ADHAM ELARABAWY

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EDUCATION

University of California, Berkeley

Electrical Engineering & Computer Science - Regents Scholar Expected Graduation: 2023

- *Relevant Courses:* CS61A/B (Data Structures, Algorithms), CS188 (Artificial Intelligence), CS170 (Algorithms), CS70 (Discrete Math, Probability Theory), EECS16A/B (Machine Learning, Robotics) , MATH53 (Multivariable Calculus)
- GPA: 3.9

EXPERIENCE

UC Berkeley Research Lab *Prof. Miki Lustig MRI ML Research Lab @ UC Berkeley* Berkeley, CA

***Undergraduate Researcher* (Python, PyTorch, Keras)** Aug 2021 - Present

- Architected a complex-valued Convolutional Neural Network Plug-and-Play denoiser in PyTorch targeted for solving the (2D + Time) inverse MRI problem in a deep unrolled MoDL architecture.
- Advised by Professor. Miki Lustig, Dr. Efrat Shimron, & Dr. Alfredo De Goyeneche Macaya.

FORMLABS *3D Printing Unicorn Company* Boston, MA

***Software Engineering Intern* (Python, Go, C++)** Sept 2020 - Present

- Developed real-time jerk-limited trajectory generation algorithm driven by material science and laser optics constraints resulting in 17% print time savings & 9% reduced active printer sound.
- Optimized cured resin peel procedure via integrating force sensor feedback for higher resolution parts leading to 8% less force on printed parts.
- Enhanced control systems and motion planning for Formlabs FLS/SLA 3D-printers.

MACHYNA LABS *Computer Vision & Machine Learning Startup* San Diego, CA

***Co-Founder / Software Engineer* (Python, PyTorch, Tensorflow, C++, Unix Scripting)** June 2021 - Present

- Formulated 3 millisecond barcode detection pipeline using HSV thresholding preprocessing into a heavily optimized convolutional neural network with 94% accuracy with EAN-13 & UPC-A barcodes.
- Engineered OpenNMT-based machine learning language model in PyTorch & Tensorflow to translate barcode images into corresponding product codes with 95% effectiveness.

KELZAL *Low-Power Computer Vision & Machine Learning Startup* San Diego, CA

***Software Engineering Intern* (Python, UNIX Script)** June 2019 - Aug 2020

- Devised neural network architecture for real-time battery-powered shopping carts for automated 24-class grocery product classification with 89% accuracy.
- Architected an entirely automated pipeline for generating a synthetic training corpus augmented with various symmetric and asymmetric signal transformations.

GROGURU *Strategic Irrigation through AI Startup* San Diego, CA

***Software Engineering Intern* (Java, JavaScript, MySQL, JSP, HTML/CSS)** June 2017 - Aug 2019

- Automated sensor placement via machine learning using NDVI composites computed from multispectral satellite imagery.
- Created full-stack web application for monitoring 200+ sensor suites on remote industrial farms.

EXTRACURRICULAR

OPEN-QUADRUPED *Featured and Cited in Northwestern Research Paper (IEEE)* San Diego, CA

***Personal Robotic Dog Project* (Python, C++, ROS)** May 2020 - Present

- Conceptualized and 3D-printed robot dog parts from scratch via FDM/SLS printing.
- Pioneered reinforcement learning on open-loop gait using IMU sensor for real-time balancing (in Gazebo Physics Engine).
- Deployed object classification and tracking via YOLOv3 neural network trained on custom dataset.
- Implemented 3D environment localization and mapping using Visual ORB-SLAM + LIDAR.

MACHINE LEARNING @ BERKELEY *Machine Learning Organization @ UC Berkeley* Berkeley, CA

***Researcher + External Relations Officer* (Python, PyTorch, Keras)** Feb 2020 - Present

- Conducted active machine learning research using autoencoders as an image compression technique in an effort to outperform existing compression methods with 3% improved signal-to-noise reconstruction performance.

PATENTS & AWARDS

- **Provisional Patent Inventor - Improved Elevated Robotic System & Method** (Reg.#62959086): Conceived control system for assistive robotic vehicle that traverses a metal rail. Current applications: tracking an intruder around a house, optimized networking through router placement, educational platform for introducing computer vision.
- **2020 U.S. Presidential Scholar Candidate:** One of 4500 U.S. high school students selected.
- **2019 First Place in the Computer Science Division:** 65th Annual Greater San Diego Science and Engineering Fair.
- **2018 First Robotics Competition World Championship Division Finalist:** placed 7th in the FRC World Championship.