Jacob Zietek

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EDUCATION

Purdue University   August 2020 – December 2023
Bachelor of Science in Computer Science; GPA: 3.67   *West Lafayette, IN*

Extracurricular Activities: ML@Purdue Founding President, Undergraduate Research, Working multiple jobs

Relevant Coursework: CS593ROB Robotics, CS471 Intro to Artificial Intelligence, CS473 Web Information Search And Management, CS381 Intro to the Analysis of Algorithms, CS373 Machine Learning, CS252 Systems Programming, CS251 Data Structures & Algorithms, MA351 Elementary Linear Algebra, CS511 Statistical Methods

PAPERS & PUBLICATIONS

Y.Hu, J.Setpal*, D.Zhang*, **J.Zietek**, J.Lambert, R.Gonzalez, J.Rayz. BoilerBot: A Reliable Task-oriented Chatbot Enhanced with Large Language Models, Alexa Prize TaskBot Challenge 2 Proceedings. 2023

J.Zietek, N.Wade, C.Roberts, A.Malek, M.Pylla, W.Xu, S.Patil. Pac-Man Pete: An extensible framework for building AI in VEX Robotics, arXiv Technical report. 2023

J.Zietekered*, J.Setpal*, R.Gonzalez. BoilerBot: Amazon Alexa TaskBot, Technical report and research proposal. Secured $250,000 in funding for Purdue's AKRaNLU Laboratory. 2022

EXPERIENCE

Artificial Intelligence Engineer   June 2023 – Present
Armada AI   *San Francisco, CA*

- An early member of the AI team at a well-funded startup specializing in autonomous applications on the edge, independently developing AI products
- Built object detection and real-time video question and answering demos
- Conducting research and engineering an assistant capable of answering domain-specific questions in real-time from video feeds using code-generation LLMs

Undergraduate Research Assistant   November 2022 – December 2023
Purdue University CoRAL Lab   *West Lafayette, IN*

- Conducted research on Robotics and AI under the supervision of Professor Ahmed Qureshi
- Project 1: built large parts of a robot-dog tour guide system for Purdue University with custom knowledge of campus, passed project to new students, publication goal of Summer 2024
- Project 2: teaching robots how to infer objectives from ambiguous language prompts using operator eye-sight in end-to-end ML models, non significant results and no publication
- Implemented Google Robotics' Language-table environment with a UR5e robot arm in Pybullet and used RRT* to generate a dataset of expert trajectories for behavioral cloning

Undergraduate Research Assistant   November 2022 – August 2023
Purdue University AKRaNLU Lab   *West Lafayette, IN*

- Competed in the Alexa Prize TaskBot 2 Challenge under the supervision of Professor Julia Rayz
- Developed a task-oriented multi-modal conversational agent, with a primary focus on software engineering and developing NLP models with quick inference time for real-time use
- Fine-tuned Distil-BERT to classify user intent while navigating menus, with 72.4% accuracy
- Helped train profanity/misuse classifiers and aligning open source LLMs to domain-specific data
- Built an internal website to display competition analytics and user conversations
- Continuously worked on UX improvements and bug fixes in our back end
- First author of a research proposal which won $250,000 from Amazon Alexa

Software Development Engineering Intern   August 2022 – November 2022
Amazon   *Santa Clara, CA*

- Health Storefront and Tech Applied Science team, AI R&D
- Experimented with AWS name entity recognition models to extract relevant information from health records

- Built a customer-facing recommender engine for health guidance
- Presented a demo to Amazon Health leadership, including our organization's Vice President

Artificial Intelligence Intern

Shield AI

May 2022 – August 2022

San Diego, CA

- Developed a malleable end-to-end supervised ML pipeline with custom models, losses, data pipelines, & metrics to train fully autonomous pilots using simulation data
- Experimented with offline deep reinforcement learning algorithms to behavior clone expert policies
- Ran experiments for knowledge distillation of existing AI pilots to build baseline pilot models

TensorFlow Model Developer

Purdue University Duality Lab & Google

January 2021 – May 2022

West Lafayette, IN

- Led the re-implementation of novel deep learning computer vision models and complementary tutorials for TensorFlow 2.x's Model Garden to be used by the greater machine learning community
- Increased the average precision of our [YOLOv4-tiny](#) model from 16% to 21.2% with hyperparameter optimization
- Created a [TF-Record generator](#) from the Pix3D dataset for the development of a 3D mesh predictor model
- Found [a bug within TensorFlow](#) where evaluating popular models on TPUs causes out-of-memory crashes

High Performance Computing Technical Intern

Pacific Northwest National Laboratory

May 2021 – August 2021

Richland, WA

- Evaluated Python linear algebra libraries to assess their usability and performance when implementing sparse matrix algorithms, contributing insights to the development of an in-house domain-specific programming language

Projects

VEX Robotics AI Competition | ML@Purdue | *Python, Unity*

August 2021 – Dec 2022

- Led the development of a fully autonomous robot to compete in a robotics tournament
- Developed a simulation of the VEX Robotics playing field to train a Sim2Real digital twin
- Trained a custom YOLOv5s model and developed generalized localization algorithms to detect game elements
- Open sourced code, published findings and best practices for the greater VEX Robotics community

VEX Robotics Competition | Head Programmer | *C++, RobotC, Python*

June 2018 – May 2020

- Programmed and engineered robots for 2 annual VEX Robotics competitions
- Developed a program to record exact driver movements to be played back as autonomous functions, saving time programming simple routes and routines during competition
- World Championship competitor

NASA's Zero Robotics | Team Founder | *C*

August 2018 – January 2019

- Programmed SPHERES satellites on the International Space Station to autonomously retrieve space debris
- Competed in the World Championship where our team's code was run live aboard the International Space Station

Awards

Hello World 2020 (Purdue Freshman Hackathon): 2nd place overall
HackRPI 2020: Best use of GCP, 2nd place in AI track
Mary-Ann Neel Computer Science Scholarship
North American Computational Linguistics Olympiad 3rd Place in age group
VEX Robotics Competition World Championship Competitor
Zero Robotics International Space Station Programming Challenge Finalist

Skills

Proficient Languages: Python, Java, C++, C, JavaScript, p5.js/Processing, R
Related Technologies: AWS, Google Cloud, LambdaLabs, OpenCV, GitHub, Jupyter, Linux, Unity, TurtleBot, VEX Robotics, SLURM, Hugging Face, ROS, Langchain
Data Science: PyTorch, TensorFlow, Keras, Pandas, NumPy, Matplotlib, Scipy