Christian Kauten

Software & Image Processing Engineer | Computer Vision Researcher

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Education

Ph.D., Computer Science & Software Engineering — Auburn, AL
Auburn University — *05/2017–08/2021*

M.S., Computer Science & Software Engineering — Auburn, AL
Auburn University — *05/2017–08/2019*

B.S., Software Engineering — Auburn, AL
Auburn University — *08/2013–05/2017*

Research & Teaching Experience

Graduate Research Assistant — Auburn, AL
Auburn University — *05/2021–Present*

- Conducted a comparative study to measure the effect of loss function when training deep learning image deblurring models. Findings are being prepared for submission to the *Computer Vision and Pattern Recognition* conference [1].

Graduate Teaching Assistant — Auburn, AL
Auburn University — *01/2021–05/2021*

- *COMP4710 – Senior Design Project:* Lead a team of 3 undergraduate software engineers to build an autonomous vehicle simulation platform with Unity using C#. Also directed the team to develop an Open.ai Gym interface to control the vehicle.
- *COMP7300 – Advanced Operating Systems:* Assisted the administration of a graduate level operating systems course by grading homework and projects for 57 students. Also worked one-on-one with students to resolve conflicts with homework and C/C++ coding projects.

Graduate Research Assistant — Auburn, AL
Auburn University — *05/2017–12/2020*

- Conducted a psychological study with 300 participants to determine that trust in artificial intelligence improved the intention to use an autonomous vehicle and reduced the perceived risk of using the system. Findings are being submitted to the *Information Systems Research* journal [2].
- Executed DHS–funded research in financial sector by simulating high-frequency trading with agent-based models. Findings were circulated internally for the US Department of Treasury.
- Developed a financial market emulator based on CBOE market data feed specifications that is capable of running in real-time.
- Administered a deep learning cluster with 3 GPU nodes (each with 4 GPUs); installed drivers, wrote documentation, and helped other students to access and use the server.
- Invented a user interface for autonomous vehicles based on camera sensors and deep learning object detection models. The prototype was published in the *2018 Pre-ICIS SIGDSA Symposium* [5].
- Proposed a machine learning model to predict returning blood donors for a large regional blood center with a Mathews' Correlation Coefficient of 0.851. Findings are being published in the *Information Systems Frontiers* journal pending minor revision [3].
- Trained a deep reinforcement learning agent that can beat level `1.4` of *Super Mario Bros.*
- Integrated a Nintendo Entertainment System (NES) emulator in C++ with Python as an OpenAI Gym interface capable of running at $667Hz$. Built interfaces for the games *Super Mario Bros.*, *Tetris*, and *The Legend of Zelda*.

Publications

1. Christian Kauten, Xiao Qin, Ashish Gupta, and Stan Reeves. Choosing a loss function for deep image deblurring. *(work in progress)*, November 2021.

2. Christian Kauten, Ashish Gupta, Han Li, Xiao Qin, and Scott Martin. Does trust influence autonomous vehicle adoption? a case study of a perception augmentation system. *(work in progress)*, May 2021.

3. Christian Kauten, Ashish Gupta, Xiao Qin, and Glenn Richey. Predicting blood donors using machine learning techniques. In *Information Systems Frontiers (in press)*, May 2021.

4. Chaowei Zhang, Ashish Gupta, Christian Kauten, Amit V. Deokar, and Xiao Qin. Detecting fake news for reducing misinformation risks using analytics approaches. *European Journal of Operational Research*, 279(3):1036–1052, December 2019.

5. Christian Kauten, Ashish Gupta, Xiao Qin, Han Li, David Bevly, and Alison Jenkins. A perception augmentation system for autonomous vehicles. In *Proceedings of the 2018 Pre-ICIS SIGDSA Symposium*, San Francisco, CA, USA, December 2018.

6. Xiaopu Peng, Christian Kauten, Chaowei Zhang, Thomas Heckwolf, Jianzhou Mao, Taha Tekreeti, and Xiao Qin. REDUX: Managing renewable energy in data centers using distributed UPS systems. In *2018 IEEE International Conference on Smart Cloud (SmartCloud)*, pages 46–53, New York, USA, September 2018.

Open-Source Products

NTSC-py C++, Python
A Python `ctypes` interface to Blargg's C++ NTSC filter libraries *2021*

Potato Chips – VCV Rack Plugin C++
VCV Rack modules based on programmable sound chip emulation *2020*

RackNES – VCV Rack Plugin C++
A Nintendo Entertainment System emulator as a synthesizer module for VCV Rack *2020*

Super Mario Bros. – Open AI Gym Interface Python
A tool for training reinforcement learning agents to play Super Mario Bros. 1 & 2 *2018*

Nes-py – Open AI Gym Interface C++, Python
An emulator for training reinforcement learning agents to play Nintendo Entertainment System games *2019*

Skills

Software Engineering Software Modeling and Design; Test and Behavior Driven Development; Benchmarking, Profiling, and Optizimation

Numerical Analysis and Computer Science Algorithm Design and Analysis; Artificial Intelligence and Machine Learning; Digital Signal Processing; Computer Vision

Programming Environments C++ (5+ years), Python (5+ years), MATLAB (1+ year), JavaScript (2+ years)

Scientific Toolkit Keras, TensorFlow, NumPy, SciPy, Pandas, SciKit Learn / Image (all 4+ years)

Interpersonal Teamwork, Leadership, Data Synthesis, Technical Writing & Presentation