Institution of Electronics and Telecommunication Engineers

KOLKATA, CENTRE, Plot No J1-7, EP-Block, Sector V, Salt Lake, Electronics Complex, Kolkata 700091

A Quarterly News Letter

SIGNAL

Volume - 17 :: Issue No - 2 :: April-June, 2020

CHAIRMAN'S MESSAGE

Mr. P. S. Biswas

At the end of my tenure as the chairman of IETE, Kolkata centre, I am very happy to see the publication of Volume: 17 issues: 2 of SIGNAL, These are also the 5th and 6th issues after its revival. Because we received more material than what could be accommodated in one issue , and the earlier publication got delayed because of lockdown difficulties, we decided to publish two issues simultaneously.

The main topic of these publications is Sensor Network. We are all moving towards smarter and smarter environment. WSN is gradually going to be integral part of our lives and activities in future.

Your comments through our website are most welcome.

Partha S Biswas.

Chairman, IETE Kolkata Center

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IOTWR-2020

INTERNATIONAL CONFERENCE/ZONAL SEMINAR ON "IOT IN PRESENT WIRELESS REVOLUTION (IOTWR-2020)"

The Institution of Electronics and Telecommunication Engineers, Kolkata Centre, hosted International Conference/Zonal Seminar/Students' Convention on 27th June 2020 on the theme: "IOT in present Wireless Revolution (IOTWR-2020)", its Challenges and Issues. The Conference has been organized through online mode using Google Meet. The IOTWR-2020 was an international Conference out of which presented quality papers will be selected and uploaded for publication in the International Journal of Hybrid Intelligence, Inderscience Publishers

Fight Against CORONA— Stay Home, Stay Safe

EDITOR'S COLUMN

Dr. Jyotsna Kumar Mandal

The Managing committee took charge during third week of July 2018. In the 7th EC meeting of IETE Kolkata Centre it was decided to revive the Quarterly Newsletter "SIGNAL" of IETE Kolkata Centre under the leadership of the Secretary, IETE as Editor. This last issue newsletter was published in December 2005. Fifteen years Long tradition was suspended due to some unknown reasons. MC, IETE has arranged to publish the IETE Newsletter which has been stopped since 2005. It was decided that the volume and issue numbers will be continuous, but the year of publication will start for 2019. The volume no 16 and the issue number 1, has been published as January-March 2019. The Secretary took initiative to redesign the newsletter and uploaded issues into to the web portal of IETE (www.ietekolkata.org) with circulation to all members of IETE. No printed version is there. Since January 2019 five issues are uploaded into the IETE web site. In this auspicious Annual General Meeting, we are publishing two issues due to receipt of good number of materials. Various activities of IETE Kolkata Center and different ISF Center have been reflected into these tow issues (Vol. 17 issue 1(January-March, 2020) and Vol 17 issue 2(April-June 2020)). Due to Lock Down, we could not host our International Conference IoTWR-2020. On 27th of June we have conducted this IoTWR-2020 in online mode. Glimpse about the event is also given in the vol. 17, issue 2.

On behalf of IETE Kolkata Center I would like to thanks to all esteem corporate members for their cooperation during entire period of my tenure. I would like to express my gratitude to OBs and EC members of IETE for their supports.

These two issues will be a valuable documents to the esteem members.

Best wishes

Jyotsna Kumar Mandal

Secretary, IETE Kolkata Centre

Editor, SIGNAL

"Take risk in your life. If you win, you can lead. If you loose"

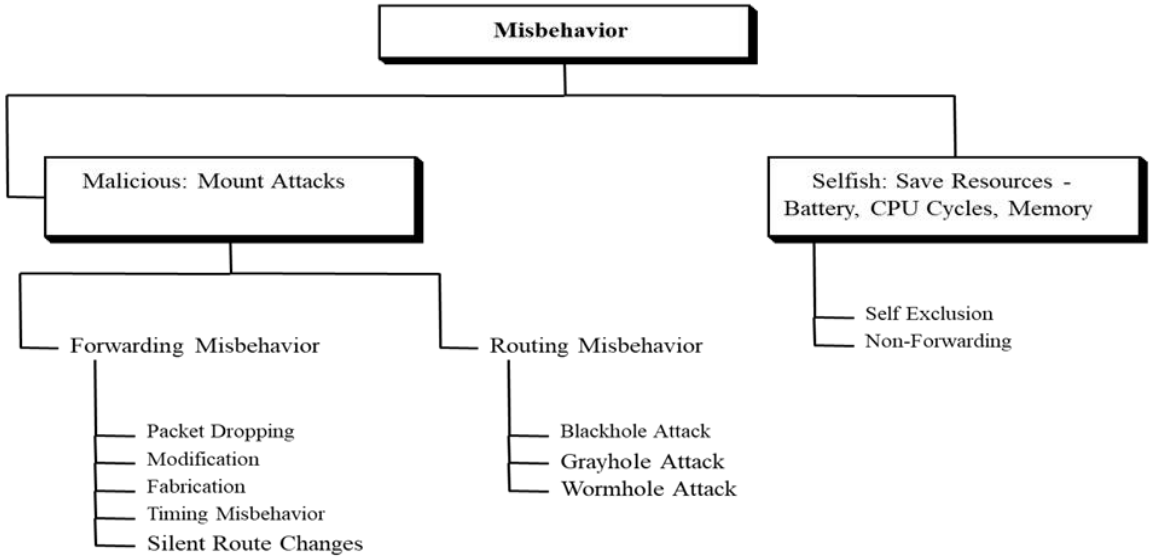
— Swami Vivekananda

Trust Management System in Wireless Self-Organizing Networks

Prof. Subir Kumar Sarkar , Department of Electronics and Telecommunication Engineering, Jadavpur University, Kolkata, India

Continued from previous issue..

Node Misbehaviour in MANETs and WSNs:



Solution to Various Attacks:

In order to prevent various attacks, which WSNs and MANET suffers, the possible solutions can be Security : 1.Cryptographic 2. Trust based. However, Cryptography and other intrusion prevention mechanisms cannot prevent such as security threats. But Why Cryptographic solutions are not enough?

Drawbacks of Cryptographic security mechanisms in WSNs:

Cryptographic security algorithms are

- computation intensive.
- Node limitations on memory, battery life, computation and communication capabilities.
- Can not detect adversary force overtaking.
- Can not detect physically captured, malicious and communication failure nodes. Hence, total breakdown of Network.
- Requires much memory and communication bandwidth to handle new s/w packages.
- Good algorithms: But, NO secrecy! Hence, Cryptographic security mechanisms are not enough solution.

TRUST Definitions :

It is a new tool to maintain security.

Trust is the firm belief in the competence (reliability,timeliness, honesty and integrity) of an entity to act as expected such that this firm belief is not a fixed value associated with the entity but rather it is subject to the entity's behavior and applied only within a specific context at a given time. – *Azzedin* and *Maheswaran*.

Trust tells the degree of reliability of other node in performing actions.

It can be evaluated by maintaining a record of the transactions with other nodes directly as well as indirectly.

Cryptographic security Vs Trust

Where TRUST is Important? We can consider that everybody will tell the truth in the Paradise and all can be trusted. Also we know that everybody will tell the lie in the Hell and hence nobody can be trusted. In the Earth some people tell the truth and some tell the lie. Hence Trust is important in the Earth. Cryptographic security means no one is trust.

1) Cryptographic security means no one is trusted and requires authentication all the time.
2) Encryption/Decryption. secret key is required.
3) More complex and high overhead in all aspects.

1) Trust means everybody is trusted somehow and does not require any authentication.
2) Every node evaluates the trust of neighbors, based on previous records of direct and indirect interactions.
3) Less overhead. It tells the degree of reliability.

Trust Management System in Wireless Self-Organizing Networks

Prof. Subir Kumar Sarkar , Department of Electronics and Telecommunication Engineering, Jadavpur University, Kolkata, India

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Types of TRUST: Three types of Trust:

- Basic: it is based on previous experience of a node. If two nodes A and B in a network are to communicate with each other, the basic trust is not the trust that A has on B; rather it is the general dispositional trust that node A has on other nodes.
- General: it is the trust that node A has on node B, which is not dependent on a particular situation.
- Situational: it is the trust that node A has on node B in a particular situation. In most of the cases, we are concerned with this type of trust between nodes in wireless self-organizing networks such as MANETs and WSNs.

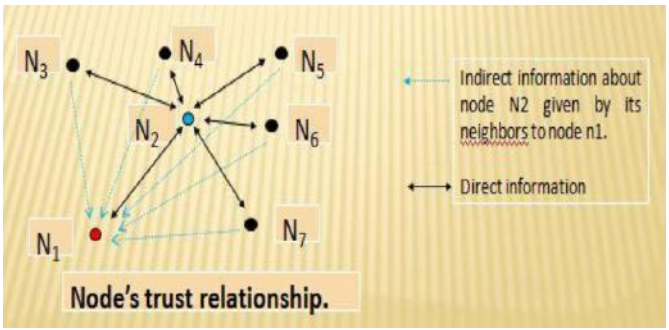
Classification of Trust Systems:

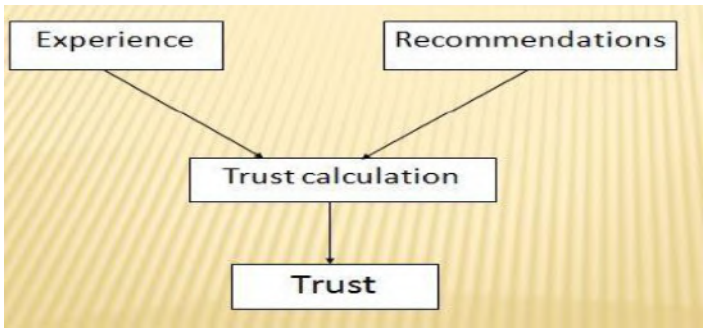
Trust systems can be classified on the following issues:

1. Initializations of the systems 2. Type of observations used 3. Method of information access 4. Method of information distribution in the network

Trust Management System:

- It is an algorithmic module which helps support the decision-making processes of the network.
- In the figure below, Node N1 is gathering the second hand information about N2, from N2's neighbors.





Basic Trust Computational Model:

Some open problems for Modeling the TRUST:

- Trust modeling problem is inherently complicated due to uncertainties involved. Bayesian probability, Beta distribution are some of the tools that have been proposed to solve it. However, design of a reliable and robust trust framework for self-organizing networks like WSN is still an open problem.
- Bootstrapping problem: most of the existing systems require considerable time to build trust among the nodes. Developing an effective and efficient solution to minimize this latency is a big challenge.
- Designing algorithms for revocation of trust in the nodes is another challenge. Expelling a node due to misbehavior is a decision problem under uncertainty and requires a formal mathematical approach to solve. Most of the existing approaches solves it in an ad hoc manner.
- Development of a robust scheme that motivates the nodes to publish their ratings honestly is another open problem. This is particularly challenging in WSN and MANET as the nodes often do not belong to the same interest group.

Acknowledgement: The author thankfully acknowledges the supports obtained from his PhD scholar namely: Dr. Basavaraju, Dr. A R Sardar, Dr. S R Biradar, Dr. Moutushi Singh , Dr. Gowrishankar , Dr Koushik Majumder and R R Sahoo.

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[3] . PhD thesis entitled "To study some aspects of data communication in computer networks" Jadavpur University by Dr. A.Kumar (2007)

Contd..

[4] PhD thesis entitled "Some Studies on Ad-hoc Networks." Jadavpur University by Dr.T.G.Basavaraju (2008)

[5] PhD thesis entitled "Performance comparison of protocols (transport, network and medium access control) for mobile ad hoc networks."Jadavpur University by Dr.S. R. Biradar (2010).

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[7] PhD thesis entitled "Design and Performance study of routing protocols for mobile Ad hoc Network." Jadavpur University by Dr.Koushik Majumder (2012)

[8] PhD thesis entitled "Some studies on routing algorithm and security in communication network including optical network and sensor network "JadavpurUniversity by Dr. AbdurRahamanSardar(2016)

[9] PhD thesis entitled "Some studies on Computer Networking and Data Security" MAKAU by Dr. Moutushi Singh

GLIMPSES OF THE EVENTS

During April - June, 2020

IETE Students' Forum, Haldia Institute of Technology

A coding competition has been organized by IETE Students' Forum (ISF), Haldia Institute of Technology held on 25th April and 1st May, 2020. The competition was named as ByteFight. The competition was held in two rounds of different coding level. Initially around 110 students had participated. 65 out of them had been able to promote themselves in next level. Finnally, top 3 students awarded

Webinar on "Industry Evolution, Fundamentals of Container/Kubernetes & Associated Security" during 03-06-2020 (Between 5:00 PM at the Adamas University

The IETE Students' Forum (ISF) in association with the department of ECE (Adamas University, Kolkata, West Bengal) conducted an online Webinar on "Industry Evolution, Fundamentals of Container/Kubernetes & Associated Security" on 03-06-2020 (Between 5:00 PM to 6:00 PM) using Zoom Cloud Meeting Application. The industry expert invited to deliver this webinar was Mr. Mandeep Singh (Technical Consultant, Digital Native Vertical, Palo Alto Networks). Mr. Mandeep Singh covered topics like Software development cycle, Virtual Server, Cloud, Docker, security of Dockers and Container/Kubernetes. The Webinar was attended by 88 participants from various academic institutes and industries.

Webinar on "What role will you play in the 5G enabled future world?" at the Adamas University

The IETE Students' Forum (ISF) in an association with the department of ECE (Adamas University, Kolkata, West Bengal) conducted a Webinar on "What role will you play in the 5G enabled future world?" on 09-06-2020 using Microsoft Teams Application. The industry expert invited to deliver this webinar was Mr. Indrajit Sanyal (Head of Service Delivery Unit Cloud & NFV Infrastructure, Business Unit Digital Services, Ericsson). Mr. Indrajit Sanyal covered topics like 5G and its implementation throughout the globe, the spectrum for 5G, Massive MIMO, enabling technologies for 5G and a few real-life applications of the 5G technology.

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