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Jonathan Koch

https://jonathanzkoch.dev/home

OVERVIEW

Languages: *Python, C & C++ (including CUDA, OpenCL, & oneDNN), C#, Java, RISC-V, Julia, Lua, JavaScript, Perl, R*
Competencies: *ROS, Actor-Critic, Tensor Libraries & Math, Sockets, NumPy, Linux, Computer Networking, 2D & 3D Physics and Simulation Engines*
Research Background: *Robotics & AI; Object Manipulation, Audio & Image Processing, Perception Modeling, Reinforcement Learning, Transformers*
Interests: *Predictive Models, NLP, Multi-Agent Learning & AI, Cognitive Science, Generative Models, Data Science, Acoustic Guitar, Piano, BJJ*

EDUCATION

Bachelor of Science in Computer Science, Concentration in Robotics and AI

Cumulative GPA: *3.7/4.0*

University of South Florida College of Engineering | Tampa, FL | Fall 2020 - Spring 2024

EXPERIENCE

Software Engineering R&D Co/Op
May 2022 - Present
CAE USA Research and Development Facility https://cae.com/
Tampa FL
- Developed Windows and Linux lab nodes of in parallel computer clusters for simulation and hardware R&D.
- Added 4 untested base repository trees into a Continuous Integration pipeline including over 35 independent repositories.
- Worked alongside embedded developers to map sensor data from touchscreen hardware to screen positions from device.

Research Scientist
Fall 2021 – Present
Robot Perception and Action Laboratory, *University of South Florida,* https://rpal.cse.usf.edu/
Tampa FL
- Research in robotic object manipulation through supervised and reinforcement learning; construct and pretrain a transformer network tasked for encoding spatial information, explore methods for improving accuracy of a policy.
- Document and communicate results amongst lab members and incorporate recorded findings into academic publishing.

Senior Coding Coach and Instructor
Fall 2021 – Summer 2023
theCoderSchool Tampa *https://github.com/theCoderSchoolTampa/CoderSchoolAI*
Tampa FL
- Spearheaded initiative for effectively delivering Agent AI concepts in a simpler and more digestible interface for kids.
- Developed an educational library built on-top of Python designed to remove complexity of Agent AI and Neural Network training; create and train a Neural Network for Image Classification in 7 lines of code.
- 15+ projects at theCoderSchool have integrated the library in their project; used in games, scripts, and AI Camp.

Vice Chair; AI Group, VEX Robotics
Fall 2020 - Present
USF IEEE Student Chapter
Tampa FL
- Organize and oversee Professional Development events/forums, plan our Spring/Fall Picnics and Banquets, introduce new students and act as the main POC for all USF students interested in joining IEEE's Technical Clubs and Teams.
- Founded AI Group; leadership in AI projects, including Auton-Drone and Just Dance Robots, and AI Workshops.
- Founded programming team for VEX with currently 20 active members, raised $10k towards scholarship endowment.

PROJECTS

Teach-A-Bull (AI Tutor)
November 2023 - Present
https://github.com/USF-IEEE/AITutor-Backend/blob/main/ResearchDocumentation.md
(Demo Coming Soon!)
- Make high-quality, personalized, and cheap education available to all students, regardless of socioeconomic status.
- Develop a distributed and information-dense "*Knowledge Graph*", conduct experiments with *LLMs as Actors in Text-Based Environments* (LLMaAiT-BE); measured high (*cosine*) similarity between generated content and "Expert" data for educational content and materials. Proposed a formalized method for developing pretrained LLMs as Actors.
- 10x decrease in the cost of SAT/ACT prep (73$ per session vs. $7.30 per content generation session in API requests).
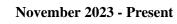
CoderSchoolAI (pip install CoderSchoolAI)
May 2023 - Present
https://github.com/theCoderSchoolTampa/CoderSchoolAI/blob/master/README.md
(Demo) https://youtu.be/_cpspql8Chw?si=IlI8mxfdjF8rDdph
- Neural Network API, AI tools, and Reinforcement learning library built on-top of PyTorch; beginner-friendly docs.
- MDP implementation in 10 lines of code, created basic API for developing many-to-many DNN function approximators, various data and tensor utilities for efficient data manipulation, implementation of PPO, DQN, and DDPG algorithms.
- Used in my robotics research in *RPAL.* Continuously developing and expanding capabilities. Find it on PyPi.

Virtual Assistant
August 2021 – Present
https://github.com/Johnnykoch02/VirtualAssistant/blob/main/README.md
(Competition Video) https://www.instagram.com/reel/CdJ00oyvc0V/
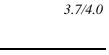- Converts spoken Natural Language prompts into a sequence of tasks which execute sequentially to solve the problem.
- Keyword Detection via Audio Sequence Modeling, avoiding 1000's of Speech-To-Text Charges from Google ♥
- Developed my understanding for using LLMs in problem solving, deepened my curiosity for using LLMs as Actors.