ALEX ATANASSOV

17561 TEAL STONE CT, SAN DIEGO, CA 92127
P: 858-264-7490 | alx.atanassov@gmail.com

SUMMARY

Master's student in Electrical Engineering focused on building AI software systems and ML pipelines in Python and C++. Experienced in end-to-end model development, evaluation, and deployment-minded optimization; seeking full-time AI/ML software engineering roles.

CORE COMPETENCIES

- **Python, C++, ROS2, Gazebo, Git, SQL**
- **ML deployment, inference optimization, performance profiling (latency, memory)**
- **PyTorch, TensorFlow, Docker, ONNX**
- **Linear algebra, probability theory, Bayesian filtering (Kalman, EKF), SLAM**

TECHNICAL PROJECTS

Satellite Building Footprint Extraction through ML-Based Segmentation

- Built an end-to-end semantic segmentation pipeline in PyTorch; trained a U-Net model on satellite imagery with custom data loaders, mask generation, augmentation, and IoU/Dice-based evaluation
- Integrated transfer learning and SimCLR-based self-supervised pretraining into a ResNet U-Net; used Albumentations and diverse test tiles to simulate deployment and improve generalization
- Developed Transformer-based segmentation models (Swin-Unet, SegFormer) to benchmark U-Net; used attention-based encoders to improve long-range modeling and boundary precision
- Optimized segmentation inference with ONNX export and quantization-aware training; reduced latency and memory for edge deployment scenarios
- Containerized an inference workflow with Docker and FastAPI; built evaluation scripts and visualizations to validate outputs and debug failure cases

Simulated SLAM and Navigation Stack for Mobile Robots

- Built a 2D SLAM system using LiDAR and RGB-D sensors; generated occupancy grid maps via ROS2 TF and enabled real-time localization and mapping in simulated Gazebo environments
- Developed a modular A* planner with configurable heuristics and tunable cost functions; used a collision-aware GridMap to enable robust global path planning in dynamic environments
- Integrated a semantic perception module using pretrained DeepLabv3; enriched navigation maps with dynamic obstacle labels for perception-aware planning
- Engineered a ROS2-based sensor fusion module using Kalman filters; combined LiDAR odometry and RGB-D depth data to improve real-time localization in the SLAM stack

Luxiva (AI SMS Concierge)

- Built an SMS booking assistant using Flask webhooks and Twilio for real-time inbound and outbound messaging
- Implemented schema-based parsing into a JSON booking schema (venue, date, time, party size, requests), with validation and follow-up prompts for missing or ambiguous fields
- Added stateful update handling and persistence (conversation memory, change detection, structured logging) to support edits and prevent premature or duplicate confirmations

WORK HISTORY

Existential Robotics Laboratory (UCSD) / Research Assistant   **| September 2023 – June 2024**

Robotics Path Planning & Control
- Developed a Deep Q-learning model to optimize robot navigation in uncertain environments; integrated real-time feedback for adaptive path control
- Designed a risk-aware path-planning layer by combining A* search with gradient-based refinement to improve robustness in obstacle-dense environments
- Benchmarked path-planning algorithms in dynamic simulations by analyzing collision rates, trajectory efficiency, and computational cost as performance metrics
- Simulated multi-agent coordination in Gazebo using ROS; implemented particle filter-based localization and neural distance functions for obstacle avoidance
- Built a 3D occupancy map from simulated LiDAR and camera data; applied Kalman filtering to enhance localization accuracy in noisy, cluttered scenarios

PopmintchevLABS (UCSD) / Research Assistant   **| October 2022 – June 2023**

Laser Pulse Compression for Materials & Bio-System Analysis
- Used SolidWorks to modify components to enhance the mechanical design of the X-ray beamline
- Collaborated and got feedback from more senior researchers to modify beamline components to optimize spectrum and beamwidth
- 3D printed and worked alongside the team to assemble and fine-tune the equipment

EDUCATION

M.S. in Electrical Engineering, University of California, San Diego (Expected March 2026)
B.S. in Electrical Engineering, University of California, San Diego

ADDITIONAL EXPERIENCE

Spotify Artist & Songwriter (Independent) | 1M+ streams; independently produced, released, and marketed original music