Xiaorui Gu

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Education

Northwestern University | Evanston, IL
M.S. in Electrical Engineering | Incoming, Sep 2025

University of Illinois | Urbana, IL
B.S. in Mechanical Engineering | Aug 2021 – May 2025

Research

Mobility and Fall Prevention Research Laboratory | Jun 2024 – Mar 2025
Research Intern
– *Advisor: Prof. Manuel E. Hernandez, University of Illinois*

- Developed a piezoresistive pressure sensor array based on Velostat, achieving high sensitivity and portability for gait analysis and rehabilitation exercise.
- Designed an interactive LED-based visual aid synchronized with a mobile device UI.
- Programmed and tested firmware in C++ on ESP32 S2 for data acquisition, ensuring reliable sensor integration.

Bahl Research Group | Aug 2023 – Jan 2025
Undergraduate Research Assistant
– *Advisor: Prof. Gaurav Bahl, University of Illinois*

- Designed and constructed experimental setups for a fully levitated 6-DOF system, potentially for use in low-frequency signal generation and IMUs.
- Provided manufacturing support across semesters, including CAD, 3D printing, laser cutting, water jet cutting, CNC machining, and PCB soldering.

Garg Group | May 2023 – Mar 2025
Undergraduate Research Assistant
– *Advisor: Prof. Nishant Garg, University of Illinois*

- Investigated 3D reconstruction for measuring concrete mix flow motion using OpenCV and Open3D.
- Prototyped a sensor array for temperature and humidity monitoring with Arduino and ESP8266, integrating data collection with Firebase.

Publication

Gu, X., Gupta, P., Liu, J., Zhou, H., Cisto, B., Khan, M. A., Mason, S., Motl, R., Sebastiao, E., & Hernandez, M. E. *Intelligent Square Stepping Exercise System for Cognitive-Motor Rehabilitation in Older Adults with Multiple Sclerosis. Proceedings of the 2025 Design of Medical Devices Conference*, Minneapolis, MN.

Selected Projects

Autonomous Driving with Static & Dynamic Obstacle Avoidance | Jan 2025 – May 2025
Team: SafeTaxi, ECE484: Principles of Safe Autonomy, University of Illinois

- Worked on vision-LiDAR fusion algorithms for lane following and various obstacle avoidance scenarios, using the International F1TENTH Autonomous Racing Competition platform powered by NVIDIA Jetson NX.

Object Recognition on Mobile DSP | Aug 2024 – Dec 2024
Team: UIUC Campus Tour Application, ECE420: Embedded DSP Systems, University of Illinois

- Built an Android mobile app for landmark classification using SIFT feature extraction, K-means clustering, and SVM classification.

Skills

Programming - Python, C++, Java, MATLAB, Linux, Anaconda, Git
CAD & Simulation - KiCAD, Autodesk Fusion 360, SolidWorks
Library & Framework - OpenCV, PyTorch, ROS, Gazebo