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.Zietek*, J.Setpal*, R.Gonzalez. [BoilerBot: Amazon Alexa TaskBot](), Technical report and research proposal. Awarded $250,000 in funding for Purdue's AKRaNLU Laboratory. 2022

EXPERIENCE

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

- Early member of the AI team pre-series A, building general purpose AI applications for our powerful mobile compute centers
- Demoed state of the art object detection and real-time video question and answering on the edge
- Building an AI assistant that detects anomalies and provides insights from multiple video feeds in real time

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

- Project 1: built an interactive robot-dog tour guide system for Purdue University with custom knowledge of Purdue's campus, passed project to new students, publication goal of Summer 2024
- Project 2: inferring objectives from ambiguous language prompts using operator gaze point, insignificant results and lacked compute to complete project, no publication
- Implemented the Language-table environment, comprising a tabletop with multiple distinct objects and a UR5e robotic arm in PyBullet, and generated a dataset of trajectories for behavioral cloning with RRT*
- Heavily modified Google's Language-table training environment for local training, new data augmentations, and custom model architectures; optimized all additions to work with TensorFlow graph execution
- Trained an end-to-end policy that directly manipulates objects based on ambiguous language commands, visual information of the surroundings, and user gaze point, predicting the positional change required for the robot's end effector at 5hz
- Relabeled the original Language-table dataset to include a predicted gaze; identified the target block's class from the language prompt and used a custom YOLOv5 model to simulate a gaze point
- Replicated the Language-table environment in real life and ran experiments

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

- Competed in the Amazon Alexa Prize TaskBot 2 Challenge
- Developed a task-oriented multi-modal conversational agent, primarily focused on developing NLP models with optimized inference speed for real time use
- Fine-tuned Distil-BERT to classify user intent while navigating menus, with 72.4% accuracy
- Trained profanity/misuse classifiers and aligned 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

- Primary author of a research proposal which was awarded $250,000 from Amazon Alexa

Software Development Engineering Intern
Amazon

August 2022 – November 2022
Santa Clara, CA

- Health Storefront and Tech Applied Science team, AI R&D
- Built a customer-facing recommendation engine for health guidance
- Experimented with AWS name entity recognition models to extract relevant information from health records
- 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
- Built a pipeline to process simulation dogfighting data and train reinforcement learning models
- Behavior coloned expert pilot policies to build foundational pilot models

TensorFlow Model Developer
Purdue University Duality Lab & Google

January 2021 – May 2022
West Lafayette, IN

- Led the re-implementation of 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

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

AWARDS

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, Pybullet
Data Science: PyTorch, TensorFlow, Pandas, NumPy, Matplotlib, Scipy