KUNYOUNG LEE

Ph.D. Researcher in AI, ML, Computer Vision, and Affective Computing.

✉ guy9284@gmail.com   🎓 Google Scholar   🏠 https://kyl92.github.io

RESEARCH INTEREST

I am interested in overcoming the instability and noisy data that arise in affective computing-based AI application for real-world. I have studied various kinds of topics to help AI deal with real-world problems in emotion recognition. Specifically, I am interested in advancing deep learning algorithms for **Remote Photoplethysmography, Remote Respiration Measurement, and Facial Expression Recognition** in real-world data such as driving and mobile environment.

EDUCATION

Sangmyung University, Seoul, Korea   Mar. 2019 – Feb. 2024
- Ph.D., Department of Computer Science, Graduate School
- Adviser: Eui Chul Lee
- Thesis: Camera-based Remote Photoplethysmography and Heart Rate Variability Measurement for Real-time Driver Monitoring

Sangmyung University, Seoul, Korea   Mar. 2017 – Feb. 2029
- M.S., Department of Computer Science, Graduate School
- Adviser: Eui Chul Lee
- Thesis: A Study on temporal-spatial feature based machine learning model for spontaneous/posed smile facial expression classification

Sangmyung University, Seoul, Korea   Mar. 2011 – Feb. 2017
- B.S., Department of Computer Science
- Adviser: Eui Chul Lee

PUBLICATIONS

[C #] : CONFERENCE,
[W #] : WORKSHOPS,
[J #] : JOURNAL,
 # : COUNT.

[J11] Kunyoung Lee, Jaemu Oh, Hojoon You, and Eui Chul Lee. Improving Remote Photoplethysmography Performance through Deep-Learning-Based Real-Time Skin Segmentation Network. Electronics 12, no. 17 (2023): 3729.

[J10] Kunyoung Lee, Seunghyun Kim, Byeongseon An, Hyunsoo Seo, Shinwi Park, and Eui Chul Lee. Noise-Assessment-Based Screening Method for Remote Photoplethysmography Estimation. Applied Sciences 13, no. 17 (2023): 9818.

[J9] Jin, Eunju, Hyunju Kang, **Kunyoung Lee**, Seung Gun Lee, and Eui Chul Lee. Analysis of Nursing Students' Nonverbal Communication Patterns during Simulation Practice: A Pilot Study. In Healthcare, vol. 11, no. 16, p. 2335. MDPI, 2023.

[J8] Kunyoung Lee, Seunghyun Kim, and Eui Chul Lee. Fast and Accurate Facial Expression Image Classification and Regression Method Based on Knowledge Distillation. Applied Sciences 13, no. 11 (2023): 6409.

[J7] You, Hojoon, **Kunyoung Lee**, Jaemu Oh, and Eui Chul Lee. Efficient and Low Color Information Dependency Skin Segmentation Model. Mathematics 11, no. 9 (2023): 2057.

[W1] Kim, Seunghyun, **Kunyoung Lee**, and Eui Chul Lee. Multi-View Body Image-Based Prediction of Body Mass Index and Various Body Part Sizes. In Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition, pp. 6033-6040. 2023.

[J6] Hwang, Hyeonsang, **Kunyoung Lee**, and Eui Chul Lee. A real-time remote respiration measurement method with improved robustness based on a CNN model. Applied Sciences 12, no. 22 (2022): 11603.

[J5] Jang, Woohyuk, Chaewon Lee, Dae Sik Jeong, **Kunyoung Lee**, and Eui Chul Lee. Multi-Currency Integrated Serial Number Recognition Model of Images Acquired by Banknote Counters. Sensors 22, no. 22 (2022): 8612.

[C3] Kunyoung Lee, Hojoon You, Jaemu Oh, and Eui Chul Lee. Extremely Lightweight Skin Segmentation Networks to Improve Remote Photoplethysmography Measurement. In International Conference on Intelligent Human Computer Interaction, pp. 454-459. Cham: Springer Nature Switzerland, 2022.

[C2] Kunyoung Lee, Kyungwon Jin, Youngwon Kim, Jee Hang Lee, and Eui Chul Lee. A comparative analysis on the impact of face tracker and skin segmentation onto improving the performance of real-time remote photoplethysmography. In Intelligent Human Computer Interaction: 12th International Conference, IHCI 2020, Daegu, South Korea, November 24–26, 2020, Proceedings, Part II 12, pp. 27-37. Springer International Publishing, 2021.

[J4] Kunyoung Lee, and Eui Chul Lee. Siamese Architecture-Based 3D DenseNet with Person-Specific Normalization Using Neutral Expression for Spontaneous and Posed Smile Classification. Sensors 20, no. 24 (2020): 7184.

[J3] Nam, Uiseo, **Kunyoung Lee**, Hyunwoong Ko, Jun-Young Lee, and Eui Chul Lee. Analyzing facial and eye movements to screen for Alzheimer's disease. Sensors 20, no. 18 (2020): 5349.

[J2] Park, Seho, **Kunyoung Lee**, Jae-A. Lim, Hyunwoong Ko, Taehoon Kim, Jung-In Lee, Hakrim Kim et al. Differences in facial expressions between spontaneous and posed smiles: Automated method by action units and three-dimensional facial landmarks. Sensors 20, no. 4 (2020): 1199.

[J1] Kunyoung Lee, and Eui Chul Lee. Comparison of facial expression recognition performance according to the use of depth information of structured-light type RGB-D camera. Journal of Ambient Intelligence and Humanized Computing (2019): 1-17.

[C1] Kunyoung Lee, and Eui Chul Lee. Comparison of 2D&3D Performances of Facial Feature Analysis Using RGB-D Vision Sensor. In Advances in Computer Science and Ubiquitous Computing: CSA-CUTE 17, pp. 1416-1421. Springer Singapore, 2018.

DOMESTIC [C #] : CONFERENCE, [W#]: WORKSHOPS, [J #] : JOURNAL, # : COUNT.	**[J3]** Jeong Won Hwang, **Kunyoung Lee**, Eui Chul Lee, " Method for Detecting Target in Extrusion Components through Vision Inspection Based on Object Tracking Algorithm", Journal of Next-generation Convergence Technology Association, 7(9), pp. 1412~1420, (2023) **[J2]** Chaewon Lee, Sung Bin Youn, Chul Woo Cho, Hyeonsang Hwang, **Kunyoung Lee**, Eui Chul Lee, " License Plate Image Enhancement Based on Enhanced Super-resolution Generative Adversarial Networks" Journal of Next-generation Convergence Technology Association, 6(1), pp. 5-11, (2022). **[J1]** Byeong Seon Ahn, **Kunyoung lee**, Eui Chul Lee, " Selective Face De-identification Method Preserving Facial Expression Information" Journal of Next-generation Convergence Technology Association, 6(11), pp. 2103-2109, (2022). **[C1]** Chaewon Lee, Sung Bin Youn, Chul Woo Cho, Hyeonsang Hwang, **Kunyoung Lee**, Eui Chul Lee, "License plate image enhancement based on super-resolution Generative Adversarial Networks," The Korean society of forensic sciences, 40, 2021.11.23 ~ 2021.11.30.
PATENTS [R#]: REGISTRATION, [A#]: APPLICATION, # : COUNT.	**[R8]** Lee, Kunyoung; Lee, E. C.; Jang, W.; Jeon, S.; Seok, C.; Shin, K.; Lee, D.; Kim, S.; Kim, S. "Apparatus and method for recognizing serial number of paper money base on image recognition" Korean Patent Registration No: 10-2632091-0000 Date: 2024.01.29 **[A4]** Lee, Kunyoung**;** Lee, E. C.; Kim, S.; Jeon, Y.; Lee, J.; Lee, K. "Device and method for acquiring heart rate" Korean Patent Application No: 10-2023-0160496 Date: 2023.11.20 **[R7]** Lee, Kunyoung; Lee, E. C.; Shin, Y.; Han, W., "Apparatus and method for gaeze tracking based on machine learning" Korean Patent Registration No: 10-2587813-0000 Date: 2023.10.05 **[R6]** Lee, Kunyoung; Lee, E. C.; Kim, Y. "Autism spectrum disorder evaluation method based on facial expression analysis" Korean Patent Registration No: 10-2565852-0000 Date: 2023.08.07 **[R5]** Lee, Kunyoung and Lee, Eui Chul, "Method and apparatus for remote photoplethysmogram," Korean Patent Registration No: 10-2542525-0000 Date: 2023.06.07 **[A3]** Lee, Kunyoung; Lee, E. C.; Kim, S.; Park, S.; An, B.; Seo, H.; "Noise assessment-based pulse signal screening method for remote photoplethysmography," Korean Patent Application No: 10-2023-0059266 Date: 2023.05.08 **[A2]** Lee, Kunyoung; Lee, E. C.; Kim, Y; "Apparatus and method for compressing facial recognition neural network model for multiple outputs," Korean Patent Application No: 10-2023-0053584 Date: 2023.04.24 **[A1]** Lee, Kunyoung; Lee, E. C.; You, H.; Oh, J.; "Method and Apparatus for Detecting Fake Faces Using Remote Photoplethysmography Signals," Korean Patent Application No: 10-2022-0125681 Date: 2022.09.30 **[R4]** Lee, Kunyoung; Lee, E. C.; Nam, U.; Kim, Y; "Deivce and method of screening dementia through analysis

between face direction and gaze," Korean Patent Registration No: 10-2446848-0000 Date: 2022.09.20

[R3] Lee, Kunyoung; Lee, E. C.; Kim, T.; Nam, U., "Apparatus and method for measuring psychological anxiety" Korean Patent Registration No: 10-2235932-0000 Date: 2021.03.30

[R2] Lee, Kunyoung and Lee, Eui Chul, "Apparatus and method for measuring face symmetry" Korean Patent Registration No: 10-211515-00000 Date: 2020.05.20

[R1] Lee, Kunyoung; Lee, E. C.; Kim, J. M., Jang, W., Han, J., "Apparatus and method for measuring heartbeat using triaxial accelerometer" Korean Patent Registration No: 10-1986213-0000 Date: 2019.05.30

DOMESTIC PROJECTS [P#]: GRANT, [C#]: CONTRACT, # : COUNT.	[C10] **HYUNDAI NGV,** 비전 기반 심박수 측정 시스템 개발 및 고도화, **Project Manager,** Jul. 2023 ~ Oct. 2023 [C9] **HYUNDAI NGV,** 운전자 감성인식을 위한 비접촉 생체신호 측정기술 개발 **Project Manager,** Oct. 2022 ~ Sep. 2023 [C8] **이후시스(주),** 비접촉 생체반응 측정 기술 개발, **Project Manager,** Aug. 2022 ~ Jan. 2023 [P9] **한국연구재단(NRF),** 비접촉 생체신호 추출 및 생체정보 융합을 통한 이상징후 판별 기술 개발, Jul. 2022 ~ Present [C7] **SL Corporation,** 얼굴 표정 및 HRV 특징을 이용한 운전자 감정인식 알고리즘 개발, **Project Manager,** Jun. 2022 ~ Dec. 2023 [P8] **과학기술정보통신부(MSIT),** 비접촉 생체신호 기반 운동효과 피드백 기능을 갖춘 AI 홈 트레이닝 시스템 제작, Apr. 2022 ~ Feb. 2023 [C6] **(주)이모코그,** 신경퇴행성 질환자의 생체신호 수집 및 분석 기술 개발, Mar. 2022 ~ Aug. 2022 [C5] **HYUNDAI NGV,** 비전기반 생체반응 및 행동상태 측정 연구, **Project Manager,** Dec. 2021 ~ Dec. 2022 [P7] **과학기술일자리진흥원(COMPA),** 머신러닝 화재 판정 모듈 및 AI 학습플랫폼 고도화.안정화 개발, Project Manager, Oct. 2021 ~ Mar. 2023 [P6] **산업통상자원부(KIAT),** 안면인식 위변조 보안을 적용한 무인매장 솔루션 연구개발 및 실증, Sep. 2021 ~ Aug. 2022 [C4] **주식회사 애니랙티브,** RGB 카메라 기반 생리반응 측정 및 인터렉션 기술개발, **Project Manager,** Aug. 2021 ~ Oct. 2021 [P5] **한국데이터산업진흥원(Kdata),** 2021 데이터바우처 지원 사업(수요기관:기산전자), Jul. 2021 ~ Nov. 2021 [C3] **한국전자기술연구원(KETI),** 상태데이터 통합 인터페이스 고도화 용역, Jun. 2021 ~ Nov. 2021 [C2] **대검찰청(SPO),** AI 를 이용한 차량번호 인식 기법 연구, **Project Manager,** Mar. 2021 ~ Dec. 2021 [P4] **한국전자기술연구원(KETI),** 상태데이터 통합 인터페이스 제작, Oct. 2020 ~ Dec. 2020 [C1] **기산전자,** Deep Learning 기반 PC OCR 엔진 기술 개발, **Project Manager,** Mar. 2020 ~ Jun. 2020 [P3] **한국연구재단(NRF),** 카메라 기반 통합형 자율신경 반응 측정 모델 연구, Jun. 2019 ~ Feb. 2022 [P2] **한국연구재단(NRF),** 생체기반 영상정보 정량적 분석 시스템, Mar. 2017 ~ Feb. 2021 [P1] **산업통상자원부(MOTIE),** 마음-몸 피드백을 통한 감정 치유를 위한 비접촉식 센싱 기반 인간 내면상태 인식 및 미러링 표출 상호작용 로봇 기술 개발, Mar. 2017 ~ Aug. 2021

PROGRAMMING SKILLS