ARYAN YAMINI SENTHIL

aryanyaminisenthil@gmail.com • (405)-414-7622 • Norman, OK 73071

RESEARCH INTERESTS

Deep Learning • Reinforcement Learning (Agents) • Multimodal AI

EDUCATION

B.S. Engineering Physics
Expected: Dec 2025

The University of Oklahoma | Norman, OK | Curriculum GPA: 3.4

RESEARCH EXPERIENCE

Undergraduate Research Assistant | University of Oklahoma
May 2022 – September 2024, August 2025 - Present

Advisor: Dr. Mrinal Saha; Postdoctoral Mentor: Dr. Kuntal Maity

- Conducted experimental research on **smart materials** exhibiting **flexoelectric, piezoelectric,** and **pyroelectric properties,** investigating their **electrical response to mechanical and thermal stimuli** and applying **deep learning to analyze and predict these responses,** leading to a publication**.**
- Designed and fabricated **smart sensors** using **silica-based polymers** integrated with these **smart materials** to capture and characterize their **electromechanical behavior.** These sensors were **3D printed using a custom-formulated gel,** making them **soft, flexible, and ultrasensitive.**
- Developed and researched **deep learning algorithms that leverage the intrinsic electric fields** of these smart sensors to generate measurable outputs **without the need for external power**, advancing progress toward **autonomous, AI-driven sensing technologies**.
- Developed a **novel multi-task architecture** that simultaneously predicts **load type and deformation** from voltage-time data. Designed a **spectrogram-based CNN** achieving **100% classification accuracy** and a **Wide & Deep network** achieving **RMSE of 0.041mm** for regression. Merged both into an **end-to-end model** handling classification and continuous prediction.
- Developing a **transformer-based architecture** for **damage detection and localization** in carbon fiber composites. Established baseline with an initial **CNN achieving 100% accuracy**, now advancing to transformers to capture **long-range dependencies** for precise spatial localization.
- Implemented **end-to-end Python ML pipelines** incorporating preprocessing, feature engineering, training, **hyperparameter optimization**, and evaluation, demonstrating proficiency in **production-grade workflows**.

PUBLICATIONS

"Design of Flexible and Ultrasensitive 3D Printed Flexoelectric Sensor for Self-Powered Damage Detection of Composite Structures"

Kuntal Maity, Mrinal Saha, **Aryan Senthil,** Anirban Mondal.

39th Annual Technical Conference of the American Society for Composites (ASC) [In Press]

https://composites.uw.edu/ASC/?q=2024

HONORS & AWARDS

Dean's List, **Gallogly College of Engineering, University of Oklahoma**

PROFESSIONAL EXPERIENCE

CEO and Cofounder
May 2024 - Jun 2025
Dirac Technologies | Norman, OK

- Secured funding to design and develop **two autonomous 6 axis robotic arms** capable of learning manipulation tasks through **imitation learning** frameworks.
- Engineered and integrated **object detection, teleoperation,** and **embedded control modules**, enabling the system to **learn and reproduce human-guided teleoperated demonstrations with high precision.**
- Led a 5-member cross functional team in hardware design, embedded systems, and AI integrations, directing efforts to synchronize teleoperation data with autonomous robotic performance.

Math Tutor
Oct 2022 - May 2023
Math Center - University of Oklahoma | Norman, OK

- **Delivered personalized tutoring** in *Calculus, Differential Equations, Linear Algebra,* and *Physical Mathematics* for individuals and small groups.
- **Guided students** through homework, exam preparation, and practice tests, resulting in **improved academic performance and confidence**.

LEADERSHIP EXPERIENCE

Community Service Chair
Aug 2022 - Dec 2023
Pi Kappa Phi Fraternity - University of Oklahoma | Norman, OK

- Directed and organized **The Ability Experience**, Pi Kappa Phi's national philanthropy initiative, to empower individuals with disabilities through service and awareness campaigns.
- Coordinated and managed fundraising and volunteer events, raising funds to support children with disabilities and expanding accessibility initiatives.
- Collaborated with university officials and community partners to develop outreach programs and recruit fraternity members for sustained volunteer engagement.
- Led chapter participation in **University of Oklahoma's "The Big Event" & "The Small Event,"** the university's largest community service project, strengthening partnerships with local nonprofits.

Executive Board Member
Sep 2020 - May 2021
OU Cousins - University of Oklahoma | Norman, OK

- Coordinated and facilitated intercultural programs fostering friendship and cultural exchange between U.S. and international students.
- Collaborated with university departments and student organizations to promote diversity, inclusion, and global awareness across campus.