Pham Khanh Quan, Ph.D. Student.
Chungbuk National University, Korea

khanhquan@chungbuk.ac.kr https://phamkhanhquan197.github.io/

Education

Sep 2023 – August 2026 **Ph.D. Chungbuk National University** in Information & Communication Engineering. [GPA: 4.41/4.5]

Sep 2021 – August 2023 **M.Sc. Chungbuk National University** in Information & Communication Engineering. [GPA: 4.3/4.5]
Thesis title: *Experimental Evaluation and Analysis of Federated Learning in Edge Computing Environments*.

2015 – 2020 **B.S. Ton Duc Thang University** in Electronics and Telecommunication Engineering. [GPA: 7.06/10.0]
Thesis title: *On the Implementation of a Low-Cost Mind-Voice-and-Gesture-Controlled Humanoid Robotic Arm Using Leap Motion and Neurosky Sensor*.

Employment History

July 2020 – July 2021 **AI-Robotic R&D Engineer** in ARAR (Advanced Robotics & Automation Research)
- *Robotics R&D lab specializing in SLAM navigation and automation for service robots.*

Dec 2019 – June 2020 **Engineering Intern** at Intel Product Viet Nam.
- *Internship in QA auditing and preventive maintenance compliance.*

Feb 2019 – August 2019 **Engineering Intern** at Renesas Design Viet Nam.
- *Semiconductor R&D center focused on embedded software development for chip design.*

Research Interests

My research focuses on efficient and adaptive optimization for federated learning, with an emphasis on addressing data heterogeneity and communication efficiency. I am particularly interested in singular value decomposition (SVD)-based low-rank adaptation techniques, such as FedKLS, which leverage KL-divergence to dynamically select singular components tailored to client distributions. My broader interests include personalized and communication-efficient FL, and the integration of lightweight model adaptation methods (e.g., LoRA variants) for domain generalization and on-device intelligence. In addition, I apply reinforcement learning to automate hyperparameter tuning and decision-making processes in intelligent systems, especially in the context of robotics and manufacturing optimization.

Research Publications

Journal Articles

1. **P. K. Quan**, M. Kundroo, G. Ban, S. Bae, and T. Kim, "Reinforcement learning-based laser cutting machine parameter optimization," *Journal of Intelligent Manufacturing*, pp. 1–16, 2025. DOI: 10.1007/s10845-025-02619-z.

2. V. Van Truong, **P. K. Quan**, D.-H. Park, and T. Kim, "Performance evaluation of decentralized federated learning: Impact of fully and k-connected topologies, heterogeneous computing resources, and communication bandwidth," *IEEE Access*, 2025. DOI: 10.1109/ACCESS.2025.3542772.

3. **P. K. Quan** and T. Kim, "Elastic federated learning with kubernetes vertical pod autoscaler for edge computing," *Future Generation Computer Systems*, vol. 158, pp. 501–515, 2024. DOI: 10.1016/j.future.2024.04.047.

4. **P. K. Quan**, M. Kundroo, and T. Kim, "Experimental evaluation and analysis of federated learning in edge computing environments," *IEEE Access*, vol. 11, pp. 33 628–33 639, 2023. DOI: 10.1109/ACCESS.2023.3262945.

5. **P. K. Quan**, T. V. Vo, and P. T. Tran, "On the implementation of a low-cost mind-voice-and-gesture-controlled humanoid robotic arm using leap motion and neurosky sensor," *Journal of Electrical Engineering & Technology*, vol. 17, no. 1, pp. 665–683, 2022. DOI: 10.1007/s42835-021-00903-5.

Conference Proceedings

1. V. V. Truong, **P. K. Quan**, and T. Kim., "Flexifed: Adaptive resource-based client topology selection and similarity-based aggregation in decentralized federated learning," in *Conference of Korean Artificial Intelligence Association (CKAIA)*, 2024.

2. **P. K. Quan** and T. Kim., "The impact of data-rich clients in non-iid federated learning," in *Korea Digital Contents Society Summer Academic Conference (DCS)*, 2023.

Skills

Languages	English, Korean, Vietnamese
Coding	Python, C/C++, LaTeX
Web Dev	HTML

Miscellaneous Experience

Awards and Achievements

2025 **Outstanding Graduate Research Award**, Chungbuk National University.

2020 **Second Place Winner at Student Research of Science**, Ton Duc Thang University.

References

Prof. Taehong Kim
Professor of Information & Communication Engineering, Chungbuk National University.
Room 307, E8-10 building, Chungdae-ro 1, Seowon-Gu, Cheongju, Korea.
taehongkim@cbnu.ac.kr

Prof. Tran Thanh Phuong
Vice Dean of Faculty of Electrical and Electronics Engineering, Ton Duc Thang University.
Room C117, 19 Nguyen Huu Tho St., Dist. 7, Ho Chi Minh City, Vietnam.
tranthanhphuong@tdtu.edu.vn