jkoch21@usf.edu
(631) 372-1384
Tampa, FL

Jonathan Koch

https://linkedin.com/in/jonathanzkoch/
https://github.com/Johnnykoch02/
https://Linktr.ee/Johnnykoch02/

OVERVIEW

***Languages**: Python, C & C++, C#, Java, Lua, JavaScript, Perl, R*
***Competencies:** ROS, Stable-Baselines3, PyTorch, Vector Math, Sockets, NumPy, Linux, Computer Networks, 2D & 3D Physics and Simulation Engines*
***Research Background:** Robotics & AI; Object Manipulation, Audio Processing, Probabilistic Robotics, Reinforcement Learning, Transformers*
***Interests**: Domestic Robotics, Data Engineering, Culinary Robotics, Action-Based Generative Models, Cognitive Modeling, Acoustic Guitar*

EDUCATION

Bachelor of Science in Computer Science, Concentration in Robotics and Automation — **Cumulative GPA:** *3.6/4.0*
University of South Florida College of Engineering, Tampa, FL — *Fall 2020 - Spring 2024*
***Courses Taken**: Automata Theory, Intro to AI, Control of Mobile Robots, Operating Systems, Linear Algebra, Vector Calculus*

EXPERIENCE

Software Engineering R&D Co/Op — **May 2022 - Present**
Canadian Aerospace Engineering Development and Research Facility https://cae.com/ — ***Tampa FL***
- Development of Windows and Linux lab environments of computer system networks for simulation and hardware testing.
- Oversaw development of specialized Linux-based driver software used for proprietary Sim-based interactive systems.

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 reinforcement learning; Collect and analyze data in the real world and simulation for training of RL models and investigate new solutions to improving model accuracy and performance.
- Document and communicate results amongst lab members and incorporate recorded findings into academic publishing.

Senior Coding Coach and Instructor — **Fall 2021 – Present**
theCoderSchool Tampa *https://github.com/theCoderSchoolTampa/CoderSchoolAI* — ***Tampa FL***
- ***CoderSchoolAI*:** Led development of a Python library designed to make learning Agent AI simpler and more deliverable to kids. Started an educational program around the library to teach Agent AI concepts through the simpler interface to reach a younger audience. Guided the development of agents through classic and learning-based methods *(Snake in Python)*

Vice Chair; VEX Robotics Programming Lead — **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.
- Oversee and Manage Internal Affairs to the Organization, provide support to Technical Chairs for Project Development
- Took initiative to start a programming team for IEEE's competitive robotics club; coordinated R&D in robot software.

PROJECTS

Virtual Assistant — **August 2022 - Present**
https://github.com/Johnnykoch02/VirtualAssistant — ***(Video from the Data Pipeline)*** **https://www.screencast.com/t/6TbGzbHzr**
- Develop an Agent to target novice actions performed on a computer and allow verbal automation of watching Netflix shows and movies, watching YouTube videos, playing songs on Spotify, and answering existential questions about life.
- Keyword Detection via Sequence Modeling and LSTM Network to avoid Speech-To-Text Charges from Google ❤
- Automation Tool: State Machine {*Parsing Keyword, Retrieving Command, Executing Command*} built on top of GPT-3.

HackaBull Entry: Robbie The Danci-Bull Robot — **March 2023**
https://devpost.com/software/robbie-the-dancibull-robot — ***(Video)*** **https://youtu.be/zSz2d7ekwHU**
- Our Mission was to develop a Simulated Robot that can dance to any song you provide as input.
- Constructed a policy and features extraction network that receives audio data and joint angles as observations that outputs a probability distribution corresponding to a $d\theta$ in each of the seventeen joints on the Robot.
- Engineered a Data Pipeline that used Just Dance Videos and a Joint-Angle Extraction algorithm for Offline Reinforcement Learning and then perfect the robot's motions through RL-HF. *(See Devpost)*

TerriBull Robotics Vex Library (*Program Team Lead)* — **August 2021 – Present**
https://github.com/Johnnykoch02/BullBot — ***(Competition Video)*** **https://www.instagram.com/reel/CdJ00oyvc0V/**
- Software Library written for TerriBull Robotics Team for full autonomous capability and task implementation.
- Led a research project in simulating a one-to-one physics-based system of the environment designed for meta-learning a dynamic time-based objective. Utilization of offline and online reinforcement learning algorithms.
- *Jetson*: Designed to track object positions and communicate object data being processed from the camera.
- *V5*: Controller of most sensors and task implementation; performs actions and relies on Jetson to minimize error.