Seungcheol (Paul) Oh

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Skills

Background: Machine Learning, Wireless Communication, Optimization, NLP, GPT-2, LLM, Transformers
Languages: Python, MATLAB, SQL, C/C++, HTML/CSS, Kotlin
Tools & Libraries: PyTorch, NumPy, Simulink, Matplotlib, CVX Solver, Android Studio

Experiences

Visiting Researcher, Wireless Communication Systems Development, WiSE Lab *June 2023 - Present*

- Developing data driven, end-to-end solutions to time-dependent optimization problems in wireless communication systems with GRU, LSTM
- Leveraging decision-transformer (GPT-2) to abstract essential temporal information to maximize objective by sequentially designing polarization vectors and beamformers
- Enhancing polarized antenna selection system via convex-optimization techniques

Graduate Researcher, WiSE Lab *May 2019 – Dec 2022*

- Developed polarized antenna selection scheme to improve the error rate of the system to conventional system with 3 dB signal to noise ratio (SNR) gain for 10^{-3} error rate (coop project with Prof. Andreas Molisch) [2]
- Developed multi-polarized superposition beamforming to effectively allocate power and subcarriers across two orthogonal polarizations to achieve significant signal to noise ratio gain [1, 4]
- Designed experiments for polarization reconfigurable NOMA with Dynamic ordered SIC

Undergraduate Researcher, WiSE Lab *Jan 2018 - May 2019*

- Experimented P-MIMO system under different channel models to verify the practicality of the system [5]
- Prototyped analog beamforming in MIMO communication system with USRP device;
  First Place Award for Senior Capstone Design Competition

Publications

Google Scholar Link

[1] **Oh, Paul** and Sean Kwon. Multipolarization superposition beamforming: Novel scheme of transmit power allocation and subcarrier assignment. IEEE Transactions on Wireless Communications, 22, 2023.

[2] **Paul S. Oh**, Sean Seok-Chul Kwon, and Andreas F. Molisch. Antenna selection in polarization reconfigurable MIMO (PR-MIMO) communication systems. arXiv, 2021.

[3] Junghyun Kim, Thong D. Ngo, **Oh, Paul S.**, Sean S.-C. Kwon, Changhee Han, and Joongheon Kim. Economic theoretic leo satellite coverage control: An auction-based framework. In 2020 International Conference on Information and Communication Technology Convergence (ICTC), pages 258–260, 2020.

[4] **Oh, Paul** and Sean Kwon. Multi-polarization superposition beamforming with xpd-aware transmit power allocation. In 2020 IEEE 92nd Vehicular Technology Conference (VTC2020-Fall), 2020.

[5] **Oh, Seungcheol Paul** and Seok-Chul Sean Kwon. Capacity of polarized-mimo (p-mimo) system in different wireless channels. In 2018 IEEE Green Energy and Smart Systems Conference (IGESSC), 2018.
2018 IGESSC Best Paper Award.

Invited Talks

EE 488: Communication Capstone Design Class, *Visiting Lecturer*

- Conducted tutorials to apply machine learning in wireless communication *Spring 2024*
- Held tutorials on LabVIEW to operate USRPs to design beamforming systems *Fall 2019*

Education

California State University Long Beach Long Beach, CA, USA
Master of Science in Electrical Engineering May. 2022
Advisors: Seok-Chul Kwon
Thesis: Enhancement of Multiple Input Multiple Output (MIMO) Communication System with Polarization
Graduated with graduate Dean's List of University Scholars and Artists

California State University Long Beach
BAS.c. in Electrical Engineering Dec. 2019
Graduated with Dean's Honour List, Magna Cum Laude and Distinction