Tyler King

contact

ttk22@cornell.edu
(408) 838-0038
linkedin.com/in/ttk22
github.com/tylertking

education

Cornell University, Ithaca, NY
B.S. in Computer Science — Aug 2021 – present
GPA: 4.06/4.30

coursework
∗ = in progress

Algorithms∗	Intro to Machine Learning	Computer Systems
Information Networks∗	Discrete Math	Linear Algebra
OOP and Data Structures	Probability and Statistics	Multivariable Calculus

publications

Experimental Method for Studying Optimal Human Decisions (HCII 2022)
Nikolos Gurney, ***Tyler King***, and *John H. Miller*

Generalizing Minimum Path Star Topology Algorithms (arXiv 2021)
Tyler King and *Michael Soltys*

experience

USC Institute for Creative Technologies, Los Angeles, CA
REU Intern — May 2022 – August 2022

- Converted human decisions metadata into image and graph formulations and preprocessed instances
- Benchmarked deep neural networks to achieve 59% testing accuracy on noisy human decisions
- Built a few-shot learning model to classify human vs partial AI decisions in varied landscapes

McMahon Lab, Ithaca, NY
Research Intern — January 2022 – present

- Created Python pipeline for analog optimization with the coherent Ising machine's internal dynamics
- Deployed coherent Ising machine hyperparameter tuning on wandb with Bayesian optimization Hyperband; achieved best performance of 99.9958% on 1 year vehicle routing problems
- Modeled vehicle routing instances to infer performance of large-scale realistic systems in partnership with ExxonMobil

Cislunar Explorers, Ithaca, NY
Software Engineering Intern — September 2021 – May 2022

- Implemented robust Python unit tests for satellite dynamics modeling to achieve >80% coverage
- Derived unscented Kalman filter equations for satellite attitude and trajectory estimation using LaTeX; added structured noise into unscented Kalman filter dynamics to account for image pixelation
- Modeled satellite dynamics given initial velocity/position and gravitational pull of heavenly bodies

Notre Dame Nanophotonics, Notre Dame, Indiana
Research Intern — May 2021 – September 2021

- Benchmarked quantum circuits and processors using IBM's Quantum hardware
- Conducted error analysis on various implementations of Grover's (quantum search) algorithm via hardware (*ibmq_lima*) and noisy simulations (*qasm_sim*)
- Leveraged MATLAB and Matplotlib to model results and cross-validate statistical significance

projects

Coherent Ising Machine Optimizer — July 2022 – November 2022

- Helped develop cim-optimizer as a part of a ten million dollar NSF grant #1918549
- Built up the Bayesian optimization Hyperband and random hyperparameter optimization suite for three variations of the coherent Ising machine that vary initial conditions of simulated dynamics
- Confirmed accuracy of external field coherent Ising machine by implemented dynamics from original amplitude heterogeneity correction paper in PyTorch and analyzing runtime and performance
- Wrote example usages of cim-optimizer in Jupyter Notebooks and integrated full documentation with Sphinx. All documentation was hosted on readthedocs and integrated as a pip package via PyPI

Optimized A* Pathfinding — March 2021 – May 2021

- Theorized a novel approach to A* pathfinding by using greedy predrawn paths
- Achieved 6-fold speedup with comparable performance to classical A* pathfinding heuristics
- Developed pygame GUI to allow user interaction and visualize pathing

languages & technologies

Python, Julia, Java, R, MATLAB, C
PyTorch, Tensorflow, Keras, Git/GitHub, Jupyter, Conda, Sklearn, Pandas, NumPy, Matplotlib, Seaborn, Networkx, Qiskit, Azure, Sphinx, Jira, Excel, Linux, LaTeX