Hokwang Choi

LinkedIn · GitHub · hokwangchoi.com · Montreal, Canada · choi920330@gmail.com

Education

Master of Science in Robotics, Systems, and Control Aug 2018 – May 2021

ETH Zurich, Switzerland

Bachelor of Science in Mechanical and Aerospace Engineering Mar 2011 – Jul 2018

Seoul National University, South Korea

Technical Skills

Languages: C/C++, Rust, Python, Matlab

Frameworks & Libraries: PyTorch, TensorFlow, Keras, OpenCV

Tools & Technologies: Linux, Git, Kubernetes, Docker, Bazel, gRPC, Emacs, Blender, UNIGINE

Specializations

- Building data pipelines for large-scale machine learning projects with understanding of bit flow from raw data to input to the neural network
- Improving simulation data quality with deep understanding of pixel-level information from real cameras
- Solving algorithmic problems to improve performance of computationally intensive processes

Experience

Staff Software Engineer Dec 2021 – Present

DAEDALEAN AG, Zurich, Switzerland - Fully remote with regular visit to the office

- Developed object detection models that outperformed real data models using only simulation data
- Improved the rendering for data generation pipeline by doubling the speed while reducing the resource consumption using multi-threaded processes minimizing CPU core idle time
- Built and delivered internal tools for data analysis including API backends, Kubernetes deployment, and database management
- Conducted experiments on neural network's performance sensitivity over different parameters such as object pose, lighting, blurring, and more.
- Led the internal simulation team and improved synthetic data quality based on camera characteristics for enhanced model training
- Skills: C++, Rust, Kubernetes, Clickhouse, MongoDB, gRPC, Git, Linux, Emacs

Software Engineer Oct 2021 – Nov 2021

LIGHTWAVE TECHNOLOGY, Montreal, Canada · Contract

- Developed single-camera detection and warning system fully running on C++
- Configured system on ARM architecture (Bazel, OpenCV, TensorFlow libraries)
- Discontinued due to visa support issues
- Skills: TensorFlow, C++, Bash, Bazel

Software Engineer Intern Jan 2020 – Jul 2020

DAEDALEAN AG, Zurich, Switzerland

- Developed weather condition and fish-eye rendering simulations using UNIGINE engine
- Co-developed API providing synthetic images to train neural networks for an air traffic detection system
- Implemented Real-To-Sim trajectory reconstruction module from sensor data
- Skills: C++, UNIGINE, OpenCV, OpenGL, gRPC, Bazel, Git, Docker, Linux

Research Projects

Compliant Autonomous Robot Navigation in Crowded Environments Oct 2020 – Apr 2021

Master Thesis, Sevensense AG, ETH Zurich

- Research on scene understanding with categorization of static, dynamic, and uncertain objects
- Implemented 3D object detection system with multiple stereo-cameras
- Developed socially-compliant robot navigation algorithms for crowded environments
- Skills: C++, ROS, Python, OpenCV, PyTorch, Linux, Git, Docker

Autonomous MAV Exploration with Reinforcement Learning Sep 2019 – Dec 2019

Semester Project, ETH Zurich

- Verified feasibility of using deep reinforcement learning for autonomous navigation
- Implemented and tested various RL algorithms for micro aerial vehicle exploration
- Skills: Python, ROS, PyTorch, TensorFlow

Self Ball Bouncing Quadrotor Mar 2018 – Aug 2018

Bachelor Thesis, Seoul National University

- Designed optimal trajectory generation for ball bouncing using LQR controllers
- Demonstrated precise quadrotor control for dynamic interaction tasks
- Skills: Matlab, LQR Control

Aerodynamic Body Design for a Human-Sized Rocket Mar 2017 – Sep 2017

National University Competition, Seoul National University

- Utilized CFD simulations to optimize nose cone, body tube, and fins for minimal drag and maximum stability
- Conducted stability analysis ensuring center of pressure remained aft of center of gravity throughout flight profile
- Hand-manufactured rocket body and achieved successful launch that validated CFD predictions
- Skills: CFD Fluent, Manufacturing, Fluid Dynamics, Solidworks

Awards & Certifications

- **Overseas Scholarship** – Kwanjeong Educational Foundation (20K USD per year for two years)
- **National Scholarship for Science and Engineering** – Korea Student Aid Foundation (100% tuition for the whole Bachelor's academic years)
- Computer Vision Nanodegree – Udacity
- Private Pilot License – Transport Canada
- Ski Instructor Level 2 – CSIA

Languages & Additional Information

Languages: Korean (Native), English (C2), French (B2), German (A2)
Activities: Rocket Club SNU (2017), Military Service (2012–2014)