

Yixiang Gao, PhD, *Electrical and Computer Engineering*

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PROFESSIONAL SUMMARY

AI/ML Researcher with a Ph.D. in Electrical and Computer Engineering from the University of Missouri - Columbia. Specialized in fostering interdisciplinary collaborations, notably with speech and language pathologists, enhancing the integration of advanced AI methodologies in clinical settings. Actively engaged in two NIH-funded projects (R15, R01), and published extensively across engineering and clinical platforms, including EMBC, CEC, AQL, ICVPB, and in peer-reviewed journals such as Applied Sciences. Exhibits profound expertise in **Deep learning, Computer Vision, Object Detection, Robotics** and **Pattern Recognition**. Seeking to leverage extensive AI/ML expertise to address complex real-world challenges and drive innovation in technology application.

TECHNICAL SKILLS

Programming Languages: Python, C/C++/CUDA, Matlab, HTML

Libraries: pytorch, scikit-learn, transformers, ultralytics, mmdet, ROS, ONNX, tinygrad

MLOps and API Tools: Git, Docker, Kubernetes, Github Actions for CI/CD

Operating Systems: Linux(preferred), Windows

Languages: English, Chinese

EDUCATION

University of Missouri - Columbia	Ph.D in Electrical and Computer Science	2017 – Current (Expected July 2024)
University of Missouri - Columbia	BS in Electrical Engineering	2014 – 2017
University of Missouri - Columbia	BS in Computer Engineering	2014 – 2017

EXPERIENCE

Graduate Research Assistant | *University of Missouri - Columbia* | *ViGIR Lab* 2017 – Current (Expected July 2024)

- PhD Thesis: Confounded predictions in machine learning
 - Detect, quantify, and mitigate confounding factors in machine learning and deep learning models.
- Student Investigator for NIH R01DC018026 2019 – Current
 - Continuation study following the previous NIH R15 project.
 - Developed classification pipeline with transformers and CNN using Pytorch and Matlab for analyzing both sEMG and fMRI data.
 - Published research on confounding factors in sEMG pattern recognition for voice pathology (AQL 2021/2023, CEC 2023, ICVPB 2024).
- Student Investigator for NIH R15DC015335 2017 – 2019
 - Developed machine learning algorithms with SVM, K-means, and MLP using scikit-learn and Pytorch for analyzing sEMG data.
 - Published pioneering research on the applications of machine learning techniques in voice pathology (AQL 2017/2019, EMBC 2018, Applied Sciences).

Other projects

- Object Detection through Fisheye Cameras | *University of Missouri - Columbia* | *ViGIR Lab* 2024
 - Trained several deep learning vision models such as YOLOv8, RT-DETR, Co-DETR on Fisheye8k dataset to participate the CVPR AI City challenge.
- SpotMicro - A quadruped robot dog | *University of Missouri - Columbia* | *ViGIR Lab* 2022 – 2023
 - An open-source quadruped robot for the MU Robotics club. Operated by a Raspberry Pi 4 and integrated with ROS.
- Object Detection and Pose Estimation using Embedded Devices | *University of Missouri - Columbia* | *ViGIR Lab* 2019
 - Applied YOLO on a Raspberry Pi 3 with stereo-vision cameras for object detection and pose estimation. (SSCI 2019).

Graduate Research Assistant | *University of Missouri - Columbia* 2017 – 2019

- Microprocessor Engineering
- Software Design in C and C++

PUBLICATIONS

- [1] R. Farag, P. Upadhyay, **Yixiang, Gao**, et al., "COVID-19 detection from pulmonary CT scans using a novel efficientnet with attention mechanism," in *The IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshops (CVPRW)*, (Accepted), 2024.
- [2] **Yixiang, Gao**, G. N. DeSouza, M. Berardi, and M. Dietrich, "Voice sEMG classification of sentences for vocal fatigue detection using GA-SVM for confounder," in *13th International Conference on Voice Physiology and Biomechanics (ICVPB)*, (Accepted), 2024.
- [3] **Yixiang, Gao**, M. Berardi, M. Dietrich, and G. N. DeSouza, "Feature adaptation with GA-SVM for confounding removal - an application on vocal fatigue detection using semg classification," in *The 15th Advances in Quantitative Laryngology, Voice and Speech Research (AQL)*, 2023.
- [4] **Yixiang, Gao**, M. Berardi, M. Dietrich, and G. N. DeSouza, "Removal of confounding factors using GA-SVM feature adaptation: Application on detection of vocal fatigue thru semg classification," in *IEEE 2023 Congress on Evolutionary Computation (CEC)*, 2023.
- [5] **Yixiang, Gao**, M. Dietrich, and G. N. DeSouza, "Classification of vocal fatigue using neck sEMG with leave-one-subject-out testing," in *The 14th Advances in Quantitative Laryngology, Voice and Speech Research (AQL)*, 2021.
- [6] **Yixiang, Gao**, M. Dietrich, and G. N. DeSouza, "Classification of vocal fatigue using sEMG: Data imbalance, normalization, and the role of vocal fatigue index scores," in *Applied Sciences*, vol. 11, 2021.
- [7] **Yixiang, Gao**, M. Dietrich, and G. N. DeSouza, "Explore voice production variability through neck semg clustering - challenge for accurate labeling of vocal fatigue," in *The 14th Advances in Quantitative Laryngology, Voice and Speech Research (AQL)*, 2021.
- [8] J. Demby's, **Yixiang, Gao**, and G. N. DeSouza, "A study on solving the inverse kinematics of serial robots using artificial neural network and fuzzy neural network," in *2019 IEEE International Conference on Fuzzy Systems (FUZZ-IEEE)*, 2019.
- [9] J. Demby's, **Yixiang, Gao**, A. Shafiekhani, and G. N. DeSouza, "Object detection and pose estimation using CNN in embedded hardware for assistive technology," in *2019 IEEE Symposium Series on Computational Intelligence (SSCI)*, 2019.
- [10] M. Dietrich, E. Tippit, A. Walker, M. Pfeiffer, **Yixiang, Gao**, and G. N. DeSouza, "Relative fundamental frequency during vocal loading and relationships with laryngeal muscular patterns," *The 13th Pan-European Voice Conference*, 2019.
- [11] M. Dietrich, **Yixiang, Gao**, and G. N. DeSouza, "Extralaryngeal surface emg features that distinguish between those with and without elevated scores on the vocal fatigue index," *The Fall Voice Conference*, 2019.
- [12] **Yixiang, Gao**, M. Dietrich, M. Pfeiffer, A. Walker, and G. N. DeSouza, "Classification of vocal gestures extracted from quasi-daily sentences to detect vocal fatigue," *The 13th Advances in Quantitative Laryngology, Voice and Speech Research (AQL)*, 2019.
- [13] **Yixiang, Gao**, M. Dietrich, M. Pfeiffer, and G. N. DeSouza, "Classification of sEMG signals for the detection of vocal fatigue based on VFI scores," in *2018 40th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, 2018.
- [14] **Yixiang, Gao**, M. Pfeiffer, M. Dietrich, and G. N. DeSouza, "Classification of neck surface EMG signals for the early detection of vocal dysfunction," *The 12th Advances in Quantitative Laryngology, Voice and Speech Research (AQL)*, 2017.

OTHER ACTIVITIES

academic paper reviews: EMBC2019/2020/2021, CEC2023, Applied Sciences, TAI

open-source contributions: tinygrad, huggingface transformers