Muhammad Fadli Arsani

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EDUCATION

University of California San Diego **San Diego, CA**
B.S. Electrical Engineering - Machine Learning & Controls (GPA: 3.92) *Graduation Date: June 2024*

- Relevant courses: Deep Learning in Computer Vision, Python For Data Analysis, OOP Programming in C++, Linear & Non-Linear Optimization, Machine Learning Algorithms, Intro To Autonomous Vehicles, Robotics, Controls Theory, Signals & Systems, Data Structures & Algorithms, C Programming, Circuits Theories, Probability & Statistics, Calculus (I, II, III), Linear Algebra, Physics, Differential Equation.
- Organizations/Awards: **Warren College Honors Society**, awarded **Provost Honors** every quarter.

WORK EXPERIENCE

Research Software Engineer **San Diego, CA**
Existential Robotics Lab, Contextual Robotics Institute (CRI) UC San Diego *January 2023 – Current*

- Built implementations & visualizations of baseline **robotics algorithms** for **localization**, **mapping**, & **controls**.
- Implemented various robotics algorithms like **Particle Filter, SLAM, Kalman Filter, A* search, etc**.
- Programmed a **navigation environment** in **PyBullet real-time physics simulation engine**.

Research & Software Engineer Intern **San Diego, CA**
Autonomy Lab, Contextual Robotics Institute (CRI) UC San Diego *March 2022 – September 2022*

- Trained a **Reinforcement Learning policy** on the **Unitree A1** robot allowing it to traverse challenging terrains.
- Collected **real-world data** to bridge the gap between **Sim2Real** and uncertainties in the real world.
- Utilized **GPU clusters** and other MLOps tools like **Kubernetes** and **WANDB** to train the models.
- Modified our terrains in the **NVIDIA Isaac Gym**, allowing the robot to adapt to more challenging terrains.

PROJECTS

BEDSR - Budget Enhanced Deep Residual Networks for Single Image Super-Resolution *Winter 2022*
PyTorch, Python, Deep Learning, Computer Vision

- Designed and implemented a **resource-constrained neural net**, inspired by Bee Lim et. al. **EDSR** paper.
- Achieved an average peak signal-to-noise ratio **(PSNR) of 33.43 dB** on popular SR datasets.
- Built and wrote the entire model, training & testing pipelines, data preprocessing, etc. from scratch.

Jetson-Nano-Powered Self-Driving RC Car *Spring 2021*
C++, Python, ROS, Jetson Nano, Brushless DC Motor, etc.

- Wrote a **ROS package**, utilizing the **OpenCV** library for **lane switching** and **line detection**.
- Implemented a **Python module** that handles **sending of messages**, (ex: steering, throttle) to the **ESP32**.
- Built a **ROS client** for the **ESP32** that **enables communication** of steering and throttle messages with **ROS.**
- Deployed **Deep Learning Models** on the **Jetson-Nano** attached to the RC Car for autonomous driving.

Auto-Encoders Flavors *Current (in progress)*
PyTorch, Python, Deep Learning

- Implemented variants of autoencoder, namely: **Vanilla AE, Sparse AE, Denoising AE, Variational AE, Deep Convolutional AE, etc.**
- Documented, visualized, and explained the different flavors of autoencoders.

Smart Wearable *Fall 2021*
C, Python, ESP32, OLED Display, Accelerometer, etc.

- Used **photodetector** and **Digital Signal Processing** to **measure and filter heart rate** in **real time**.
- Trained the filtered data via **Gaussian Mixture Models (GMM)**, and used **LOSOV for validation**.
- Provides **live weather forecast** and **time & date display**, achieved through **OpenWeather Map API**.

SKILLS

Skills: Python, C, C++, MATLAB, PyTorch, ROS/ROS2, Embedded Programming, Electrical systems testing, SOC/microcontrollers, Kubernetes, WANDB, Ubuntu (main computer).