

## Dr. Alekha Kumar Mishra

Department of Computer Applications,  
NIT Jamshedpur,  
Jamshedpur-831014, India

**Date of Birth:** 01-04-1981

**Contact No.:** +918249803116

**E-mail:** alekha.ca@nitjsr.ac.in, alekha@gmail.com

---

## Summary

- **Teaching Experience** of over 8 years from NIT Jamshedpur, VIT Vellore and Silicon Institute of Technology Bhubaneswar in India.
- **Ph.D Research Scholar** from the Department of Computer Science and Engineering, National Institute of Technology Rourkela, India
- **Master of Technology** in Computer Science and Engg. from National Institute of Technology Rourkela, India
- **Master in Computer Application** from Silicon School of IT, Bhubaneswar, India
- **Project Trainee** in C-DAC Mumbai

## Research

### Ph.D

(July 2009 to November 2014)

**Institute** : National Institute of Technology Rourkela, India

**Research Area** : Security in Wireless Sensor Networks

**Thesis Title** : Node Replica Detection in Wireless Sensor Networks

**Abstract** : My Ph.D research work contributes two replica detection schemes for static wireless sensor networks called zone-based node replica detection (ZBNRD), and node coloring based replica detection (NCBRD). ZBNRD divides the area of deployment into number of zones. Zones are formed dynamically bearing a zone-leader. The membership information of a node in zones is used to detect the existence of replica in the network. In NCBRD, each node is assigned with a color (value), which is unique within its neighborhood. A replica is detected when there exists a color conflict among the neighbors of a node. A detection scheme is also proposed for mobile WSN called energy based replica detection (EBRD). In EBRD, the residual energy of a node is used to detect replicas. A conflict in the timestamp-residual energy pair of a node is detected as replica.

**Supervisor** : Prof. Ashok Kumar Turuk

<b>M.Tech</b>	<b>(July 2007 to June 2009)</b>
<b>Institute</b>	: National Institute of Technology Rourkela, India
<b>Research Area</b>	: Security in Mobile Ad hoc Networks
<b>Title</b>	: Analysis of Secured Routing Scheme for MANET
<b>Abstract</b>	: My Master's thesis provides a study and an analysis on AODV and secured AODV protocol in detail. An extension of Adaptive-SAODV is proposed, which aims to improving its performance. The proposed extension distributes the overhead of verifying the signature of packets by an intermediate node during routing. We have compared and analyzed the improvement of proposed algorithm over Adaptive-SAODV using simulation.
<b>Supervisor</b>	: Dr. Bibhudatta Sahoo
<b>Other Research</b>	<b>(April 2004 to August 2004)</b>
<b>Institute</b>	: C-DAC Bombay, India
<b>Research Area</b>	: Natural Language Processing and Machine Learning
<b>Title</b>	: Discovering Rules for Transliteration from English to Hindi: A Genetic Algorithm approach
<b>Abstract</b>	: In this work, we developed rules for transliteration from English to Hindi language. First English words are categorized in to unambiguous and ambiguous words based on their phonetics. In the second step, one-to-one rules are defined for unambiguous transliteration rules, whereas the rules for ambiguous words are defined and learned using genetic algorithm. It is observed from the results that almost 80% of ambiguous words of CMU dictionary were successfully transliterated using 3-neighborhood rules.
<b>Supervisor</b>	: Dr. Sasikumar M

---

## Publications

### Journals

1. Alekha Kumar Mishra, Deepak Puthal, and Asis Kumar Tripathy, "GraphCrypto: Next generation Data Security Approach Towards Sustainable Smart City Building", Sustainable Cities and Society, Volume 72, May 2021, ISSN 2210-6707, DOI:<https://doi.org/10.1016/j.scs.2021.103056>.
2. Meenakshi Das, Sowmya Saraswathi, Rashmi Panda, Alekha Kumar Mishra and Asis Kumar Tripathy, "Exquisite Analysis of Popular Machine Learning-Based Phishing Detection Techniques for Cyber Systems", Journal of Applied Security Research, September 2020, ISSN: 1936-1629, DOI: 10.1080/19361610.2020.1816440,
3. Alekha Kumar Mishra, Maitreyee Sinha, and Asis Kumar Tripathy, "A Sinkhole Prevention Mechanism for RPL in IoT", International Journal of Computational Science and Engineering, Volume 23, Issue 3, November 2020,, ISSN:1742-7193, DOI: 10.1504/IJCSE.2020.111435

4. Alekha Kumar Mishra, Asis Kumar Tripathy, Deepak Puthal, and Laurence T. Yang, “Analytical Model for Sybil Attack Phases in Internet of Things”, IEEE Internet of Things Journal, Volume 6, Issue 1, February 2019, Pages 379 - 387, ISSN:2327-4662.
5. Alekha Kumar Mishra, Asis Kumar Tripathy, Arun Kumar, and Ashok Kumar Turuk, “A Replica Detection Scheme based on the Deviation in Distance Traveled Sliding Window for Wireless Sensor Networks”, Journal of Wireless Communications and Mobile Computing, Volume 2017, Issue 2017, January 2017, Pages 01 - 08, ISSN:1530-8677.
6. Alekha Kumar Mishra and Ashok Kumar Turuk, “A Comparative Analysis of Node Replica Detection Schemes in Wireless Sensor Networks”, Journal of Network and Computer Applications, Volume 61, February 2016, Pages 21 - 32, ISSN:1084-8045.
7. Alekha Kumar Mishra and Ashok Kumar Turuk, “Residual energy-based replica detection scheme for mobile wireless sensor networks”, Journal of Security and Communication Networks, Volume 8, Issue 4, March 2015, Pages 637 - 648, ISSN:1939-0122.
8. Alekha Kumar Mishra and Ashok Kumar Turuk, “Node Coloring Based Replica Detection Technique in Wireless Sensor Networks”, Wireless Networks, Volume 20, Issue 8, November 2014, Pages 2419 - 2435, ISSN:1572-8196.
9. Alekha Kumar Mishra and Ashok Kumar Turuk, “A Zone-Based Replica Detection Scheme for Wireless Sensor Networks”, Wireless Personal Communications Journal, Volume 69, Issue 2, March 2013, Pages 601 - 621, ISSN:1572-834X.
10. Alekha Kumar Mishra and Ashok Kumar Turuk, “Efficient mechanism to exchange group membership identities among nodes in wireless sensor networks”, IET Wireless Sensor Systems, Volume 3, Issue 4, December, 2013 Pages 289 - 297, ISSN:2043-6394.
11. Manoj Kumar Samantara and Alekha Kumar Mishra, “A Variation of AODV Protocol with Reduced End-to-End Delay in Mobile Ad Hoc Networks”, Journal of Computational Intelligence and Electronic Systems, Volume 1, Issue 2, December, 2012, Pages 195 - 199, ISSN:2326-3024.
12. Alekha Kumar Mishra and Bibhudatta Sahoo, “A Modified Adaptive-SAODV Prototype for Performance Enhancement in MANET”, International Journal of Computer Applications in Engineering, Technology and Sciences, Vol 1, Iss 2, Apr-Sep 2009, Pages 443-447, ISSN: 0974-3596.

## Proceedings

1. Alekha Kumar Mishra and Arun Kumar, “Performance-based Comparative Analysis of Open Source Vulnerability Testing Tools for Web Database Applications”, 11th International Conference on Computing, Communication and Networking Technologies (ICCCNT), July 2020, Electronic ISBN:978-1-7281-6851-7, DOI:10.1109/ICCCNT49239.2020.9225324,.
2. Alekha Kumar Mishra, Asis Kumar Tripathy, and Maitreyee Sinha, “Customized Score-Based Security Threat Analysis in VANET”, First International Conference on Advances in Distributed Computing and Machine Learning (ICADCML), January 2020, ISSN:978-981-15-4217-6
3. Yedle Balaji, Gunjan Srivastava, Arun Kumar, Alekha Kumar Mishra, and Tapas Kumar Mishra, “A Survey: Security Issues and Challenges in Internet of Things”, First International Conference on Advances in Distributed Computing and Machine Learning (ICADCML), January 2020, ISSN:978-981-15-4217-6

4. Nikita Karangle, Alekha Kumar Mishra, and Danish Ali Khan, "Comparison of Nikto and Uniscan for measuring URL vulnerability", 10th International Conference on Computing, Communication and Networking Technologies (ICCCNT), July 2019, ISBN:978-1-5386-5906-9
5. Asis Kumar Tripathy, Satyabrata Swain, and Alekha Kumar Mishra, "Efficiency Comparison and Analysis of Pseudo-Random Generators in Network Security", 4th International Conference On Artificial Intelligence and Evolutionary Computations in Engineering Systems (ICAIECES), India, April 2019, pp 01 - 07. EISBN:978-981-15-0199-9
6. Alekha Kumar Mishra, Asis Kumar Tripathy, and Satyabrata Swain, "Analysis and Prevention of Phishing Attacks in Cyber Space", First International Conference on Secure Cyber Computing and Communication (ICSCCC), India, December 2018, pp. 430-434, EISBN:98-1-5386-6373-8.
7. Alekha Kumar Mishra, Mohammad S. Obaidat, Deepak Puthal, Asis Kumar Tripathy, and Kim-Kwang Raymond Choo, "Graph-Based Symmetric Crypto-System for Data Confidentiality", 2018 IEEE Global Communications Conference (GLOBECOM), Abu Dhabi, United Arab Emirates, 2018, pp. 1-6, ISSN: 2576-6813
8. Shivang Raj, Saksham Sehrawet, Gurrehmat Singh Oberoi, Kanav Sethi, and Alekha Kumar Mishra, "A Key Exchange Model for Resource-Constrained Devices in Secured Machine to Machine Communication Environments", In proceedings of International Conference on New Trends In Engineering and Technology (ICNTET-2018), September 2018, Pages 01 - 06, EISBN: 978-1-5386-5630-3.
9. Tanishka Shorey, Deepthi Subbaiah, Ashwin Goyal, Anuraag Sakxena, and Alekha Kumar Mishra, "Performance Comparison and Analysis of Slowloris, Golden Eye, and Xerxes DDoS attack Tools", In proceedings of 7th International Conference on Advances in Computing, Communications and Informatics (ICACCI-2018), September 2018, Pages 01 - 05, EISBN: 978-1-5386-5314-2 .
10. Alekha Kumar Mishra, Asis Kumar Tripathy, Mohammad S. Obaidat, Zhiyuan Tan, Mukesh Prasad, Balqies Sadoun and Deepak Puthal, "A Chain Topology for Efficient Monitoring of Food Grain Storage Using Smart Sensors", In proceedings of the 15th International Joint Conference on e-Business and Telecommunications, Volume 2:ICETE, May 2018, Pages 89 - 98, EISBN:978-989-758-319-3.
11. Alekha Kumar Mishra, Suma Shree Thota, Simrat Bains, Meenakshi Das, Shruti Singhail, Siddhant Choudhary, and Asis Kumar Tripathy, "Genetic Algorithm based Approach to Determine Optimal Collection Points for Big Data Gathering in Distributed Sensor Networks", In proceedings of 5th International Conference on Signal Processing and Integrated Networks (SPIN-2018), February 2018, Pages 244 - 247, EISBN: 978-1-5386-3045-7 .
12. Alekha Kumar Mishra, Faraz Ahmad, Prawigya Pariyar, Abhishek Ghosh, Pushan Srivastava, Sumanth G, and Ashutosh Dubey, "Cellular Automata based Optimal Illumination in LED Based Lighting Systems", In proceedings of Second International Conference on Advances in Electronics, Computer and Communications (ICAIECC-2018), February 2018, Pages 01 - 06, EISBN: 978-1-5386-3785-2 .
13. Alekha Kumar Mishra, Ranjan Goyal, Utkarsh Nawalgaria, "Analysis of DDoS Attack in Internet of Things : An Automata Approach", In proceedings of International Conference on Electrical, Electronics, Computers, Communication, Mechanical, and Computing (EECCMC), January 2018, Pages 193 - 196, EISBN: 978-1-5386-4304-4.
14. Asis Kumar Tripathy, Alekha Kumar Mishra, and Tapan Kumar Das, "Smart Lighting: Intelligent and Weather adaptive Lighting in Street Lights using IOT", In proceedings of IEEE International Conference On Intelligent Computing, Instrumentation and Control Techniques (ICICICT), July 2017, Pages 312 - 315, EISBN: 978-1-5090-6106-8.

15. Alekha Kumar Mishra, Arun Kumar, Asis Kumar Tripathy, and Tapan Kumar Das, "A Two-Tailed Chain Topology in Wireless Sensor Networks for Efficient Monitoring of Food Grain Storage", In proceedings of 5th International Conference on Advanced Computing, Networking, and Informatics (ICACNI), June 2017, Volume 708, Pages 01 - 08, EISBN:978-981-10-8636-6.
16. Tapan Kumar Das, Asis Kumar Tripathy, and Alekha Kumar Mishra, "Optical Character Recognition using Artificial Neural Network", In proceedings of International Conference on Computer Communication and Informatics (ICCCI), January 2017, Pages 01 - 04, EISBN: 978-1-4673-8855-9 .
17. Alekha Kumar Mishra and Manoj Kumar Samantara, "A dynamic energy-efficient chain formation scheme for PEGASIS in wireless sensor networks", In proceedings of 2nd International Conference on Computational Intelligence & Networks, CINE' 2016, January 2016, Pages 41 - 46, ISSN:2375-5822 .
18. Alekha Kumar Mishra, Rukshan Ur Rahman, Rahul Bharadwaj, and Rohit Sharma, "An Enhancement of PEGASIS Protocol with Improved Network Lifetime for Wireless Sensor Networks", In Proceedings of IEEE Power, Communication, and Information Technology Conference, PCITC '15, October 2015, Pages 01 - 06, EISBN: 978-1-4799-7455-9 .
19. Alekha Kumar Mishra and Ashok Kumar Turuk, "A Key Renewal Model for Wireless Sensor Network Under Node Capture Attack", In Proceedings of International Conference on Emerging Trends in Engineering and Technology (ICETET), November 2011, Pages 301 - 305, ISSN: 2157-0485 .
20. Alekha Kumar Mishra and Ashok Kumar Turuk, "Adversary Information Gathering Model for Node Capture Attack in Wireless Sensor Networks", In Proceedings of International Conference of Devices and Communications (ICDeCom), Mesra, February 2011, Pages 01 - 05, EISBN: 978-1-4244-9190-2 .
21. Alekha Kumar Mishra and Bibhudatta Sahoo, "A Secure AODV Routing Scheme with Reduced Data Packet Delay in MANET", In Proceedings of International Conference on Information Technology, 2009 (ICIT 2009), Bhubaneswar, December 2009, Pages 50-54.
22. Alekha Kumar Mishra and Ashok Kumar Turuk, "A Survey of Security Threats in Various Layers of Wireless Sensor Networks", In proceedings of AICTE sponsored National Conference on Emerging Trend and Its Application in Engineering, December, 2011, Bhubaneswar, Pages 351 - 355.
23. Alekha Kumar Mishra and Bibhudatta Sahoo, "Analysis of Security Attacks for AODV protocol in MANET", In Proceedings of National Conference on Modern Trends of Operating Systems, MTOS-2009, Bhubaneswar, Pages 54-57.

## Book Chapter

1. Alekha Kumar Mishra, Asis Kumar Tripathy, Sowmya Saraswathi, and Meenakshi Das, "Prevention of Phishing Attack in Internet-of-Things based Cyber-Physical Human System", High Performance Vision Intelligence, Springer, 2020, EISBN: 978-981-15-6844-2, DOI:10.1007/978-981-15-6844-2
2. Alekha Kumar Mishra, "Security Threats in Wireless Sensor Networks", Handbook of Research on Advanced Wireless Sensor Network Applications, Protocols, and Architectures, IGI Global, 2017. Pages 307-325.

## Patent

1. "A Symmetric Cryptosystem For Secure Data Communication Between Network Devices Using Graph Based Operation", Inventor, Intellectual Properties India Application Number: 202041032254, Date of filing 28/07/2020, Status : Published.

2. “An IoT Based Intelligent Food Storage System”, Co-Inventor, Intellectual Properties India Application Number: 202041018273, Date of filing 29/04/2020, Status : Published.

## Research Interests

Security Threat Modeling and Detection in IoT and Smart Sensor Networks, Energy-efficient routing in RPL, Secured communication for IoT.

## Subjects Handled Recently

Network Socket Programming, Data Structures and Algorithms, Cryptography and Cybersecurity, Object Oriented Programming

## Skill Sets

**Programming Languages:** C, C++, Python, Java

**Simulation Tools:** Cooja, Omnet++, Inetmanet, Castalia, NS-2

## Teaching Experience

<b>National Institute of Technology Jamshedpur</b>	
<b>Duration</b>	Since June 2018
<b>Subjects Taught</b>	Network Socket Programming, Cryptography & Cybersecurity, Computer Networks, C++ Programming
<b>No. of PG Students Guided</b>	02 (M.Tech), 20 (MCA)
<b>Vellore Institute of Technology Vellore</b>	
<b>Duration</b>	2 years
<b>Subjects Taught</b>	Compiler Design, Theory of Computation, Cryptography & Cybersecurity, Data Structures and Algorithms, Python & C++ Programming
<b>No. of UG Students Guided</b>	12
<b>Silicon Institute of Technology Bhubaneswar</b>	
<b>Duration</b>	4 years
<b>Subjects Taught</b>	Compiler Design, Data Structures and Algorithms, Cryptography Fundamentals, C & C++ Programming
<b>No. of UG Students Guided</b>	3

## Professional Body Membership

IEEE (MemID - 93300974), OITS(MemID - L06/298), Orchid ID : <https://orcid.org/0000-0002-5461-7845>, Scopus Author ID: 55032743400, Web of Science ResearcherID:AAB-7750-2019

## Academic Activities

- Co-Organizing Secretary, First International Conference on Advances in Distributed Computing and Machine Learning(ICADCML-2020)
- Program Committee Member, IEEE International Symposium on Security, Privacy and Trust in Internet of Things to be held at from 1st to 4th August 2017 at Sydney.
- Resource person, Two day Workshop on Scientific Document Preparation using LaTeX held at Silicon Institute of Technology, Bhubaneswar from 28th-29th December 2015.
- Faculty Coordinator, Workshop on Design of Experiments and Statistical Modeling held in March 2015 at NIT Sikkim.
- Faculty Coordinator, International Conference in Information Technology-2014 held in December 2014 at SIT Bhubaneswar.
- Program Committee Member, International Conference on Advances in Communication Networks and Intelligence' 2013 held in June 2013 at CIT Raipur.
- Student coordinator, International Conference on Communication, Computing & Security' 2012 held in October 2012 at NIT Rourkela.

## Article Reviewer

- IEEE Internet of Things Journal
- IEEE Transactions on Systems, Man and Cybernetics: Systems
- Computer Networks
- KSII Transactions on Internet and Information Systems
- Journal of Innovations in Systems and Software Engineering
- International Conference on Information Technology, Bhubaneswar, ICIT 2017
- IEEE International Symposium on Security, Privacy and Trust in Internet of Things, SPTIoT 2017
- International India Conference 2015, INDICON 2015
- International Conference on Communication, Computing & Security' 2012

## References

1. **Name :** Dr. Ashok Kumar Turuk  
**Designation :** Professor  
, **Specialization :** Network and Cloud Security, Optical Network, Wireless Network, Mobile Computing, and Embedded System  
**Address :** Department of Computer Science and Engineering,  
National Institute of Technology Rourkela,  
Rourkela-769008,

Odisha, (India)  
**E-mail :** akturuk@nitrkl.ac.in  
**Phone :** 0661-2462360, +919437265366

**2. Name :** **Dr. Danish Ali Khan**  
**Designation :** Professor  
**Specialization :** Optimization Techniques, Supply Chain Management, Software Engineering  
**Address :** Department of Computer Applications,  
National Institute of Technology Jamshedpur,  
Jamshedpur-831014, Jharkhand, (India)  
**E-mail :** dakhan.ca@nitjsr.ac.in  
**Phone :** +919835546792

**3. Name :** **Dr. Arun Kumar**  
**Designation :** Assistant Professor  
**Specialization :** Wireless Sensor Networks, Ad-hoc and Mobile Networks, Communication Algorithms, Computer Networks Analysis.  
**Address :** Department of Computer Science and Engineering,  
National Institute of Technology Rourkela,  
Rourkela-769008,  
Odisha, (India)  
**E-mail :** kumararun@nitrkl.ac.in, arun.nit.rkl@gmail.com  
**Phone :** (+91) 661 246 2373