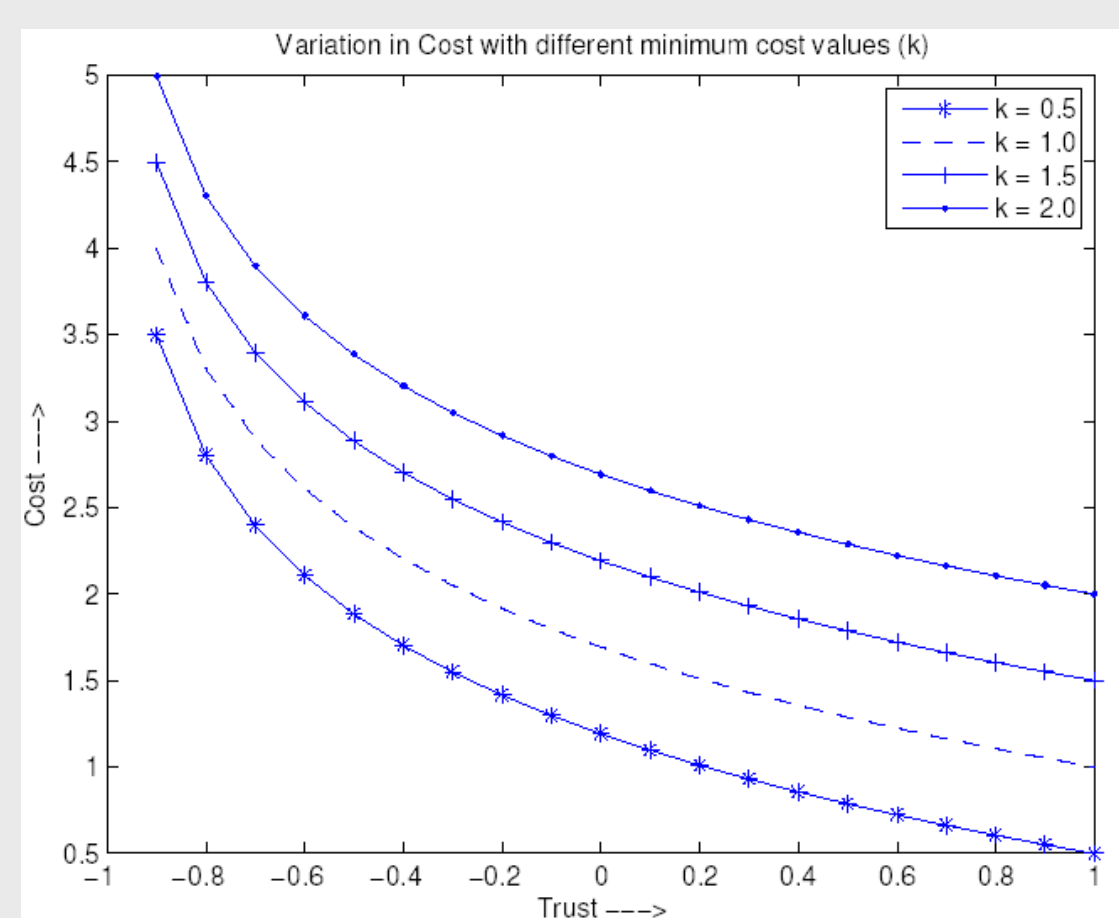
4 Approach

- We propose a trust-based routing protocol. Our protocol finds the most **reliable path** to forward a packet from source to destination.
- The **reliability** of a node is measured in terms of **trust**.
- This trust metric is used to generate the 'cost of forwarding', or simply cost. The cost metric is somewhat inversely related with the trust metric that is, higher the trust (reliability) on the node, lower is the cost.
- Then we modify the routing protocol using these costs to find the shortest path, that is the path with minimum cost. Consequently the chosen path is **the most reliable path**. This trust-based approach helps to achieve a level of confidence for the source node of reliable packet delivery even when some nodes in the network misbehave.
- To our knowledge, ours is the first attempt to incorporate a quantifiable generic trust metric into ad hoc routing in MANET paradigm.

5 The Cost Metric

- Trust values between any node pairs are based on the properties of the node, past experiences, and recommendation about a node.
- Let t be the trust metric between two entities, the forwarding cost is computed as follow.

$$cost(N_r, N_e) = Min_{cost} - \ln\left(\frac{1+t}{2}\right)$$



5.1 Node's Property

- Node property determines an ability in handling and forwarding the packets. In MANET, we select Signal strength and Signal Stability as Node's properties.

5.2 Trust Recommendation

- Each trust-aware node in MANET agrees to provide a recommendation about its neighbour upon receiving a **recommendation request**. The trust recommendation is computed by multiplying the recommendation for a particular node with the trust value between the requester and recommender.

5.3 Experiences

- Nodes in MANET rate their neighbors by past experiences. This value is measured from the historical forwarding interaction. More packets drop degrades the forwarding interaction which, in turn, degrades the past experience.

6 Conclusion

- Propose a trust-based approach to routing in mobile ad hoc networks.
- Modify the distance vector routing algorithm for routing in MANETs using the trust value.
- Trust-base routing protocol makes more reasoned decision for finding reliable path to forward a data packet as it uses intermediate nodes' properties and behaviors to select a path.