Michael Cardei

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Education

University of Florida, | B.S in Computer Science June 2020 – May 2024
Herbert Wertheim College of Engineering | **GPA:** 3.92/4.00
Relevant Courses: Trustworthy Machine Learning (Graduate Course), Applied Machine Learning, Natural Language Processing, Introduction to Multi-Modal Machine Learning, Programming Language Concepts, Engineering Statistics, Operating Systems, Data Structures and Algorithms
Relevant Associations: Gator AI Club, ACM

Research Experience

Student Researcher August 2023 – Present
University of Florida, Adaptive Learning and Optimization Lab, Advised by Dr. Thai

- Investigating **privacy vulnerabilities** and exploring implementation strategies within Federated Learning for **Large Language Models**.
- Examining neuron-based explainable AI methods for network intrusion anomaly detection mechanism analysis.

AI/Robotics Research Intern (RISS) June 2023 – August 2023
Carnegie Mellon University Robotics Institution, ILIM Lab, Advised by Dr. Narasimhan

- Researched methods for context-driven road work-zone detection and localization for autonomous vehicles.
- Leveraged advanced **Computer Vision, Deep Learning, and NLP** techniques—including detection, instance segmentation, scene text recognition, and transfer learning.
- Poster, and video available Here, Poster

Research Intern August 2022 – June 2023
Wake Forest University, Advised by Dr. Topaloglu

- Researched novel methods for **bias mitigation and fairness** in medical deep learning applications
- Implemented, optimized, and tested deep learning algorithms while also performing feature engineering, model creation, and model evaluation
- Used multiple Machine Learning frameworks such as TensorFlow, PyTorch, and Keras for the creation and implementation of Deep Neural Networks

Research Intern (REU) May 2022 – August 2022
Wake Forest University School of Medicine, Advised by Dr. Topaloglu

- Researched novel approaches for **Privacy Preserved Machine Learning** based upon data frequency domain transformations
- Created and tested multiple adversarial attacks along with implementing the privacy methods in a **Federated learning** environment. Utilized TensorFlow Federated and TensorFlow Privacy along with other machine learning libraries.
- Presented my research at the Wake Forest REU summer symposium winning 2nd place in the "Cancer, Imaging, and Informatics" session

Publications

1. Ay, S., **Cardei, M.**, Meyer, AM. et al. "Improving Equity in Deep Learning Medical Applications with the Gerchberg-Saxton Algorithm". *Journal of Healthcare Informatics Research* (2024). https://doi.org/10.1007/s41666-024-00163-8 (Full Version)

2. S. Ay, **M. Cardei**, A. Meyer, W. Zhang and U. Topaloglu, "Improving Equity in Deep Learning Medical Applications with the Gerchberg-Saxton Algorithm," in *2023 IEEE 11th International Conference on Healthcare Informatics (ICHI)*, Houston, TX, USA, 2023 pp. 692-694. doi: 10.1109/ICHI57859.2023.00123

3. Seha Ay, Can Bora Unal, **Michael Cardei**, Suraj Rajendran, Wei Zhang, and Umit Topaloglu, "Advancing Privacy in Deep Learning Through Data Transformations", **Under Review**. Preprint available Here, Page.

Achievements and Awards

CMU Robotics Institute Summer Scholar June 2023

WeatherOrNot, University of Florida Artificial Intelligence Hackathon Finalist, 3rd October 2022

- Developed a full-stack web-app predicting the effects of climate change on images of geographical location
- Utilized stable diffusion generative model alongside EM-DAT and NOAA datasets to perform inpainting for predicting the impact of various natural disasters

Wake Forest University BME and Informatics Summer Research Scholar May 2022

Skills

- Languages: C++, Python, Java, R, SQL
- Tools/Frameworks: TensorFlow, PyTorch, Keras, MMDetection, Mask2Former, Scikit-Learn, TensorFlow Federated, TensorFlow Privacy, MongoDB, GitHub