

Chapter 11

Implementing Leader Election Algorithm after Evaluation of Node Trust in MANETs

Jayanta Das
SSVASM, India

Abhijit Das
RCCIIT, India

ABSTRACT

Security and trust are two inevitable concepts for secure Manet. There are various systems used for ensuring security and trust in case of Manet. These systems have several advantages as well as several disadvantages in terms high communication and computation overhead. In this proposed trust based system, trust of node is evaluated on the basis of ratio of signal sent and acknowledgement received. After that, priority of each node is calculated and at last Leader Election algorithm is applied to select node leader.

INTRODUCTION

Wireless sensor network (WSN) is consisting with spatially dispersed and dedicated sensors for monitoring and recording the physical conditions of the universe and organizing the collected data at a central or main location. WSN is basically a system that incorporates a gateway that provides wireless connectivity back to the wired environment and distributed sensor nodes. WSN allows us to observe the event previously which is unobserved at an excellent resolution over large spatiotemporal scales.

Wireless communication (Shantanu, 2011) is not merely a buzz word, rather, it is an innovative paradigm that is successfully providing services to human being from wireless LANs (McGuffin, 1995) to mobile telephone communication, wireless PANs (Fegan, 2007), and sensor networks. Especially, last decade has witnessed tremendous growth in wireless communication that has helped to trigger and fueled the area of distributed computing. Now days, due to active research, the horizon of distributed computing has been further pushed to the field of Mobile Computing (Goodchild, 2003) with an objec-

DOI: 10.4018/978-1-5225-1785-6.ch011

Implementing Leader Election Algorithm after Evaluation of Node Trust in MANETs

tive to implement efficient solutions in wireless domain with minimal cost and reduced or less power consumption by handheld devices.

“Wireless networking (Amit Shrivastava, Overview of Routing Protocols in MANET’s and Enhancements in Reactive Protocols) is a technology that enables two or more computers to communicate using standard network protocols, but without network cabling” (Gawali, 2012). And now there exist network protocols that are developed just for the implementation of Wireless networks. We can classify wireless network in primarily following two categories:

1. Network with existing infrastructure: is a network where exists a wireless access point or earlier wireless hardware support for every node to connect to networks. Here nodes do not require to participate in any kind of transit services. They communicate to access points to send & receive packets from other nodes. In this kind of network different access point can be able to follow different wireless protocol like 802.11 b or 802.11g and still can communicate with each other. There exist several wireless products based on this kind of technology.
2. Ad hoc network is a network where there is no existence of wireless infrastructure for networking, instead each node communicates with each other using their sole transmitter-receiver only. In this kind of network each and every node does participate voluntarily in transit packet that flow to and from different nodes. Each node does follow same routing algorithm to route different packets. Thus, this kind of network have limited homogenous feature. There are not many wireless products that follow this proposed technology.

Manet is defined as self-configuring network of mobile host which is connected by wireless network. Its specialty is to provide peer-to-peer communication without accessing any point or any wired network. The movement of mobile nodes is random and during this movement no predetermined topology is formed by mobile stations. That is why, there is no assurance to form long term guaranteed path from any node to another node. So, it is applied in that type of applications where emergency service is needed like military battlefield. Now the question is arisen that why we choose MANET for communication purpose. There are several reasons behind that. There is no requirement to install specific infrastructure and as well as low set up time and cost in case of MANET. Another thing is that Trust of node to provide appropriate security in the network. In this matter, we should discuss about Trust.

Trust is one of the prime factor for decision-making processes of any network for which absolutely plays very crucial role. If it is possible to predict regarding any faulty behavior in advance for any network, any network becomes flawless.

Some of the main features of MANET are listed below:

1. MANET can be formed or constructed without any preexisting infrastructure.
2. It follows dynamic topology where nodes may join and leave the network at any time and the multi-hop routing may keep changing as nodes join and depart from the network.
3. It does have very limited physical security, and thus increasing security is an important concern.
4. Every node in the MANET can be helpful to assist in routing of packets in the network.
5. Limited Bandwidth & Limited Power.

28 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage:
www.igi-global.com/chapter/implementing-leader-election-algorithm-after-evaluation-of-node-trust-in-manets/173248

Related Content

Application of Artificial Intelligence to Wind Energy for the Control of Variable Speed Wind Turbine

Navdeep Singh, Bhanu Pratap, Nitin Sundriyal, Surinder Chauhan and Prashant Singh (2026). *Driving Affordable and Clean Energy Through AI and Intelligent Systems* (pp. 33-66).

www.irma-international.org/chapter/application-of-artificial-intelligence-to-wind-energy-for-the-control-of-variable-speed-wind-turbine/399656

Bridging the Digital Divide: Enhancing Organizational Agility for Equitable Access in Urban and Rural Post-Secondary Education

Jagneet Kourand Raino Bhatia (2026). *AI Ethics, Governance, Equity, and Safety for Responsible Organizations* (pp. 263-290).

www.irma-international.org/chapter/bridging-the-digital-divide/408412

Personalized Cardiovascular Risk Assessment in Pediatrics: Leveraging AI for Early Intervention Strategies

G. Revathy, Muruga Priya, R. Albert Paulin Michael and M. Dhira (2025). *AI-Powered Systems for Healthcare Diagnostics and Treatment* (pp. 179-194).

www.irma-international.org/chapter/personalized-cardiovascular-risk-assessment-in-pediatrics/376752

Artificial Intelligence (AI)-Driven Content Curation and Microlearning: Revolutionizing On-the-Go Learning in Modern Workplaces

Arpita Nayak and Ipsita Mohapatra (2026). *AI as Help and Hindrance in Education* (pp. 109-120).

www.irma-international.org/chapter/artificial-intelligence-ai-driven-content-curation-and-microlearning/386821

Designing Interactive Architecture: Lessons Learned from a Multi-Professional Approach to the Design of an Ambient Computing Environment

Mikael Wiberg (2009). *International Journal of Ambient Computing and Intelligence* (pp. 1-18).

www.irma-international.org/article/designing-interactive-architecture/34032