

# Zhengqi(Drago) Dong

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## EDUCATION

**Boston University, College of Engineering, Boston, MA (GPA: 3.9/4.0)** **Expected 12/22**

MS in Robotics & Autonomous Systems

**The Ohio State University, College of Engineering, Columbus, OH (GPA: 3.67/4.0)** **05/21**

B.S Computer Science Engineering (Minor in Statistics)

Graduated with Honor in Engineering, and Honor Research Distinction in Agricultural Engineering

**Related Coursework:** Medical Robotic, Robotic Autonomouous System, Cyber-Physical System, Machine Learning, Neural Network, High-performance Deep Learning, Natural Language Processing, Algorithm & Data structure, Operation System, Principles of Programming Languages, Networking, Information Security, Web Development, Database Systems, Probability & Statistic, Statistical Modeling, Spreadsheet, and Database Modeling with Excel and Access, Analog & Digital Circuits

## WORK EXPERIENCE

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*

- Teaching assistant for DS 519 (Spark! Software Engineering X-Lab Practicum), supervised by Prof. Langdon White.

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 Vickro.
- 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

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

- 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**, The Ohio State University

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 including user and movie database, routes configuration, multi-languages support, movie recommendation, and searching by leveraging IBM Cloud Platform and TMDB RESTful APIs.
- Achieved automated deployment by containerizing the application with Docker and launching via Heroku.

- High-Performance Deep Learning Research Study**, The Ohio State University 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 for plant leaves disease detection.
  - Compared pros and cons of approaches between machine learning and deep learning-based detection.
  - Conducted sequences of experiments on multiple factors including train-validation split ratio, batch size, and complexity size of pre-trained models, which resulted in 99.5% and 98.11% accuracy in training and validation perspective.
  - Completed "Honors Research Distinction" thesis by authoring and presenting multiple deliverable works of literature, including over 70+ pages thesis, presenting a poster in two research forums, and oral defense presentation.
- Information Security Final Project – Spam Filter Detector**, The Ohio State University 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(GDB, Valgrind, makefile), R(tidyverse and shiny), Java, Ruby(Ruby on Rails), SQLite, X86 Assembly Language, HTML, CSS(Bootstrap), JavaScript(React.js), MATLAB, Bash Script, LaTeX

**High-Performance Computing Applications:** TensorFlow/PyTorch/LBANN deep learning framework, Horovod/Dask/mpi4py library, and Slurm/PBS scheduler, distributed training concept (model/data/hybrid parallelism, MPI operations)

**Software Tools&Technologies:** PyCharm, RStudio, Visual Studio, Linux, Github, AWS(Cloud 9), Docker, Heroku, Postman, CAD(SolidWorks).

**Robotic Tools&Technologies:** ROS, SLAM, Jetbot, Jetson nano, Arduino, Milling, 3D Printing

**Languages:** Chinese, English

## LEADERSHIP & ACTIVITIES

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

## ACADEMIC COMPETITIONS

**2019 RoboMaster Competition at Shenzhen,**  
*OSU AI Team Member*

09/2018 - 05/2019

- Developed a customized Object Detection program with Yolo-v3 model by clipping over 1000 pictures from past competition videos and labeling bounding box over the ground truth objects.
- Practiced maneuvering console of Standard Robot and Drone in a self-build battlefield.

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

08/2018 - 12/2018

- Helped Ohio State's team won the first place within 16 North American universities, 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.

## **HONORS AND AWARDS**

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- 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.