Eidan Erlich

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Proven Leadership in Autonomous Robotics, Machine Learning, and Cutting-Edge R&D

Education

- **University of Waterloo** *2022 - Present*
  BASc, Mechatronics Engineering GPA: 3.75/4.00
  - Courses: Data Structures & Algorithms, RTOS, Digital Logic (VHDL, PLC), Numerical Methods, Sensors, Physics 1&2, Statistics, Calculus III, Linear Algebra, Systems and Signals 1&2

Experience

- **Centre for Advanced Materials Joining - University of Waterloo** *Jan 2025 - Present*
  Research Assistant Waterloo, Canada
  - Researching and developing Machine Learning Tools to Predict RSW Nugget Quality
- **Symphonic Labs** *Sep 2024 - Dec 2024*
  Machine Learning Research Intern San Francisco, USA
  - Led development of a state-of-the-art video lip reading model that improved performance by over 10%
  - Designed and implemented an Natural Language Processing (NLP) model for audio reconstruction from video input, recreating spoken sounds with high accuracy
  - Engineered distributed training infrastructure across multiple cloud nodes
- **Institute of Aircraft Production Technology (Airbus) – TU Hamburg** *Jan 2024 - April 2024*
  Aircraft Production Research Assistant Hamburg, Germany
  - Led and architected a mobile, multimodal, vision-based data acquisition system for Airbus
  - Leveraged classical and deep learning methods for robust SLAM, segmentation, and classification
  - Dockerized and deployed application to cloud compute resources, streamlining code distribution and execution
- **Monsters Aliens Robots Zombies** *May 2023 - Aug 2023*
  Machine Learning Research Intern Toronto, Canada
  - Fine-tuned a CNN and GAN model pipeline for feature recognition and augmentation for effective lip syncing
  - Created a high-level architecture for video synthesis using Latent Diffusion with image & audio conditional encoding
  - Implemented a highly requested user feature of multi format compatibility, driving revenue growth of over $150,000
  - Optimized training pipeline by creating a cloud-based queue system, reducing training time by over 40%
- **Vitreous Retina Macula Specialists of Toronto** *Feb 2022 - Oct 2022*
  Biomedical Research Lead Toronto, Canada
  - Proactively initiated, researched, and fully designed 3D printed ophthalmological surgical instruments
  - Led a team of MD and master's students, conducting root cause analysis and designed experiments on feedback to refine prototypes
  - Pioneered proof of concept for 3D printing in a clinical setting, leveraging DFMA to reduce manufacturing costs by 90%

Publications

[1] Nye, M., et al. (**E. Erlich**, co-author) **BETTY Dataset: A Multi-modal Dataset for Full-Stack Autonomy**, in 2025 IEEE International Conference on Robotics and Automation (ICRA), May 2025. (Accepted for publication).

[2] P. Prünte, et al. (**E. Erlich**, co-author), **Leveraging passive monitoring applications in production and intralogistics**, in *Proc. 18th CIRP Conf. Intell. Comput. Manuf. Eng.*, Hamburg, Germany, 2024.

[3] K. Moenck, et al. (**E. Erlich**, co-author), **Mobile, multimodal, vision-based data acquisition system for passive monitoring in production and intralogistics**, in *Proc. 18th CIRP Conf. Intell. Comput. Manuf. Eng.*, Hamburg, Germany, 2024.

Projects

- **MIT-PITT-RW Autonomous Racing - Indy Autonomous Challenge** *Feb 2023 - Present*
  General Manager Waterloo, Canada
  - Lead a team of 50 undergraduate and graduate researchers in developing the software driving a fully autonomous Indy racecar, competing in the Indy Autonomous Challenge, the world's highest-speed driverless competition
  - Coauthored a dataset research paper submitted to ICRA 2025, concentrating on supervised and self-supervised state estimation, dynamics modeling, motion forecasting, and perception for high-speed autonomous vehicles
  - Developed an extended Kalman filter in Python and ROS2, leveraging sensor fusion for agent tracking and prediction
- **Toyota Innovation Challenge** *2022 & 2023*
  - Developed a model using an RGB-D camera to track a scale model car within a simulated manufacturing line environment
  - Developed a machine learning model for defect detection in a manufacturing setting, achieving 95% accuracy

Proficiencies

Languages: Python (6 years), C++ (5 years), C (2 years), MATLAB (3 years), JavaScript, jQuery, HTML, CSS (1 year), SQL (2 years), Java (3 years)

Libraries & Tools: PyTorch, TensorFlow, RestAPI, FastAPI, Git, Linux, VS Code, Visual Studio, Django, React

Software Experience: Website Development, Object-Oriented Programming, Data Structures and Algorithms, Scripting, Data Analysis, Testing, Debugging, Model Development, Model Training, Machine & Deep Learning, Computer Graphics