Quy Phuong Le

lequyphuong1903@gmail.com | +82 10 9671 2240 | Namgu, Busan, 48513, Republic of Korea

Google Scholar | LinkedIn | Github | Personal Website | Portfolio

Education

Pukyong National University *Mar 2024 – Feb 2026*

MS Degree in Industry 4.0 Convergence Bionics Engineering *(Full time)* Busan, Republic of Korea

- **GPA**: 4.17/4.5
- **Thesis Topic**: Edge Computing Approach for Golf Club Path Recognition using Self-Supervised Learning

Ho Chi Minh City University of Technology *Aug 2019 – Nov 2023*

BS Degree (Honors) in Mechatronic Engineering *(Full time)* Ho Chi Minh, Vietnam

- **GPA**: 8.22/10
- **Thesis topic**: Damage detection of steel beam using CycleGAN

Technical Skills

Programming: C/C++, C#, Python, Matlab

Machine Learning Frame Work: PyTorch, TensorFlow

Model Deployment & Optimization: Quantization, ONNX, TFLite, TensorRT, Edge AI

Embedded Systems: MCU, PCB Design, Sensors and Actuators, Analog Front End, RTOS

Application Development: Mobile Applications (iOS, Android), WinForm

IoT & Cloud Integration: Firebase, Azure, MQTT, TCP/IP, UDP

Tools: Linux, Docker, Git, CUDA, TensorBoard

Research Experience & Projects

Research Assistant *Mar 2024 – Present*

NanoBioMechanics Laboratory (NBMLab) Busan, Republic of Korea

During my time at NBM Lab, I developed an IoT system integrated with AI for smart devices to support healthcare applications. I designed and implemented real-time data acquisition pipelines for motion analysis. My research focuses on using machine learning models for biomedical signals collected from sensors.

1. **Smart Wearable Devices for Golf Swing Analyzer System** (Video, Code)
   - Wearable device development includes: smart gloves, smart belts, smart insoles.
   - Integrated system connecting AIoT, cloud to improve skills in golf swing.
   - Software development for processing, analyzing, and visualizing swing performance metrics.
   - An unsupervised model's performance is assessed based on the quality of the latent representation and the reconstructed data. This provides a score of similarity between the user and the professional golfer.
   - Created a visualization tool that provides golfers with intuitive feedback on balance, stability, and weight shift.
2. **Non-contact Sensor Vital Signs Monitoring System** (Video, Code)
   - Develop a non-contact monitoring system using flexible sensors to track heart rate and respiratory rate.
   - The hybrid deep learning model integrates feature extraction, GRU, and multi-head attention blocks to learn patterns from sensor data.
   - Design a cloud system with a mobile application for remote health monitoring and real-time data visualization.
3. **Smart Device with Sensors Fusion for Vital Signs Monitoring** (Video, Code)
   - Develop a smart chair integrating multiple sensors (PPG, BCG, ECG) to monitor physiological signals continuously.
   - Implement sensor fusion algorithms to enhance accuracy in heart rate and respiration measurement.
   - Design an AI-assisted system for health status detection and anomaly identification in real time.
4. **Wireless sensor network** (Video, Code)
   - Develop a wireless sensor network to collect and process data from multiple sensor nodes.
   - Design a system to reconstruct body movements based on real-time sensor data.
   - Implement data synchronization and optimized communication protocols for accurate motion analysis.

Research Assistant *Oct 2020 – Jan 2024*
UID Laboratory Ho Chi Minh, Vietnam

At UID Lab, I worked on hands-on projects in Machine Learning and Artificial Intelligence. I explored embedded systems and robotics to integrate software and hardware for biomedical signals. In addition, I conducted research in signal processing, machine learning algorithms, and deep learning architectures to design and implement neural network modules.

1. **PPG Signal and Application in the Medical** (Code)
   - Research and design embedded systems and PCB for PPG signal measurement using the heart rate
   - Develop MCU with RTOS and BLE capabilities for signal acquisition and transmission.
2. **Study on Damage Detection of Steel Beam Using AI**
   - Utilizing vibration data through signal processing, for anomaly detection in steel beams.
   - Develop and deploy using the CycleGAN architecture. Vibration data is encoded to lower dimension and three-sigma rule to detect and visualize damage.

Publications

[J.1] Truong Tien Vo*, **Quy Phuong Le***, Huynwoo Jung*, et al. (2025). **Multi-Sensor Smart Glove With Unsupervised Learning Model for Real-Time Wrist Motion Analysis in Golf Swing Biomechanics**. *IEEE Internet of Things Journal*, 12(11), pp. 16574–16586. (*Co-First*) (**Q1**, IF **8.9**, Top **4.1%**)

[J.2] **Quy Phuong Le**, Truong Tien Vo, Dogeon Ha, et al. (2025). **On-Chip Machine Learning For In-home Patient Monitoring Using Non-Contact Ballistocardiogram-Based Bed Sensor**. Manuscript is in revision for publication in *IEEE Internet of Things Journal*. (**Q1**, IF **8.9**, Top **4.1%**)

[J.3] Truong Tien Vo*, **Quy Phuong Le***, Trong Nhan Nguyen, et al. (2025). **Multi-Task Non-Contact Ballistocardiogram Based Vital Signs Monitoring in Acupuncture**. Manuscript is in revision for publication in *Computers in Biology and Medicine*. (*Co-First*) (**Q1**, IF **6.3**, Top **5.2%**)

[J.4] **Quy Phuong Le**, Dogeon Ha, Huynwoo Jung, et al. (2025). **On-Device Club Path Recognition with Self-Supervised Learning for Golf Analysis**. Manuscript submitted to *IEEE Sensors Journal*. (**Q1**, IF **4.5**, Top **19.6%**)

[J.5] Dogeon Ha, **Quy Phuong Le**, Truong Tien Vo, et al. (2025). **Golf Swing Measurement with Real-Time Sweet Spot Detection using High-Speed Vision and Deep Neural Network**. Manuscript is in revision for publication in *Measurement Science and Technology*. (**Q1**, IF **3.4**, Top **20.4%**)

[J.6] Truong Tien Vo, Huu Sang Nguyen, Le Hai Tran, **Quy Phuong Le**, et al. (2025). **Multimodal Smart Clothing with Haptic Feedback for Real-Time Muscle Activation Assessment in Self-Coaching Fitness**. Manuscript submitted to *IEEE Internet of Things Journal*. (**Q1**, IF **8.9**, Top **4.1%**)

[J.7] Thanh Tung Luu, Duc Thien An Nguyen, **Quy Phuong Le**, et al. (2024). **Fatigue Damage Quantification for Structural Health Monitoring of Steel Beam Using CycleGAN**. *Journal of Engineering Science and Technology*, 19(2), pp. 705–724. (Q3, IF 0.5, Scopus)

Awards

2025 PKNU Fire Grant

2025 Brain Korea BLUE Scholarship Award

References

Prof. Junghwan Oh
Full Professor
Department of Biomedical Engineering
Pukyong National University, Republic of Korea
jungoh@pknu.ac.kr

Prof. Sudip Mondal
Assistant Professor
Institute of Information Technology and Convergence
Pukyong National University, Republic of Korea
smondal@pknu.ac.kr

Prof. Jae Sung Ahn
Assistant Professor
Smart Gym-Based Translational Research Center for Active Senior's Healthcare
Pukyong National University, Republic of Korea
jsahn@pknu.ac.kr