Dr. Alakesh Kalita, SMIEEE

Email | Website | LinkedIn | Google Scholar

Research Interests

Internet of Things, Computer Networks, AI/ML for Computer System, Edge Computing.

Work Experience

Aug'24-Present
Assistant Professor
Indian Institute of Technology Dhanbad (IIT (ISM) Dhanbad)
Department of Mathematics and Computing

Oct'23-Aug'24
University Lecturer
Singapore University of Technology and Design (SUTD)
Courses:
- Python Programming Language
- Computer System and Engineering (Lab + Theory)
- Data-Driven World

Apr'22-Oct'23
Research Fellow
National University of Singapore, Singapore
Supervisor: Dr. Mohan Gurusamy

Education

Jan'18 - May'22
Doctor of Philosophy
Indian Institute of Technology Guwahati, India
Department: Computer Science and Engineering
Thesis: Adaptive Resource Allocation for Faster Formation of 6TiSCH IoT Network. PDF
Supervisor: Dr. Manas Khatua
Innovative Student Projects Award'22 from Indian National Academy of Engineering, India (Indian National Award)

July'14 - May'16
Master in Technology
Assam Central University, India
Department: Computer Science and Engineering
University Rank -2

June'08 - June'12
Bachelor in Technology
Assam Don Bosco University, India
Department: Computer Science and Engineering

Publications

Patents

1. A. Kalita, "An Internet of Things (IoT) enabled System and Process for real-time Monitoring of an Infant to Prevent Falling Off a Surface above Ground level". [Filed on 24/10/2024; Ref No: 202431081152]

Journals

15. A. Hazra, A. Kalita, M. Gurusamy, and D. Sah, "Potential of Zero-Touch Network Management in Industry 5.0: A Future Prospect" in IEEE Internet Computing, I.F: 3.7, 2024. (Accepted). PDF

14. A. Kalita, and M. Gurusamy, "On-the-Fly Autonomous Slot Allocation in 6TiSCH-based Industrial IoT Networks", IEEE Transactions on Industrial Informatics, IF-12.34, vol: 20, no: 7, pp: 9365 - 9374, 2024. PDF

13. A. Hazra, A. Kalita, and M. Gurusamy, "Distributed Service Provisioning with Collaboration of Edge and Cloud in Industry 5.0", IEEE Internet of Things Journal, I.F: 10.6, vol. 11, no. 12, pp. 21885-21894, 2024. PDF

12. A. Hazra, A. Kalita, and M. Gurusamy, "Meeting the Requirements of Internet of Things: The Promise of Edge Computing", IEEE Internet of Things Journal, I.F: 10.6, vol. 11, no. 5, pp. 7474 - 7498, 2024. PDF

11. A. Hazra, P. Maurya, A. Kalita, S. Deb, M. Gurusamy, and V. G. Menon, "Cognitive Computing and Machine Intelligence in Fog-Cloud Infrastructure for Industry 5.0" in IEEE Consumer Electronics Magazine, I.F: 4.5, 2024 (Accepted). PDF

10. A. Kalita, A. Hazra, and M. Gurusamy, "Parrando's Paradox based Enhanced Beacon Transmission in 6TiSCH Networks", IEEE Networking Letters, IF-NA, vol. 5, no. 4, pp. 204-207, 2023. PDF

9. A. Kalita, M. Gurusamy, and M. Khatua "A Gaming and Trust Model based Counter Measure for DIS Attack on 6TiSCH IoT Networks", in IEEE Internet of Things Journal, IF=10.6, vol. 10, no. 11, pp. 9727-9737, 2023. PDF

8. A. Kalita and M. Khatua, "Time–Variant RGB Model for Minimal Cell Allocation and Scheduling in 6TiSCH Networks," in IEEE Transactions on Mobile Computing, IF-7.9, vol. 23, no. 2, pp. 1803 - 1814, 2023. PDF

7. A. Kalita and M. Khatua, "6TiSCH – IPv6 Enabled Open Stack IoT Network Formation: A Review," in ACM Transactions on Internet of Things, IF-2.7, vol. 3, no. 24, pp. 1-36, 2022. PDF

6. A. Kalita, A. Brighente, M. Khatua, and M. Conti, "Effect of DIS Attack on 6TiSCH Network Formation," in IEEE Communications Letters, IF-3.55, vol. 26, no. 5, pp. 1190-1193, May, 2022. PDF

5. A. Kalita and M. Khatua, "A Non-cooperative Gaming Approach for Control Packet Transmission in 6TiSCH Network," in IEEE Internet of Things Journal, IF=10.6, vol. 9, no. 5, pp. 3954-3961, 2022. PDF

4. A. Kalita and M. Khatua, "Adaptive Control Packet Broadcasting Scheme for Faster 6TiSCH Network Bootstrapping," in IEEE Internet of Things Journal, IF=10.6, vol. 8, no. 24, pp. 17395–17402, 2021. PDF

3. A. Kalita and M. Khatua, "Autonomous Allocation and Scheduling of Minimal Cell in 6TiSCH Network," in IEEE Internet of Things Journal, IF=10.6, vol. 8, no. 15, pp. 12242-12250, 2021. PDF

2. A. Kalita and M. Khatua, "Opportunistic Transmission of Control Packets for Faster Formation of 6TiSCH Network," in ACM Transactions on Internet of Things, IF-2.7, vol. 2, no. 1, pp. 1-29, 2021. PDF

1. A. Kalita and M. Khatua, "Channel Condition Based Dynamic Beacon Interval for Faster Formation of 6TiSCH Network," in IEEE Transactions on Mobile Computing, IF-7.9, vol. 20, no. 7, pp. 2326–2337, 2021. PDF

Conferences

14. V. Tummala, A. Hazra, A. Kalita, M. Gurusamy, "Cluster Based Pseudo Hierarchical Decentralized Federated Learning in UAV Networks" in IEEE 99th Vehicular Technology Conference (VTC-Fall'2024). Accepted.
13. P. Joshi, A. Kalita, M. Gurusamy, "Securing the Skies: An IRS-Assisted AoI-Aware Secure Multi-UAV System with Efficient Task Offloading" in IEEE 99th Vehicular Technology Conference (VTC), 2024, Accepted. PDF
12. V. Tummala, A. Hazra, A. Kalita, M. Gurusamy, "Efficient Task Offloading through Federated Learning in UAV-Assisted Edge Networks" in IEEE 99th Vehicular Technology Conference (VTC), 2024, Accepted.
11. A. Kalita, A. Hazra, and M. Gurusamy, 'RIM: Reputation-Based Incentives for Optimizing Service Pricing in Metaverse", In Proc. of IEEE Future Networks World Forum, USA, Baltimore (FNWF), 2023. PDF
10. V. Sebastiani*, A. Kalita*, and M. Gurusamy, 'Dynamic Resource Allocation and Pricing for Edge-Assisted Metaverse", In Proc. of IEEE Future Networks World Forum, USA, Baltimore (FNWF), 2023. PDF
9. A. Hazra, B. Mali, A. Kalita, and M. Gurusamy, 'Federated Learning for Cost Optimized Offloading in Edge-enabled Industrial Internet of Things", In Proc. of IEEE Future Networks World Forum, USA, Baltimore (FNWF), 2023. PDF
8. A. Hazra, A. Kalita, and M. Gurusamy, 'A Combined Approach of Industrial Edge Computing and Machine Learning for Predictive Maintenance", In IEEE GLOBECOM WKSHPS: AI/ML for Edge/Fog Networks program (GLOBECOM - A4E), 2023. PDF
7. A. Kalita, A. Hazra, and M. Gurusamy, "Efficient Schemes for Improved Performance in 6TiSCH Networks", In IEEE INFOCOM WKSHPS: The 10th International Workshop on Computer and Networking Experimental Research using Testbeds (INFOCOM - CNERT), 2023, PDF.
6. A. Kalita and M. Khatua, "Opportunistic Priority Alternation Scheme for Faster Formation of 6TiSCH Network," In Proc. of the International Conference on Distributed Computing and Networking (ICDCN), 2020. PDF
5. A. Kalita and M. Khatua, "Faster Joining in 6TiSCH Network using Dynamic Beacon Interval", In Proc. of the International Conference on Communication Systems Networks (COMSNETS), 2019. PDF
4. A. Kalita, N. Ahmed, H. Rahman, and M. I. Hussain, "A QoS-aware MAC protocol for large-scale networks in Internet of Things," In Proc. of the International Conference on Advanced Networks and Telecommunications Systems (ANTS), 2017. PDF
3. A. Kalita, K. Ray, A. Biswas, and M. A. Hussain, "A topology for network-on-chip", In Proc. of the International Conference on Information Communication and Embedded Systems (ICICES), 2016. PDF
2. K. Ray, A. Kalita, A. Biswas, and M. A. Hussain, "A multipath networkon-chip topology", In Proc. of the International Conference on Information Communication and Embedded Systems (ICICES), 2016. PDF
1. A. Biswas, M. A. Hussain, and A. Kalita, "An improved congestion free modified fat tree network", In Proc. of the International Conference on Signal Processing, Communication, Power and Embedded System (SCOPES), 2016. PDF

Book Chapter

1. A. Hazra, P. Maurya, A. Kalita, I. Sarkar, "Offloading Strategies and Computing Paradigms in IoT: A Survey", in book "IoT Sensors, ML, AI and XAI: Empowering A Smarter World. Smart Sensors, Measurement and Instrumentation", vol 50. Springer. PDF

Pre-print

1. A. Kalita, "Large Language Models (LLMs) for Semantic Communication in Edge-based IoT Networks", arXiv, 2024. PDF
2. J. Poorvi, A. Kalita, and M. Gurusamy, "Reliable and Efficient Data Collection in UAV-based IoT Networks", arXiv, 2024. PDF
3. A. Kalita and M. Gurusamy, "D2R2: Distributed and Dynamic Reputation based Resource Allocation in Metaverse", TechXiv, 2022. PDF

Under Review

1. J. Poorvi, A. Kalita, and M. Gurusamy, "Reliable and Efficient Data Collection in UAV-based IoT Networks", IEEE Communications Surveys & Tutorials. (under major revision)

Technical Report

1. A. Kalita, "Contiki-NG, CC2650 IoT devices, and FIT IoT-LAB." PDF

Simulator

1. A. Kalita, "6TiSCH Cell Allocation Simulator" ‹GitHub›

Awards and Honors

- Received Annual Performance Bonus ($8000 SGD) from NUS, Singapore.
- Received Indian National Academy of Engineering (INAE) Innovative Student Projects Award (equivalent to best thesis) for Ph.D. Thesis work.
- Received travel grant to attend ICDCN'2020 conference from IIT Guwahati, India.
- Qualified UGC-NET (National Eligibility Test) for Assistant Professor (India).
- Received travel grant to attend COMSNETS'2019 conference from the conference organizer.
- Received MHRD scholarship during Ph.D. (2018-2022).
- Bagged second prize in Regional Innovators Conclave conducted by Government of Meghalaya for "Smart Lighting Model", Meghalaya, India 2017.
- Qualified GATE'2017.
- Secured First Class 2nd position with distinction in Master of Technology.
- Received TEQIP-II scholarship during M-Tech (2014-2016).
- Bagged first prize in line follower robotics competition in Assam University, India 2016.
- Awarded with *Anandaram Boruah Student Award*, 2006 for performance of $10th$ standard board examination by State Government of Assam, India.

Mentorship

- **Jiang Jiaxu**, MSc (2024-2026), NUS-ECE (Ongoing),
- **Joshi Poorvi**, MSc (2023-2024), NUS-ECE,
- **Wu Xiaoxi** (2023-2024), MSc, NUS-ECE,
- **Valensia Sebastiani**, MSc (2022-2023), NUS-ECE.

Professional Service

Resource Person

- Delivered a talk on "How Can We Make the Resource-constrained IoT Networks More Efficient and Use of LLMs in IoT Networks" at the Workshop on IoT, Robotics and AIML Workshop -2024, IIIT Sricity, India, on 12 December 2024.
- Delivered a keynote on "How to make the resource-constrained IoT networks more efficient?" at the Workshop on LPWAN-Based LEO Satellite Communication for 6G: Challenges, Innovations, and Future Directions, VTC 2024, Marina Bay Sands Hotel located at 10 Bayfront Avenue, Singapore, on 24 June, 2024
- Delivered an expert talk on "A Tutorial on 6TiSCH IoT Network", at the workshop on "Recent Trends in Information Technology, Networking, Communication and Healthcare" held in the department of CSE, Tezpur University, Assam, India, on 11-12 March, 2023.
- Delivered an expert talk on "Internet of Things", for the Project based Industrial Training on Blockchain, IoT and Machine Learning using Python, jointly organized by Central Institute of Technology Kokrajhar and NIELIT Guwahati, Assam, India, on 4 August, 2022.

Technical Program Committee Member

- Served as Session Chair for IEEE ANTS Workshop on Distributed Computing in 6G IoT Networks (6-DCIoT), IIT Guwahati, India.
- 2nd International Conference on Intelligent Computing Systems and Applications (ICICSA-2023), NIT Silchar, Assam, India
- 21st IEEE International Conference on Pervasive Intelligence and Computing (IEEE PICom 2023); Special Session on Distributed Machine Learning for Edge/Fog Computing: Challenges and Future Directions
- 1st IEEE International Conference on Computational Intelligence, Networks and Security (ICCINS-2023), Mylavaram, AP, India

Reviewer

- IEEE Transactions on Mobile Computing
- IEEE Internet of Things Journal
- IEEE Transactions on Vehicular Technology
- IEEE Transactions on Service Computing
- IEEE Engineering Management Review
- IEEE Communications Standards Magazine
- Wireless Communication and Networking (Springer)