

XIAOYA MA

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EDUCATION

- **University of California, Los Angeles** April 2023 – June 2024
Henry Samueli School of Engineering and Applied Science Cumulative GPA:3.9(AI courses) /3.5(cumulative)
- MS in Electrical Engineering
- **University of California, Los Angeles** Sep 2018 – June 2022
Cumulative GPA:3.82/4.0
- BS in Electrical Engineering + Premed Track

PROJECT

- **Transportation dynamic data analysis for Uber in LA** Sept 2023-Dec 2023
 - Optimized autonomous vehicle routing using Uber's 2019 LA travel time data, applying **NetworkX** in Python to calculate upper bounds for approximate algorithms.
 - Solve the traveling Traveling Salesman(TSP) by building minimum spanning tree, use 1-approximate algorithm in the class and plot the trajectory.
 - Used **Delaunay Triangulation** to assess traffic flow and vehicle interactions, improving autonomous navigation between high-traffic locations.
 - Predicted commute flow and estimated vehicle demand to optimize autonomous fleet deployment during peak hours,using **numpy, pandas, igraph**.
 - Developed a method to remove unreliable data from traffic flow graphs, enhancing decision-making and safety algorithms for autonomous vehicles.
- **Reinforcement Learning and Inverse Reinforcement learning** Sept 2023-Dec 2023
 - Learn the optimal policy of agent navigating in a 2-D environment(Markov Decision Process), implement the **Value iteration algorithm** to learning the optimal policy.
 - Learning an expert's reward function by observing the optimal behavior of the expert, using Inverse Reinforcement Learning algorithms like **linear programming formation** and **maximum entropy formation**.
- **Large-Scale Social and Complex Networks on Personalized recommendations and navigations** Sept 2023-Dec 2023
 - Built 4039(node/user) Facebook user network using Endo-Renyi, igraph in R and python, and apply Fast-Greedy, Edge-Betweenness, and Infomap community detection algorithms on generated personalized networks to identify meaningful communities.
 - Calculated characteristics of nodes in personalized networks, embeddedness and dispersion properties.
 - Experimented Common neighbor measure has the best accuracy(0.857) of three friend recommendation algorithms, with Jaccard measure and Adamic Adar measure.
- **Privacy accuracy and Fairness in Differentially Private Deep Learning** March 2024-June 2024
 - Assessed the trade-off between differential privacy and fairness using a **CNN model** for MNIST, mainly with **sklearn** and **pytorch**.
 - Implemented DPSGD (Differentially Private Stochastic Gradient Descent algorithm), fine-tune with regularization and clipping methods to optimize the strategy, addressing the privacy and fairness trade-off among underrepresented classes.
- **Adversarial Attacks and Defenses on Deep Learning.** March 2024-June 2024
 - Applied representative white-box adversarial algorithms(PGD),to attack CIFAR10 classifier, and train model using **PyTorch** and **Opacus** and obtain less than 4% testing accuracy.
 - Trained **GAN** for data generation, evaluated the model's robustness against adversarial perturbations, improves the accuracy by 90%+. Investigate membership inference attacks and rule-based attacks on various datasets, MNIST and UCI Adults.
- **Computer Imaging on enhanced image realism and generation** Jan 2024-March 2024
 - Synthesized images with smaller depths of field thus making it appear to have been taken from an expensive camera with a larger aperture, use the **OpenCV** Library, derive Blur kernel width.
 - Used **NerF** and **Pytorch**, trained with positional encoding, that could map pixels to world rays.
 - Implemented **hugging face diffusers** library to build a simple stable diffusion pipeline, and experiment with different components for enhanced image generation.

RESEARCH EXPERIENCE

- **Intel** sponsored, Undergraduate researcher, Semiconductor Research Cooperation(SRC) UCLA, Los Angeles, CA. Sep.2021—June.2022
 - Engaged in a research modeling project related to LNA (low noise amplifier) and Rat Racer Mixer structure: Using ADS to simulate and improve designed filter efficiencies by tailoring amplifier gain (dB) requirements. Wilkinson Power Divider(72Ohm,15Ghz, microstrip 3db Power divider): Impact of parasitic components in case of 2:1 Impedances, Comparison & momentum analysis. 2.4Ghz E-pHEMT LNA with 2.4Ghz to 2.5Ghz frequency range and NF of 1.2 dB gain 15dB.
 - Selected with academic excellence, and conferred with research stipend 2500\$
- **IBM** sponsored, Undergraduate researcher, Semiconductor Research Cooperation(SRC). UCLA, Los Angeles, CA Sep.2020—June.2021
 - Professor Tatsuo Itoh's lab, Microwaves Electronics laboratory
 - Conducted research project "Effects of PBG structure with different parameter and material on bandwidth performance of Low-Pass Filter" under guidance of Professor Tatsuo Itoh, using CST and HFSS
 - Selected with academic excellence, and conferred with research a stipend of 2500\$
- **Master Student Lab Researcher, Professor Yuanxun Wang's Lab** UCLA, Los Angeles, CA. June.2023—Dec.2024
 - Help with improving antenna performance based on: J. P. Dytioco Santos, F. Fereidoony, M. Hedayati and Y. E. Wang, "High Efficiency Bandwidth VHF Electrically Small Antennas Through Direct Antenna Modulation," in IEEE Transactions on Microwave Theory and Techniques, vol. 68, no. 12, pp. 5029-5041, using CST and HFSS
 - Work on designing, simulating and improving radiation efficiency of $ka=1/4$, $ka=1/8$ loop antenna and coupled loop antenna, using HFSS and CST

SKILLS

- **Programming:** C++,Python,Java, R, Linux, AWS, Git, MATLAB
- **ML and Data:** SQL, Huggingface, Scikit-learn, PyTorch, Tensorflow, Pandas