Pulok Tarafder

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Research Interests

THz, Ultra Massive MIMO, Deep Reinforcement Learning, Federated Learning, Wireless Networks

Education

Howard University, Washington, DC, USA

- PhD in Electrical Engineering, Grade 4.0/4.0 (Jan 2023 – Present)
- Advisors: Imtiaz Ahmed, Danda B. Rawat

Chosun University, Gwangju, South Korea

- Masters in Computer Engineering, Grade 4.19/4.5 (96.28%) (Dec 2022)
- Advisor: Wooyeol Choi
- Thesis: Deep Reinforcement Learning-Based Coordinated Beamforming for mmWave Massive MIMO Vehicular Networks

Brac University, Dhaka, Bangladesh

- Bachelor of Science in Electrical and Electronic Engineering (Apr 2019)
- Senior thesis: Comprehensive mathematical analysis and simulation design of a microwave wireless power transmission system, highest honors

Experience

Data Scientist Intern at Amazon

Amazon Transportation, Bellevue, Washington (Summer 2023)

- Research topic: Developed a spatial entrance extraction algorithm for Amazon warehouses using raw GPS data archived by Amazon Freight Trucks.

Graduate Research Assistant at Wireless Communications Systems (WiCS)

Dept. of EECS, Howard University (Jan 2023 - Present)

- Research topic: Data driven communications for THz-band communication network, applications of artificial intelligence and machine learning in wireless communication
- Conference reviewer: EuCNC, 2023 IEEE Globecom Workshops, 6G Summit 2023

Graduate Research Assistant at Smart Networking Lab

Dept. of Computer Engineering, Chosun University (Mar 2021 - Dec 2022)

- Perform research on the channel estimation, applications of deep reinforcement learning and federated learning in mmWave massive MIMO beamforming, and mmWave MAC protocols
- Conference reviewer: ICAIIC 2022

Research Assistant at Control & Applications Research Centre

Dept. of Electrical and Electronic Engineering, Brac University (May 2019 - Feb 2021)

- PSpice Instructor for EEE202 Lab
- Prepared project proposals, project reports, annual reports, reviewed domestic conference papers, and worked on designing and developing smart solar-powered electric wheelchair and stove

Skills

- **Software**: Python (TensorFlow, Keras, PyTorch, OpenAI Gym, NumPy), Matlab, LaTeX, Git, Java, Ansys Electronics (HFSS), Proteus, PSpice, Microwind (layout), DSCH2, Arduino
- **Hardware**: Advance Circuits, Arduino-based Hardware, Microcontroller/Microprocessor-based IoT Devices

Publications

Journals

J3. Islam Helmy, **Pulok Tarafder** and Wooyeol Choi*, "LSTM-GRU Model-Based Channel Prediction for High Quantization Massive MIMO System", *IEEE Transactions on Vehicular Technology*, Early Access, March 2023 (IF: 6.8 / JCR 2022) [Paper]

J2. **Pulok Tarafder** and Wooyeol Choi*, "Deep Reinforcement Learning-Based Coordinated Beamforming for mmWave Massive MIMO Vehicular Networks", *Sensors*, special issue on *"Wireless Sensors and Wireless Sensor Networks for Engineering Applications"*, vol. 23, no. 5, article no. 2772, March 2023. (IF: 3.9 / JCR 2022) [Paper]

J1. **Pulok Tarafder** and Wooyeol Choi*, "MAC protocols for mmWave communication: A comparative survey," *Sensors*, special issue on *"Theory and Techniques for the Deployment of Future Wireless Sensor Networks in 5G and Beyond"*, vol. 22, no. 10, article no. 3853, May 2022. (IF: 3.9 / JCR 2022) [Paper]

Conference Proceedings

C2. **Pulok Tarafder**, Moonsoo Kang and Wooyeol Choi, "A comparative study on centralized MAC protocols for 60 GHz mmWave communications", *International Conference on Information and Communication Technology Convergence (ICTC)*, Jeju, Republic of Korea, October 20-22, 2021 [Paper]

C1. Afrin Sultana Meem, Henry Bukenya, Abrar Faisal, **Pulok Tarafder**, A.K. M Abdul Malek Azad, "A qualitative study of current trends in microwave wireless power transmission including current advancements and challenges", *2019 IEEE Region 10 Symposium (TENSYMP)*, Kolkata, India, June 07-09, 2019 [Paper]

Organization and Outreach Activities

- Attended IEEE ICC, Seoul, South Korea (16–20 May 2022)
- IEEE Graduate Student Member (Sept 2021 - Dec 2022)
- Event Organizer, Brac University Electrical and Electronic Club (Feb 2014 - Dec 2018)
- Creative Designer, Robotics Club of Brac University (Jan 2014 - Dec 2016)

Achievements

- 1st runner-up at Automated Guided Vehicles (AGV) showcase competition, Techshopbd, Dhaka, Bangladesh (Nov 2015)
- Full-ride Research Assistant Scholarship for masters at Chosun University, Gwangju, South Korea