

ALEJANDRO APARCEDO

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EDUCATION

University of Central Florida

Expected Graduation: Fall 2024

Computer Science, B.S.

Relevant Coursework: Matrix & Linear Algebra, Calculus, Statistical Methods, Machine Learning, Software Development, Quantum Computing, Computer Vision

Senior Design Project: “ACE”, Voice Flight Assistant

January 2024 - December 2024

- Engineered an innovative speech-to-speech interface enabling natural language commands to manipulate aircraft within MACE (Modern Air Combat Environment), streamlining scenario creation and modification.
- Integrated multiple open-source AI technologies (Whisper.cpp, LLaMA.cpp, WhisperSpeech), showcasing proficiency in adapting and deploying Hugging Face and other cutting-edge models for practical applications.

EXPERIENCE

Florida Solar Energy Center

November 2023 - Current

Data Science & Machine Learning Intern

- Developed a framework for power outage detection via processing nighttime satellite imagery.
- Accelerated processing of geospatial data by 98% through High Performance Computing, mixed-precision training, and multi-gpu optimization.
- Engineered a novel framework for prediction of geospatial data using variational auto encoders and spatiotemporal graph neural networks models.
- Trained and evaluated a variety of image segmentation models applied to solar panel segmentation from aerial/satellite imagery.
- Contributed to the Department of Energy-funded CARES project, focusing on **clean**, **affordable**, and **resilient** energy systems for vulnerable communities.

Dr. Ser-Nam Lim’s Group, UCF

August - November 2023

AI Research Assistant

- Developed a framework to study the effects of visual adversarial attacks against Large Multimodal Models (LMMs).
- Conducted research on the adversarial robustness of LMMs *LLaVA*, *BLIP-2*, and *InstructBLIP* against visual attacks, advancing understanding of their performance image classification, and captioning tasks under various attack scenarios.
- Co-authored paper and presented findings at Computer Vision and Pattern Recognition conference.

Center for Research in Computer Vision

May - July 2023

Research Experience for Undergraduates

- Investigated the effects of data augmentation on *LLaVA*’s performance.
- Provided novel results on the adversarial robustness of *LLaVA* against visual attacks.

VOLUNTEERING

- LXAI @ CVPR Student Volunteer
- Photovoltaic Specialists Conference Student Volunteer
- CMD-IT/ACM Richard Tapia Conference Student Volunteer

MEMBERSHIPS

- Undergraduate Research Coordinator. Artificial Intelligence (AI) @ University of Central Florida
- Member. Society of Hispanic Professional Engineers
- Member. LatinX in AI
- Member. Institute of Electrical and Electronics Engineers.

CONFERENCE PUBLICATIONS

X. Cui, **A. Aparcedo**, YK Jang, SN Lim. “On the Robustness of Large Multimodal Models Against Image Adversarial Attacks.” *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2024.

A. Aparcedo, C. Lopez, A. Kotta, KO Davis, M. Li. “Multimodal Power Outage Prediction for Rapid Disaster Response and Resource Allocation.” *52nd IEEE Photovoltaic Specialists Conference (PVSC)*, 2024.

JOURNAL PUBLICATIONS

G. García, **A. Aparcedo**, GK Nayak, T. Ahmed, M. Shah, M. Li. “Generalized deep learning model for photovoltaic module segmentation from satellite and aerial imagery.” *Solar Energy, Vol. 274, pp. 112539*, 2024.

INVITED TALKS AND PANELS

A. Aparcedo. “Multimodal Power Outage Prediction for Rapid Disaster Response and Resource Allocation” *CWRU SDLE Research Center*, 2024. Oral presentation.

A. Aparcedo, C. Lopez, M. Li. “Improved Power Outage Prediction with Multimodal Spatiotemporal Graph Neural Networks” *10th Annual Data Science in Engineering and Life Sciences Symposium*, 2024. Poster presentation.