Zachary Choffin

(630) 899-9199 • zacharychoffin@gmail.com • https://www.linkedin.com/in/zchoffin • https://zchoffin.github.io

EDUCATION

The University of Alabama Tuscaloosa, AL
Doctor of Philosophy – PhD, Electrical and Electronics Engineering: GPA: 3.79/4.0 *Spring 2024*
Relevant Coursework: Artificial Intelligence, Intro to Machine Learning, Engineering Statistics

The University of Alabama Tuscaloosa, AL
Bachelor of Science in Electrical Engineering: GPA: 3.68/4.0 *Fall 2020*
Relevant Coursework: Matrix and Vector Analysis, Digital Signal Processing, Engineering Data Analytics

RELEVANT EXPERIENCE

The University of Alabama, *Intelligent Sensors and Wireless Systems* Tuscaloosa, AL
Graduate Research Assistant, *May 2019 – Present*

Watermelon Ripeness Detection Utilizing Microwave Imaging and Machine Learning *October 2022 - Present*

- Stepped into a leadership role within an ongoing developing a microwave imaging system for determining watermelon ripeness, due to a colleague's sudden departure, successfully driving the team to publish two papers.
- Led senior design team in developing a miniaturized PCB for RF switching in a radar-based microwave imaging system.
- Statistically analyzed and verified microwave imaging data of watermelons at various stages of ripeness using ANOVA analysis, ensuring accurate classification and assessment of ripeness levels.
- Developed a Convolutional Neural Network that accurately determines the ripeness of watermelons from radar-based images, achieving a 98% classification accuracy across a dataset of ten watermelons.

Enhanced Fuel Efficiency through C-V2X Technology *September 2020 - Present*

- Collaborated with an interdisciplinary team to develop methods for reducing fleet fuel consumption by fusing sensor data from cameras, radar, and radio.
- Developed testing plans for evaluating the communication range and performance of 3GPP Release 14 C-V2X technology in real-world environments, identifying key factors affecting deployment locations.
- Integrated V2X-Hub at an intersection to transmit traffic light timings directly to vehicles, enabling more precise vehicle trajectory calculations and improved traffic flow.

Joint Angle Detection Utilizing Machine Learning *May 2020 - Present*

- Guided a team of 2-5 members in developing and integrating smart insole sensors to measure pressure distribution across the foot.
- Achieved individual identification with a 92% accuracy rate by analyzing walking pressure data using Gaussian Process Regression algorithms.
- Utilized statistical methods to analyze the relationship between joint angles and foot pressure distribution in inverse dynamics scenarios.
- Secured a prediction accuracy exceeding 85% for joint angles up to the lower back with lower sensor counts by designing a regression-based machine learning algorithm, demonstrating significant improvement over existing models.

Honda Manufacturing of Alabama, Lincoln, AL *August 2017 -December 2017*
Engine Department: Co-op

- Worked with senior engineers to optimize engine identification using RFID code in Sysmac Studio for Omron NJ series PLCs, resulting in a more compact and efficient function block. This enhancement reduced cycle times by 2-3%, increasing output by fifteen engines per shift and simplifying future troubleshooting.
- Verified electrical drawings used to diagram and troubleshoot programmable logic controllers and robot cages. By tracing the wires and using old diagrams, the team was able to verify correct wire numbers and component locations. Using Auto Desk Mechanical 2016, the electrical diagrams were upgraded to the correct configuration of the Robot cage.

PUBLICATIONS: 4 Journal Papers, 2 Conference Papers, 2 Patents (Pending)

- **Choffin, Z**., Jeong, N., Callihan, M., Olmstead, S., Sazonov, E., Thakral, S., Getchell, C., & Lombardi, V. (2021). Ankle Angle Prediction Using a Footwear Pressure Sensor and a Machine Learning Technique. Sensors (Basel, Switzerland), 21(11), 3790.
- Anderson, W., **Choffin, Z.**, Jeong, N., Callihan, M., Jeong, S., & Sazonov, E. (2022). Empirical Study on Human Movement Classification Using Insole Footwear Sensor System and Machine Learning. Sensors (Basel, Switzerland), 22(7), 2743.

SKILLS

- Python 3, Google Colab, Pandas, Matplotlib, Tensorflow, YOLOv4, OpenCV, PyTorch, AWS, MySQL, Apache Spark, NLTK, spaCy, Linux, Bash, Jupyter Notebook, and C-V2X.