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 (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

Brac University, Dhaka, Bangladesh

- Bachelor of Science in Electrical and Electronic Engineering (Apr 2019)
- Grade: 3.07/4.0 (3.53/4 in 300 & 400 level courses)
- Senior thesis: Comprehensive mathematical analysis and simulation design of a microwave wireless power transmission system, highest honors

Research Experience

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

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

[1] Updated February 10, 2023

- Designed and implemented a torque sensor circuit for the project *Digitalization and Development of Torque Sensor Based Control System of Solar Powered Electric Wheel-chair with a Dedicated Solar Charger Kit*

- Worked on the development and troubleshooting of the project *Double Burner Smart Electric Stove Powered by Solar Photovoltaic Energy*

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. **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"*(under review).

J2. Islam Helmy, **Pulok Tarafder** and Wooyeol Choi*, "LSTM-GRU Model-Based Channel Prediction for High Quantization Massive MIMO System", IEEE Transactions on Vehicular Technology (under review).

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: 3.847 / JCR 2021) [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