

# Md Shirajum Munir

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## RESEARCH FOCUS

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- Trustworthy Machine Learning (ML) and Artificial Intelligence (AI) · Intelligent Cyber Physical Systems (CPS) · Wireless Communication Systems · Sustainable Edge Computing · AI for Cyber and Cyber for AI · Data Science for Smart Grid Operations · Cyber-security, Risk, and Privacy Management · AI Security and Privacy · Applied Data Science.

## RESEARCH GRANTS

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- **Funded Projects:**
  - Intelligent Zero Trust for Defense Against Generative AI Attacks in Power Grid Supply Chain, ≈ \$100,000, (PI), Commonwealth Cyber Initiative (CCI).
  - Multi-agent Meta Reinforcement Learning for Realizing and Controlling Networked System-Of-Systems, ≈ \$15,000, (Visiting Faculty Research Program (VFRP)), Air Force Office of Scientific Research (AFOSR)
  - Towards Developing Mission Analytics for Electronic Warfare by Quantifying Impact of RF-enabled Cyber Attacks, ≈ \$85,000, (Co-PI, Amentum (US NAVY)).
  - Trustworthy and Explainable AI Framework for Cyber Vulnerability Detection, Risk Explanation, and Defense in Networked CPS: Intellectual Property and Commercialization, ≈ 50,000, (PI), CCI+A (CATAPULT) Fund.
  - Intelligent Automation for Cyber Ready Industrial Control Systems Training Program for Safe and Secure Shipbuilding Operations, ≈ \$100,000, (Co-PI), Commonwealth Cyber Initiative (CCI).
  - Graduate Student Experiential Learning Program (Cyber ExL) [GRA mentoring], ≈ \$10,000, (PI), COVA-CCI (William & Mary).

## EDUCATION

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**Ph.D. in Computer Engineering** Mar. 1, 2017 – Aug. 18, 2021  
*Kyung Hee University*, Yongin-si, Republic of Korea. Advisor: **Prof. Choong Seon Hong**

- *Ph.D. Dissertation:* Self-Sustainable Intelligent Edge Computing Systems for Next-Generation Wireless Networks: Stochastic Model and Cognitive Learning Approach (Link).

**Bachelor of Science (BS) | Computer Science and Engineering** Feb. 1, 2006 – Aug. 12, 2010  
*Khulna University*, Khulna, Bangladesh.

- *BS Thesis:* Data exchange: Query answering for positive query with at most one inequality (Link).

## PROFESSIONAL APPOINTMENTS

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**Assistant Professor** Aug. 2024 – Present  
*University of West Georgia*, School of Computing, Analytics, and Modeling, Carrollton, GA, USA.

**Research Assistant Professor** Jul. 25, 2023 – Aug. 2024  
*Old Dominion University*, School of Cybersecurity, Norfolk, VA, USA.

**Visiting Faculty Research Program (VFRP)** May 27, 2024 – July 19, 2024  
*Air Force Research Lab (AFRL)*, Rome, NY, USA.

**Post-Doctoral Research Associate** Sep. 15, 2022 – Jul. 24, 2023  
*Old Dominion University Research Foundation, VMASC*, Norfolk, VA, USA.

<b>Postdoctoral Researcher</b> <i>Kyung Hee University</i> , Networking Intelligence Laboratory, Yongin-si, ROK.	Sep. 1, 2021 – Aug. 31, 2022
<b>Senior Software Engineer</b> <i>ReliSource Technologies Ltd</i> , Dhaka, Bangladesh.	May 16, 2016 – Feb. 24, 2017
<b>Lead Engineer, Sr. Software Engineer, Software Engineer</b> <i>Samsung R&amp;D Institute Bangladesh Ltd</i> , Dhaka, Bangladesh.	Sep. 20, 2010 – May 13, 2016

## TEACHING

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- **COMP-2320 Principles of Programming**, Fall 2024, School of Computing, Analytics, and Modeling, University of West Georgia.
- **CS-4275 Machine Learning Foundations**, Fall 2024, School of Computing, Analytics, and Modeling, University of West Georgia.
- **CYSE-635 AI Security and Privacy**, Fall 2023, School of Cybersecurity, Old Dominion University.
- **CSE-751000 Advanced AI Networking** (Teaching Assistant), Fall 2020, Department of Computer Science and Engineering, Kyung Hee University, Instructor: Prof. Choong Seon Hong.
- **CSE-710100 Advanced Probability and Statistics** (Teaching Assistant), Spring 2018, Department of Computer Science and Engineering, Kyung Hee University Instructor: Prof. Nguyen H. Tran.

## PRIOR RESEARCH PROJECTS

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### Involvement of Past Academic Research Projects:

- **[Researched, and Developed]** Developed trustworthy machine learning (ML) solutions for civilian applications and multidomain military operations, *DoD Center of Excellence in AI and Machine Learning (CoE-AIML)*, [Funding: U.S. Army Research Laboratory (W911NF-20-2-0277)] [**Python**].
- **[Lead, Researched, and Developed]** Evolvable deep learning model generation platform for edge computing, [Funding: Institute of Information & communications Technology Planning (IITP), Republic of Korea] [**Python**].
- **[Lead, Researched, and Developed]** Development of core architecture for moving edge computing system based on meta federated learning, [Funding: National Research Foundation (NRF) of Republic of Korea] [**Python**].
- **[Lead, Researched, and Developed]** Attentive driving framework based on cognitive behavior mining [**Python, Java**].
- **[Lead, Researched, and Developed]** User interaction based smart living system [**Python, Java, Android**].

### Involvement of Past Industrial Projects:

- **[Lead, Researched, and Developed]** Cold chain management and control system (Team lead) [**C++, C#**]
- **[Lead, Researched, and Developed]** SHealth (iOS interoperable platform development for Samsung wearable devices) [**Objective C, Java, Android, iOS**]
- **[Lead, Researched, and Developed]** Pro Suggest Market (Android and iOS Apps with NX series Samsung camera platform and cloud server) [**Objective C, Java, Android, Linux Programming**]
- **[Lead, Researched, and Developed]** Samsung SMART TV Emulator (Emulator development) [**C++, GTK, Linux Programming**]

- **[Developed]** Smart TV Application Development (TV Apps development for MEA region) **[HTML, CSS, Javascript]**
- **[Researched and Developed]** Image Codec Porting and Optimization (Near-loss less image codec porting, and optimization for a specific SoC within time constrains.) **[C, C++ (ARM CC), Linux programming]**
- **[Researched and Developed]** DSP Software Development Phase-2 (Samsung reconfiguration processor for SIMD) **[C, C++ (ARM CC), Linux programming]**
- **[Researched and Developed]** DSP Software Development Phase-1 (Samsung reconfiguration processor for SIMD) **[C, C++ (ARM CC), Linux programming]**

## SELECTED PUBLICATIONS (COMPLETE LIST)

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### Refereed Journal Papers [Selected]

#### First Author:

20. **M. S. Munir**, K. T. Kim, S. F. Abedin, M. G. R. Alam, W. Saad, and C. S. Hong, "Cognitive Behavior-in-the-Loop: Towards an Attentive Driving in Intelligent Transportation Systems.", *IEEE Transactions on Industrial Informatics (IEEE TII)*, In Press, August 2024. **[Lead]**
19. **M. S. Munir**, A. Adhikary, K. T. Kim, W. Saad, S. Shetty, S-B Park, and C. S. Hong, "Neuro-Symbolic Explainable Artificial Intelligence Twin for Zero-Touch IoE in Wireless Network.", *IEEE Internet of Things Journal (IEEE IoT)*, vol. 10, no. 24, pp. 22451-22468, August 2023. [Link](#). **[Lead]**.
18. **M. S. Munir**, S. H. Dipro, K. Hasan, T. Islam and S. Shetty. "Artificial Intelligence-Enabled Exploratory Cyber-Physical Safety Analyzer Framework for Civilian Urban Air Mobility.", *Applied Sciences*, 2023, 13(2), 7552. [Link](#). **[Lead]**
17. **M. S. Munir**, K. T. Kim, K. Thar, D. Niyato, and C. S. Hong. "Risk Adversarial Learning System for Connected and Autonomous Vehicle Charging.", *IEEE Internet of Things Journal (IEEE IoT)*, vol. 9, no. 16, pp. 15184-15203, August, 2022. [Link](#). **[Lead]**
16. **M. S. Munir**, N. H. Tran, W. Saad, and C. S. Hong, "Multi-Agent Meta-Reinforcement Learning for Self-Powered and Sustainable Edge Computing Systems," *IEEE Transactions on Network and Service Management (IEEE TNSM)*, vol. 18, no. 3, pp. 3353-3374, Sept. 2021, [Link](#). **[Lead]**
15. **M. S. Munir**, S. F. Abedin, N. H. Tran, Z. Han, E. -N. Huh, and C. S. Hong, "Risk-Aware Energy Scheduling for Edge Computing with Microgrid: A Multi-Agent Deep Reinforcement Learning Approach," *IEEE Transactions on Network and Service Management (IEEE TNSM)*, vol. 18, no. 3, pp. 3476-3497, Sept. 2021, [Link](#). **[Lead]**
14. **M. S. Munir**, D. H. Kim, A. K. Bairagi, and C. S. Hong, "When CVaR Meets with Bluetooth PAN: A Physical Distancing System for COVID-19 Proactive Safety," *IEEE Sensors Journal (IEEE Sensors)*, vol. 21, no. 12, pp. 13858-13869, March 2021, **Indexed in WHO: covidwho-1165629**, [Link](#). **[Lead]**
13. **M. S. Munir**, S. F. Abedin, N. H. Tran, and C. S. Hong, "When Edge Computing Meets Microgrid: A Deep Reinforcement Learning Approach," *IEEE Internet of Things Journal (IEEE IoT)*, vol. 6, no. 5, pp. 7360-7374, Oct. 2019, [Link](#). **[Lead]**

#### Mentored as a Project Lead:

12. L. Zou, **M. S. Munir**, S. S. Hassan, Y. K. Tun, L. X. Nguyen and C. S. Hong, "Imbalance Cost-Aware Energy Scheduling for Prosumers Towards UAM Charging: A Matching and Multi-agent DRL Approach", *IEEE Transactions on Vehicular Technology (IEEE TVT)*, Early Access, October 2023. [Link](#). **[Mentored]**.
11. M. Monem, M. T. Hossain, M. G. R. Alam, **M. S. Munir**, M. M. Rahman, S. A. AlQahtani, S. Almutlaq, and M. M. Hassan, "A sustainable Bitcoin blockchain network through introducing dynamic block size adjustment using predictive analytics", *Future Generation Computer Systems (FGCS)*, Early Access, November 2023. [Link](#). **[Mentored]**.
10. Y. Qiao, **M. S. Munir**, A. Adhikary, H. Q. Le, A. D. Raha, C. Zhang, and C. S. Hong, "MP-FedCL: Multi-Prototype Federated Contrastive Learning for Edge Intelligence", *IEEE Internet of Things Journal (Early Access) (IEEE IoT)*, Early Access, September 2023. [Link](#). **[Mentored]**.
9. A. Adhikary, **M. S. Munir**, A. D. Raha, Y. Qiao, Z. Han and C. S. Hong, "Integrated Sensing, Localization, and Communication in Holographic MIMO-enabled Wireless Network: A Deep Learning Approach", *IEEE Transactions on Network and Service Management (IEEE TNSM)*, Early Access, July 2023. [Link](#). **[Mentored]**.
8. K. Kim, Y. K. Tun, **M. S. Munir**, W. Saad, and C. S. Hong. "Deep Reinforcement Learning for Channel Estimation in RIS-Aided Wireless Networks.", *IEEE Communications Letters (IEEE Comm. Letter)*, Early Access, May 2023. [Link](#). **[Mentored]**.
7. L. Zou, **M. S. Munir**, Y. K. Tun, S. S. Hassan, P. S. Aung and C. S. Hong. "When Hierarchical Federated Learning Meets Stochastic Game: Towards an Intelligent UAV Charging in Urban Prosumers.", *IEEE Internet of Things Journal (IEEE IoT)*, vol. 10, no. 12, pp. 10438-10461, 15 June, 2023. [Link](#). **[Mentored]**.
6. L. Zou, **M. S. Munir**, Y. K. Tun, S. Kang and C. S. Hong, "Intelligent EV Charging for Urban Prosumer Communities: An Auction and Multi-Agent Deep Reinforcement Learning Approach," *IEEE Transactions on Network and Service Management (IEEE TNSM) (Early Access)*, Mar. 2022. [Link](#). **[Mentored]**.

#### **Collaboration with Peers:**

5. S. F. Abedin, **M. S. Munir**, N. H. Tran, Z. Han, and C. S. Hong, "Data Freshness and Energy-Efficient UAV Navigation Optimization: A Deep Reinforcement Learning Approach," *IEEE Transactions on Intelligent Transportation Systems (IEEE TITS)*, vol. 22, no. 9, pp. 5994-6006, Sept. 2021, [Link](#). **[Collaborated]**.
4. A. K. Bairagi, **M. S. Munir**, M. Alsenwi, N. H. Tran, S. S. Alshamrani, M. Masud, Z. Han, and C. S. Hong, "Coexistence Mechanism Between eMBB and uRLLC in 5G Wireless Networks," *IEEE Transactions on Communications (IEEE TCOM)*, vol. 69, no. 3, pp. 1736-1749, November 2020, [Link](#). **[Collaborated]**.
3. A. K. Bairagi, M. Masud, D. H. Kim, **M. S. Munir**, A. A. Nahid, S. F. Abedin, K. M. Alam, S. Biswas, S. S. Alshamrani, Z. Han, and C. S. Hong, "Controlling the Outbreak of COVID-19: A Noncooperative Game Perspective," *IEEE Access (IEEE Access)*, vol. 8, pp. 215570-215581, November 2020, [Link](#). **[Collaborated]**.

2. M. G. R. Alam, **M. S. Munir**, M. Z. Uddin, M. S. Alam, N. D. Tri, and C. S. Hong, "Edge-of-things computing framework for cost-effective provisioning of healthcare data," *Journal of Parallel and Distributed Computing* (ELSEVIER JPDC), vol. 123, pp. 54-60, Jan. 2019, [Link](#). [**Collaborated**].
1. S. F. Abedin, A. K. Bairagi, **M. S. Munir**, N. H. Tran and C. S. Hong, "Fog Load Balancing for Massive Machine Type Communications: A Game and Transport Theoretic Approach," *IEEE Access* (**Access**), vol. 7, pp. 4204-4218, Dec. 2018, [Link](#). [**Collaborated**].

### Refereed Conference and Symposium Paper [Selected]

#### First Author:

28. **M. S. Munir**, S. Proddatoori, M. Muralidhara, W. Saad, Z. Han, and S. Shetty, "A Zero Trust Framework for Realization and Defense Against Generative AI Attacks in Power Grid," *2024 IEEE International Conference on Communications (ICC)*, June 2024, Denver, CO, USA.
27. **M. S. Munir**, S. Shetty, and D. B. Rawat, "Trustworthy Artificial Intelligence Framework for Proactive Detection and Risk Explanation of Cyber Attacks in Smart Grid," *Proceedings of the 2023 Winter Simulation Conference (WSC 2023)*, Dec. 13, 2023, San Antonio, USA. [**Presenter**].
26. **M. S. Munir**, S. B. Park, and C. S. Hong, "An Explainable Artificial Intelligence Framework for Quality-Aware IoE Service Delivery," *2022 IEEE International Conference on Communications (ICC 2022)*, pp. 4787-4793, May 16-20, 2022, Seoul, Republic of Korea. [Link](#). [**Presenter**].
25. **M. S. Munir**, D. H. Kim, S. Kang, L. Zou, and C. S. Hong, "Intelligent Grid Shepherd: Towards a Resilient Distributed Energy Resources Control System," *2021 22nd Asia-Pacific Network Operations and Management Symposium (APNOMS 2021)*, Sep. 8-10, 2021, Tainan, Taiwan (Hybrid), [Link](#). [**Presenter**].
24. **M. S. Munir**, S. F. Abedin, D. H. Kim, N. H. Tran, Z. Han, and C. S. Hong, "A Multi-Agent System Toward the Green Edge Computing with Microgrid," *2019 IEEE Global Communications Conference (GLOBECOM 2019)*, Waikoloa, Hawaii, USA, Dec. 2019, [Link](#). [**Presenter**].
23. **M. S. Munir**, S. F. Abedin, and C. S. Hong, "Artificial Intelligence-based Service Aggregation for Mobile-Agent in Edge Computing," *2019 20th Asia-Pacific Network Operations and Management Symposium (APNOMS 2019)*, Sep. 18-20, 2019, Matsue, Japan, [Link](#). [**Presenter**].
22. **M. S. Munir**, S. F. Abedin, M. G. R. Alam, N. H. Tran, and C. S. Hong, "Intelligent Service Fulfillment for Software Defined Networks in Smart City," *The International Conference on Information Networking (ICOIN 2018)*, pp. 516-521, Jan. 10-12, 2018, Chiang Mai, Thailand, [Link](#). [**Presenter**].
21. **M. S. Munir**, D. H. Kim, S. M. Kang, Y. W. Kim, and C. S. Hong, "Fresh Aggregator for Intelligent Energy Regulation in Smart Grid Framework," *Korea Computer Congress 2021 (KCC 2021)*, pp. 1243-1245, June 23-25, 2021, Jeju, Korea (Hybrid), [Link](#). [**Best paper award**] [**Presenter**].
20. **M. S. Munir**, D. H. Kim, S. M. Kang, and C. S. Hong, "Intelligent Agent Meets with TSO and DSO for a Stable Energy Market: Towards a Grid Intelligence," *Korea Software Congress 2020 (KSC 2020)*, pp. 857-859, December 21-23, 2020, Virtual Event, Korea, [Link](#). [**Excellent paper award**]. [**Presenter**].

19. **M. S. Munir**, S. F. Abedin, D. H. Kim, and C. S. Hong, "A Risk-sensitive Social Distance Recommendation System via Bluetooth Towards the COVID-19 Private Safety," *Korea Computer Congress 2020 (KCC 2020)*, pp. 1028-1030, July, 2020, Virtual Event, Korea, [Link](#). [**Excellent paper award**] [**Presenter**].
18. **M. S. Munir**, M. G. R. Alam, and C. S. Hong, "Smart Agent Based Data Aggregation for Smart City," *Korea Computer Congress 2017 (KCC 2017)*, pp. 436-438, June 2017, Jeju, Korea, [Link](#). [**Best paper award**] [**Presenter**].
17. **M. S. Munir**, M. A. Alam and S. M. M. Karim, "Data exchange: Query answering for positive query with at most one inequality," *2010 13th International Conference on Computer and Information Technology (ICIT)*, December 2010, pp. 312-316, Dhaka, Bangladesh, [Link](#). [**Presenter**].

**Mentored as a Project Lead:**

16. M. Muralidhara, **M. S. Munir**, S. Proddatoori, and S. Shetty, "Detecting Attacks and Optimizing Routes in Radio-frequency Networks Using Machine Learning and Graph Theory," *2024 IEEE Conference on Network Softwarization (NetSoft 2024)*, June 2024, St. Louis, MO, USA, [**Will be presented**].
15. K. Kim, Y. K. Tun, **M. S. Munir**, W. Saad, and C. S. Hong, "Pilot Optimization and Channel Estimation Scheme for Semantic Communication: A Framework for Edge Intelligence," *NOMS 2024-2024, IEEE Network Operations and Management Symposium*, Seoul, Republic of Korea, [**Mentored**].
14. H. Kim, Y. M. Park, P. S. Aung, **M. S. Munir**, and C. S. Hong, "Energy-Efficient Trajectory and Age of Information Optimization for Urban Air Mobility," *NOMS 2024-2024, IEEE Network Operations and Management Symposium*, Seoul, Republic of Korea, [**Mentored**].
13. M. E. Rahman, **M. S. Munir**, and S. Shetty, "An Attention-based AI Model for 3D Beam Prediction in THz Unmanned Aerial Vehicle Communication," *Proceedings of the International Conference on Computing, Networking and Communications (ICNC 2024)*, February 19, 2024, Big Island, Hawaii, USA, [**Mentored**].
12. A. Adhikary, **M. S. Munir**, A. D. Raha, Y. Qiao, and C. S. Hong, "Artificial Intelligence Framework for Target Oriented Integrated Sensing and Communication in Holographic MIMO," *IEEE/IFIP Network Operations and Management Symposium (NOMS) (NOMS 2023)*, 8–12 May 2023, Miami, FL, USA. [Link](#). [**Mentored**].
11. Y. Qiao, **M. S. Munir**, A. Adhikary, A. D. Raha, and C. S. Hong, "CDFed: Contribution-based Dynamic Federated Learning for Managing System and Statistical Heterogeneity," *IEEE/IFIP Network Operations and Management Symposium (NOMS) (NOMS 2023)*, 8–12 May 2023, Miami, FL, USA. [Link](#). [**Mentored**].
10. A. D. Raha, **M. S. Munir**, A. Adhikary, Y. Qiao, S-B Park, and C. S. Hong, "An Artificial Intelligent-Driven Semantic Communication Framework for Connected Autonomous Vehicular Network," *37th International Conference on Information Networking (ICOIN) (ICOIN 2023)*, 2023, Bangkok, Thailand, [Link](#). [**Mentored**].
9. A. Adhikary, **M. S. Munir**, A. D. Raha, Y. Qiao, S. H. Hong, E-N Huh, and C. S. Hong, "An Artificial Intelligence Framework for Holographic Beamforming: Coexistence of Holographic MIMO and Intelligent Omni-Surface," *37th International Conference on Information Networking (ICOIN) (ICOIN 2023)*,

2023, Bangkok, Thailand, [Link](#). [**Mentored**].

8. S. K. Dam, **M. S. Munir**, A. D. Raha, A. Adhikary, S-B Park, and C. S. Hong, "RNN-Based Text Summarization for Communication Cost Reduction: Toward a Semantic Communication," *37th International Conference on Information Networking (ICOIN) (ICOIN 2023)*, 2023, Bangkok, Thailand, [Link](#). [**Mentored**].
7. Y. Qiao, **M. S. Munir**, A. Adhikary, A. D. Raha, and C. S. Hong, "A Framework for Multi-Prototype Based Federated Learning: Towards the Edge Intelligence," *37th International Conference on Information Networking (ICOIN) (ICOIN 2023)*, 2023, Bangkok, Thailand, [Link](#). [**Mentored**].
6. L. Zou, **M. S. Munir**, Y. L. Tun and C. S. Hong, "Clustering-Based Serverless Edge Computing Assisted Federated Learning for Energy Procurement," *2022 23rd Asia-Pacific Network Operations and Management Symposium (APNOMS) (APNOMS 2022)*, 2022, Japan, [Link](#). [**Mentored**]. [**Best paper award**].
5. A. Adhikary, S. A. Murad, **M. S. Munir** and C. S. Hong, "Edge Assisted Crime Prediction and Evaluation Framework for Machine Learning Algorithms," *2022 International Conference on Information Networking (ICOIN) (ICOIN 2022)*, 2022, pp. 417-422, Jeju, Korea, [Link](#). [**Mentored**].
4. L. Zou, **M. S. Munir**, K. T. Kim, and C. S. Hong, "Day-ahead Energy Sharing Schedule for the P2P Prosumer Community Using LSTM and Swarm Intelligence," *The International Conference on Information Networking (ICOIN 2020)*, pp. 396- 401, January 7-10, 2020, Barcelona, Spain, [Link](#). [**Mentored**].

#### **Collaboration with Peers:**

3. D. H. Kim, A. Ndikumana, S. M. A. R. Kazmi, K. T. Kim, **M. S. Munir**, W. Saad, and C. S. Hong, "Pricing Mechanism for Virtualized Heterogeneous Resources in Wireless Network Virtualization," *The International Conference on Information Networking (ICOIN 2020)*, pp. 366-371, January 7-10, 2020, Barcelona, Spain, [Link](#). [**Collaborated**].
2. A. K. Bairagi, **M. S. Munir**, M. Alsenwi, N. H. Tran and C. S. Hong, "A Matching Based Coexistence Mechanism between eMBB and uRLLC in 5G Wireless Networks," *The 34th ACM/SIGAPP Symposium on Applied Computing (SAC 2019)*, pp. 2377-2384, April 8-12, 2019, Limassol, Cyprus, [Link](#). [**Collaborated**].
1. A. Talukder, S. F. Abedin, **M. S. Munir**, and C. S. Hong, "Dual Threshold Load Balancing in SDN Environment Using Process Migration," *The International Conference on Information Networking (ICOIN 2018)*, pp. 791-796, Jan. 10-12, 2018, Chiang Mai, Thailand, [Link](#). [**Collaborated**].

#### **Patents (United States)**

2. C. S. Hong, **M. S. Munir**, and D. H. Kim, "METHOD, APPARATUS AND SYSTEM FOR MANAGING ENERGY IN SELF POWERED NETWORK", Patent no. US11775042B2, **Registration granted**. 05 October 2023. (Patentee: Kyung Hee University Industry-Academy Collaboration Foundation), [Link](#).
1. C. S. Hong, **M. S. Munir**, S. F. Abedin, and D. H. Kim, "Method and system for creating energy demand model", Patent no. US10901388B2, **Registration granted**. January 26, 2021. (Patentee: Kyung Hee University Industry-Academy Collaboration Foundation), [Link](#).

## Patents (PCT and Republic of Korea)

5. C. S. Hong, **M. S. Munir**, and M. S. Kim, "ADVERSARIAL LEARNING SYSTEM FOR ELECTRIC VEHICLE CHARGING INFRASTRUCTURE POWER DISTRIBUTION", Application no. PCT/KR2021/019835, **Published US patent**. June 29, 2023. (Patentee: Kyung Hee University Industry-Academy Collaboration Foundation), [Link](#).
4. C. S. Hong, **M. S. Munir**, S. F. Abedin, and D. H. Kim, "METHOD AND SYSTEM FOR CREATING ENERGE DEMAND MODEL", Patent no. 10-2109418-0000, **Registration granted**. 12 May 2020. (Patentee: Kyung Hee University Industry-Academy Collaboration Foundation), [Link](#).
3. C. S. Hong, A. K. Bairagi, **M. S. Munir**, and K. T. Kim, "Method and System for coexistence of eMBB and uRLLC in 5G Network", Patent no. 10-2109709-0000, **Registration granted**. 12 May 2020. (Patentee: Kyung Hee University Industry-Academy Collaboration Foundation), [Link](#).
2. C. S. Hong, **M. S. Munir**, and D. H. Kim, "METHOD, APPARATUS AND SYSTEM FOR MANAGING ENERGY IN SELF POWERED NETWORK", Application no. 10-2020-0106769, **Applied Korean patent**. 25 August 2020. (Patentee: Kyung Hee University Industry-Academy Collaboration Foundation), [Link](#).
1. C. S. Hong, **M. S. Munir**, and K. T. Kim, "System model of smart infrastructure for artificial intelligence service aggregation by self-moveable equipment", Application no. 10-2019-0152773, **Applied Korean patent**. 25 November 2019. (Patentee: Kyung Hee University Industry-Academy Collaboration Foundation), [Link](#).

## International Standardization

1. Information technology - Home Electronic System (HES) application model - Part 51: Framework of a narrow AI engine for a premises energy management system using energy management agents (Project home). *IEC ISO/IEC JTC 1/SC 25: INTERCONNECTION OF INFORMATION TECHNOLOGY EQUIPMENT*.

## SELECTED PRESENTATION

18. **Neuro-symbolic Explainable Artificial Intelligence (XAI) Twin Framework for Trustworthy Networked CPS Operations**, Tech Talk, AFRL, June 25, 2024, Rome, NY, USA.
17. **A Zero Trust Framework for Realization and Defense Against Generative AI Attacks in Power Grid**, IEEE ICC 2024, June 2024, Denver, CO, USA.
16. **Intelligent Zero Trust for Defense Against Generative AI Attacks**, Supply Chain Cybersecurity Workshop (Invited), CCI Symposium 2024, April 16, 2024, Richmond, VA, USA.
15. **A Trustworthy Learning Framework for Secure and Reliable Power Grid Operation Against Generative AI Attacks**, CCI Symposium 2024, April 16, 2024, Richmond, VA, USA.
14. **Neuro-symbolic Explainable Artificial Intelligence (XAI) Twin Framework and Its' Use-Cases**, Modeling, Simulation and Visualization Student Capstone Conference 2024, Invited, April 11, 2024, Suffolk, VA, USA.
13. **Trustworthy Artificial Intelligence Framework for Proactive Detection and Risk Explanation of Cyber Attacks in Smart Grid**, 2023 Winter Simulation Conference, Dec. 13, 2023, San Antonio, USA.



12. **An Explainable Artificial Intelligence Framework for Quality-Aware IoE Service Delivery**, IEEE ICC 2022, May, Seoul, ROK.
11. **Intelligent Grid Shepherd: Towards a Resilient Distributed Energy Resources Control System**, APNOMS 2021, September, Tainan, Taiwan (Hybrid).
10. **Fresh Aggregator for Intelligent Energy Regulation in Smart Grid Framework**, Best Paper Presentation in Korea Computer Congress, June 2021, Jeju, ROK (Online).
9. **Intelligent Agent Meets with TSO and DSO for a Stable Energy Market: Towards a Grid Intelligence**, Excellent Paper Presentation in Korea Software Congress, December 2021, Virtual Event, ROK.
8. **A Risk-sensitive Social Distance Recommendation System via Bluetooth Towards the COVID-19 Private Safety**, Excellent Paper Presentation in Korea Computer Congress, July 2020, Jeju, ROK (Online).
7. **A Multi-Agent System Toward the Green Edge Computing with Microgrid**, 2019 IEEE Globecom, December 2019, Waikoloa, Hawaii, USA.
6. **Artificial Intelligence-based Service Aggregation for Mobile-Agent in Edge Computing**, Asia-Pacific Network Operations and Management Symposium, September 2019, Matsue, Japan.
5. **Intelligent Service Fulfillment for Software Defined Networks in Smart City**, ICOIN 2018, Jan. 2018, Chiang Mai, Thailand.
4. **Meta-Reinforcement Learning for Proactive Energy Demand Scheduling in Smart City with Edge Computing**, Technical Paper Presentation in Korea Software Congress, December 2018, Pyeongchang, ROK.
3. **Temporal Energy Demand Extrapolation for Mobile Edge based on Computational Task in Smart-Grid Framework**, Technical Paper Presentation in Korea Computer Congress, June 2018, Jeju, ROK.
2. **RNN based Energy Demand Prediction for Smart-Home in SmartGrid Framework**, Technical Paper Presentation in Korea Software Congress, December 2017, Busan, ROK.
1. **Smart Agent Based Data Aggregation for Smart City**, Best Paper Presentation in Korea Computer Congress, June 2017, Jeju, ROK.

## HONORS AND AWARDS

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13. **Excellent Paper Award:** "Target Oriented Communication Resource Allocation for Holographic MIMO using Sequential Neural Network Model" by Korea Institute of Information Scientists and Engineers (KIISE), Korea Computer Congress 2022 (KCC 2022).
12. **Best Paper Award:** "Clustering-Based Serverless Edge Computing Assisted Federated Learning for Energy Procurement" by 23rd Asia-Pacific Network Operations and Management Symposium (APNOMS 2022).
11. **Best Paper Award:** "Fresh Aggregator for Intelligent Energy Regulation in Smart Grid Framework" by Korea Institute of Information Scientists and Engineers (KIISE), Korea Computer Congress 2021 (KCC 2021).
10. **Excellent Paper Award:** "Intelligent Agent Meets with TSO and DSO for a Stable Energy Market: Towards a Grid Intelligence" by Korea Institute of Information Scientists and Engineers (KIISE), Korea Software Congress 2020 (KSC 2020).
9. **Excellent Paper Award:** "A Risk-sensitive Social Distance Recommendation System via Bluetooth Towards the COVID-19 Private Safety" by Korea Institute of Information Scientists and Engineers (KIISE), Korea Computer Congress 2020 (KCC 2020).

8. **Best Paper Presentation Award:** "Coexistence of eMBB and uRLLC in 5G Wireless Networks" by Korea Institute of Information Scientists and Engineers (KIISE), Korea Computer Congress 2018 (KCC 2018).
7. **Best Paper Award:** "A Transport Theoretic Approach for Computational Task Migration in Multi-Access Edge Computing" by Korea Institute of Information Scientists and Engineers (KIISE), Korea Software Congress 2018 (KSC 2018).
6. **Best Paper Award:** "Smart Agent Based Data Aggregation for Smart City" by Korea Institute of Information Scientists and Engineers (KIISE), Korea Computer Congress 2017 (KCC 2017), KIISE, 2017.
5. **BK21 Plus Scholarship**, Kyung Hee University by Korean Government, Republic of Korea, March 2019 to August 2020.
4. **President Scholarship**, Kyung Hee University, Republic of Korea, March 2017 to August 2020 (Achieved for total 7 semesters based on the academic records and evaluation has done after the end of each semester).
3. **Extra Ordinary Performer**, 2015, 2014, 2010 at Samsung R&D Institute Bangladesh.
2. **Icon of the Month**, October, 2014 at Samsung R&D Institute Bangladesh.
1. **Iconic Team**, October 2012 at Samsung R&D Institute Bangladesh.

## PROFESSIONAL SERVICES

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- **Membership:**

2. Institute of Electrical and Electronics Engineers (IEEE)
1. IEEE Communications Society (ComSoc)

- **Associate Editor:**

1. IEEE Internet of Things Journal, [Link](#).

- **Guest Editor:**

2. Special issue on "Advances in Communication Systems, IoT and Blockchain" of Mathematics (ISSN 2227-7390) in the section of Computational and Applied Mathematics, [Link](#).
1. Special Issue "Energy-Efficient IoT (Internet of Things) and Big Data Challenges for Connected Intelligence", Big Data and Cognitive Computing (ISSN 2504-2289), [Link](#).

- **Journal Article Reviewer (Over 550):** IEEE Internet of Things Journal, IEEE Access, IEEE Journal on Selected Areas in Communications, IEEE Systems Journal, IEEE Transactions on Cognitive Communications and Networking, IEEE Transactions on Mobile Computing, IEEE Transactions on Network and Service Management, IEEE Transactions on Network Science and Engineering, IEEE Network Magazine, IEEE Transactions on Emerging Topics in Computational Intelligence, IEEE Transactions on Wireless Communications, Journal of Ambient Intelligence and Humanized Computing, Applied Energy, International Journal of Sensor Networks, KSII Transactions on Internet and Information Systems, IET Signal Processing, Remote Sensing, Springer Nature, Hindawi, Sustainable Energy Technologies and Assessments, Imaging Science Journal, Sensors, and others.

- **Conference Organizer (Technical Program Committee):**

5. IEEE Global Communications Conference, 8–12 December 2024, Cape Town, South Africa, [Link](#).
4. IEEE Global Communications Conference, 4–8 December 2023, Kuala Lumpur, Malaysia, [Link](#).

3. International Conference on Machine Intelligence and Emerging Technologies (MIET 2022), Noakhali, Bangladesh, [Link](#).
  2. STI 2022 (2022 4th International Conference on Sustainable Technologies for Industry 4.0), Rupganj, Dhaka, Bangladesh, [Link](#).
  1. STI 2021 (2021 3rd International Conference on Sustainable Technologies for Industry 4.0), Rupganj, Dhaka, Bangladesh, [Link](#).
- **Conference Paper Reviewer:** IEEE ICC 2024, Big Data, IoT and Machine Learning (BIM 2023), MIET 2022, STI 2021, IWCMC 2020 Wireless Sensors, IEEE SmartGridComm'19, IWCMC-Wireless Sensors 2019, INFOCOM18 WKSHPs DCPeRF 2018 and others.

## TRAINING AND CERTIFICATIONS

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- **AWS Certified Cloud Practitioner**, March 27, 2024 Expires on March 27, 2027, [Badge](#).
- **DataCamp, e-learning Certificates:**
  10. Deep Learning in Python (Credential ID 3,442,594)
  9. Importing Data in Python (Part 1) (Credential ID 3,373,504)
  8. Importing Data in Python (Part 2) (Credential ID 3,374,000)
  7. Intro to Python for Data Science Course (Credential ID 3,367,585)
  6. Introduction to Data Visualization with Python (Credential ID 3,424,326)
  5. Statistic Thinking in Python (Part 1) (Credential ID 3,374,784)
  4. Statistic Thinking in Python (Part 2) (Credential ID 3,392,982)
  3. Supervised Learning with Scikit-learn (Credential ID 3,400,164)
  2. Unsupervised Learning in Python (Credential ID 3,435,875)
  1. Pandas Foundations (Credential ID 3,415,866)

## SKILLS AND OUTREACH

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- **Research Tools:** · Data Science and Analytic · Uncertainty Risk Modeling (i.e., conditional value at risk, value at risk) · Dynamic Programming · Stochastic Games · Stochastic Optimization · Convex Optimization · Machine Learning such as Reinforcement Learning (RL), Risk-adversarial Learning, Multi-agent RL, Meta-RL, Trustworthy and Explainable AI, and Generative AI (GAN, Autoencoder, Variational autoencoder, transformer), Regression Models (LSTM, GRU, LR, RF, etc.).
- **Team Lead and Mentoring:** Practiced as a research and software development team lead.
- **Technical Writing:** Expert in writing high-impact peer-review journals and conferences, patent drafting, and successful research grant proposal.
- **Programming Language:** Python, C, C++, Java.
- **Software Development:** IoT, sensor networking, embedded system, DSP, Linux programming, PC software, mobile (android and iOS), smart TV application, and convergences applications by writing code, unit testing, debugging, code reviewing and issue fixing.
- **Software Engineering Process:** Software architecture design, Design patterns (abstract factory, builder, factory, singleton, MVC), SDLC processes (agile, waterfall, incremental), and project management (SDP, SRS, HLD, DLD, and SDC preparation by using standard templates).

## REFERENCES

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Will be provided upon request.

**Last Modified Date:** September 17, 2024.