Zhengqi (Drago) Dong

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EDUCATION

Boston University, College of Engineering, Boston, MA (GPA: 3.93/4.0) **Expected 12/2022**
MS in Robotics & Autonomous Systems
The Ohio State University, College of Engineering, Columbus, OH (GPA: 3.67/4.0) 05/2021
B.S Computer Science Engineering (Minor in Statistics)
Graduated with Honor in Engineering (29/317), and Honor Research Distinction (3/317)

Related Coursework: Medical Robotic, Soft Robotic, Motion Planning, Machine Learning, High-performance Deep Learning, Natural Language Processing, Computer Vision, Algorithm & Data structure, Interpreter & Compiler, Operation System, Networking, Information Security, Web Development, Database Systems, Probability & Statistic, Analog & Digital Circuits

WORK EXPERIENCE

YRobot, Boston, MA, United States 06/2022 - 09/2022
Software Engineering Intern
- Designed and developed a File Transferring Simulator for company's embedded system of wearable devices.
- Wrote C++ code for dev board and Python for client endpoint that can communicate via TCP and X/Y/ZMODEM protocol

BU Spark!, Boston, MA, United States 09/2021 – 01/2022
Software Developer Intern
- Created a website that loads mutual aid resources from Postgres database, then displays all food resources and mutual aid locations around Greater Boston area in an interactive map by using mapbox API.
- Designed and developed the front-end in Gatsby to improve user experience by adding multi-language feature.
- Deployed frontend via GitHub Pages with https secure access, and utilized Docker Compose to containerize back-end application, then deployed on AWS EC2 instance, and secured the communication between frond-end and backed with TLS/SSL certificate.

Boston University, Boston, MA, United States 01/2022 - Present
Course Assistant
- Course assistant for CS519 (Software Engineering X-Lab Practicum), supervised by Prof. Langdon White.
- Hold weekly office hours, oversaw lab sections, and answered students' questions regarding homework and labs

The Ohio State University, Columbus, OH, United States 08/2020 - 05/2021
Student Instructional Assistant
- Teaching assistant for CSE 3461 (Computer Networking and Internet Technologies), supervised by Prof. Jim Vickroy.
- Hold weekly office hours, oversaw lab sections, graded homeworks, and answered students' questions regarding homework and labs.

University of Dayton Residential Property, Dayton, OH, United States 05/2017 - 07/2017
Student Resident Housing Assistant
- Diagnosed and noted all damaged walls, outlets, and furniture throughout about 300 dormitories.
- Tracked inventory, coordinated logistics, and collaborated with team to replace all unusable or old furniture.
- Cleaned and discarded all spoiled foods and clothes abandoned at cabinet and wardrobe.

PROJECTS AND RESEARCH

Automatic Waste Detection on ZeroWaste [Proposal, Report, Presentation] 01/2022 - 05/2022
- Applied one-stage and two-stage detection algorithms on the ZeroWaste dataset, specifically YoloV4, YoloR, and Dynamic R-CNN, and trained on BU Shared Computing Cluster.
- Performed fine-tuning and some data augmentation methods to improve the performance, e.g., Mosaic, Mixup, Dropblock.
- Finished deliverables with a clear project report, a presentation, and an instruction code, all included on my personal website.

BU ME571-Medical Robotic Final Project [Proposal, Report, Presentation] 09/2021 - 12/2021
- Designed and created a cost effective and affordable 3D printed prosthetic haptic feedback-awared grasper

"CORE" Language Interpreter, The Ohio State University 01/2021 - 05/2021

- Designed and implemented a self-defined "CORE" language interpreter from scratch, with features including program scanner/tokenizer, semantic checking(syntax, type, function definition, scope, object binding), program executor, garbage collector, and recursive function call.
- Built a Scanner that parses the program from input files into a stream of CORE language tokens (defined by Instructor).
- Applied recursive descent algorithm to generate the parse tree for the input program.
- Built the CORE Interpreter that can interpret syntax tree, execute the input program, and reject invalid inputs with error messages.
- Utilized "call by copy return" strategy to build call stack that supports recursive function call for "CORE" language.
- Implemented the Garbage Collector features with reference counting approach for the CORE interpreter

MapReduce Emulator, The Ohio State University 01/2021 - 05/2021

- Created and implemented a multi-threaded version of MapReduce Emulator for counting the number of occurrences of words for a given file, which potentially can be used for search engines or web crawlers in text processing.

Filmpedia -- Movie Recommendation Website 08/2020 - 12/2020

- Coordinated with three other senior students to develop a dynamic movie recommendation website by using Django as backend and React.js as frontend.
- Accomplished various useful features by leveraging IBM Cloud Platform and TMDB RESTful APIs, including user and movie database, routes configuration, multi-languages support, movie searching and recommendation.
- Achieved automated deployment by containerizing the application with Docker and launched the app via Heroku

High-Performance Deep Learning Research Study 08/2020 - 12/2020

- Tested various model parallelism methods to speed up the training of out-of-core memory DNN models, such as U-net and ResNet-like architectures, in a High-Performance Computing (HPC) environment.
- Analyzed the performance (time and acc) of different DNN models on various scales of datasets by varying # of cores on CPUs/GPUs, # of batch size, learning rate, optimizers, and type of MPI communication libraries on OSU Supercomputing Center.
- Benchmarked the performance of various ML algorithms supported by the Dask-ML library and conducted on OSC cluster to provide visualized task graphs via Dask Dashboard and port forwarding technology.

NLP Project -- Recommender System, The Ohio State University 08/2020 - 12/2020

- Accomplished the following algorithms from scratch with PyTorch: Naïve Bayes/Logistic Regression Classifier, HMM (Hidden Markov Model) /CRF (Conditional Random Field) Tagger, Attention Based Encoder-Decoder Model.
- Developed a hybrid filtering recommender system with TensorFlow by integrating metapath-based heterogeneous network for graph embedding and doc2vec for text-embedding methods to achieve ~33.1% accuracy.

Honor Research Project -- Deep-Learning Based Plant Disease Detection, The Ohio State University 01/2020 - 05/2021

- Awarded $5500 scholarship by proposing an image-based deep learning approach and application framework design.
- Compared pros and cons of approaches between machine learning and deep learning-based detection.
- Conducted sequences of hyper-parameter tunning to improve the result, including train-validation split ratio, batch size, and complexity of pre-trained models, and resulted in 99.5% and 98.11% accuracy in training and validation respectively.
- Completed "Honors Research Distinction" thesis over 70+ pages and presented the result at two research forums.

OSU CSE4471 Information Security Final Project – Spam Filter Detector [Github, Report] 05/2020 - 07/2020

- Data pre-processing: extracted text body from MIME email format; split dataset to training, validation, and testing; tokenized sentence and removed stopwords for feeding to neural networks.
- Developed a spam email detector with 99.5% training acc by constructing 6 layers neural network and training the model on Apache SpamAssassin open-source dataset with Stanford Global Vector (GloVe) text embedding representation.

Operation System Project: Air Traffic Control Simulator, The Ohio State University 08/2019 - 12/2019

- Created an Air Traffic Control Simulator in C including a character-based graphical display with over 800 lines of code spanning decades of files.
- Wrote generic linked-list usable with any data type and proven to handle memory allocation failures.
- Used curses library for display control, nanosleep function to accelerate simulation process.
- Used dynamic memory allocation and gracefully deals with allocation failures.
- Dealt with numerous unit conversions for heading speed, heading degree, screen size, flight position, etc.

Web Development Project: Freelance Canvas Web Application, The Ohio State University 05/2019 - 07/2019

- Designed web frontend interface features such as like, follow, and comments by using Ruby on Rails, CSS (Bootstrap), and HTML.
- Implemented password registration, confirmation, recovery, authentication feature with Device library in Ruby.
- Designed database for users with ER-diagram and SQLite.

SKILLS

Programming languages: Python(Django, Flask, PyTorch, and certified Google TensorFlow Developer), and C/C++ (GDB, Valgrind, Makefile, gprof), Ruby(Ruby on Rails), Java, R(tidyverse and shiny), X86 Assembly Language, HTML, CSS(Bootstrap), JavaScript(React.js, Gatsby, Prisma), MATLAB, SQLite, Bash Script, LaTeX
High-Performance Computing Techniques: Code Optimization (e.g., loop parallelism, reassociation, blocking), Multiprocessor Optimization (e.g., Pthread, OpenMP, SSE/AVX intrinsic SIMD vectorization), GPU Optimization (e.g., CUDA programming), Distributed System (e.g., Slurm/PBS scheduler, MPI), Deep Learning Optimization (e.g, model/data/hybrid parallelism, LBANN, Horovod, Dask)
Software Techniques: Linux, GitHub, AWS (Cloud 9, EC2), Docker, Heroku, Postman, CAD(SolidWorks)
Robotic Techniques: ROS, Orb-SLAM, visual odometry, object detection, Jetbot, Jetson nano, Arduino, 3D Printing
Languages: Chinese, English

LEADERSHIP & ACTIVITIES

WebMaster, Student Association of Graduate Engineers (SAGE) at Boston University, Boston, MA 08/2021 - Present
WebMaster, IEEE at OSU Undergraduate chapter, Columbus, OH 01/2018 - 05/2021
Vice-president, OSU Table Tennis Club, Columbus, OH 05/2019 - 05/2020
Student Volunteer, Mid-Ohio Workers Association, Columbus, OH 10/2017 - 01/2018
Volunteer of Kroger Pantry Indoor Assistant, Mid-Ohio Foodbank , Columbus, OH 2017(~30 hr in total)
High School Robotic Team Mentor, Bonds FRC 5811, OH 11/2016 - 05/2017

ACADEMIC COMPETITIONS

2019 RoboMaster Competition at Shenzhen, 09/2018 - 05/2019
OSU AI Team Member

- Developed a customized Object Detection model by training Yolo-v3 algorithm with over 1000 standardized pictures from past competition videos, and manually labeled bounding box over all ground truth objects.
- Implemented basic PID control, robot motion calculation, CAN bus communication, Serial communication, and gyroscope filtering.
- Practiced maneuvering console of Standard combat Robot and Drone in a self-build battlefield.
- **For Practical skill:** Built 7 various types of robots to compete in a worldwide first-person shooter robotics competition. ● Iterated the mechanical design of robots a dozen times, achieved all the desired performances while keeping custom metal parts to a minimum. All vulnerable parts were quick-changeable. Developed the first hi-performance pneumatic main gun in the game. ● Programmed STM32F7 microcontrollers to apply an efficiency-optimized closed-loop control system on motors via CAN-BUS. ● Experimented with a wide range of popular computer vision neural networks for target recognition and tracking. ● Selected Google's Edge TPU board and deployed tinyYOLO to achieve 45fps at 480p while keeping the size and price low.
- **For leadership:** ● Introduced, advertised, and established a competition team, recruited 15 students from diverse backgrounds. ● Led the designing, manufacturing, and programming of 7 combat robots of various functions from scratch. ● Responsible for communicating with the school and competition committee, allocating the team's resources and expenses, managing the sub-teams' objectives and timelines, and organizing the travel and housing.

One line sentences: launched OSU first-year competition, cooperated with AI team members to develop customized infantry fighting vehicle Object Detection model with Yolo-v3 algorithm.

Four-Year EcoCAR 3 Competition, The Ohio State University, 08/2018 - 12/2018
OSU Connected and Autonomous Vehicles (CAVs) Team Member

- Helped Ohio State's team won the first place within 16 North American univerisities, see the post here.
- Coded Kalman Filter (KF) and Extended Kalman Filter (EKF) with Python and MATLAB to develop a robust sensor fusion algorithm for line detection and following.
- Analyzed old EcoCar3 Architecture and Version Control system and introduced basic mechanisms and usages of GitHub.

OSU Data-IO Competition, The Ohio State University 10/2019 - 10/2019
Team Lead of Group of 4

- Award the winner of The Mid-Ohio Food Bank Data Science Challenge (1 of 100 teams).
- Designed and built various Time Series Forecasting models to visualize and understand the underlying seasonal trends and patterns over time, which can help Food Bank managers to design a more efficient customer visiting schedule and transportation policies for the company.

2018 IEEE SAC Micromouse competition, Pittsburgh University, United States 01/2018 - 04/2018
Team Lead of Group of 3

- Coded DFS/BFS/Uniform cost/A* search algorithm with Python on Micromouse robot to search the shortest path in a maze.
- Built and programmed a cell-phone-sized robot that solves a 16x16 maze by using its own sensors and navigation stacks.
- Programmed a Cortex-M4 ARM controller to read and filter data from 3 IR range sensors and control 2 motors with encoders.
- Used Raspberry Pi to constructs the maze map and A* algorithm to find the shortest path to the exit

HONORS AND AWARDS

- Dean's List (>3.5 GPA) over five semesters, and graduated with Honor in Engineering, and Honor Research Distinction with Department of Food, Agricultural and Biological Engineering (FABE).
- Awarded 2020, 2021 IEEE Excellent Service Award, active IEEE members (Student Member, 2018–Present).
- Activate NCTTA(National Collegiate Table Tennis Association) member (Student member, 2018—Present)
- Personal interest: Table Tennis (>five years professional practices, awarded team champion at 2018-19 NCTTA Midwest Tournament), Martial Art (Green Belt, achieved three gold medals in Ohio International Chinese Martial Art Championship), Track and Field, Scuba Diving (Certified Open Water Diver), Photography, Cooking, Snowboarding.