Charles Zhang

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Education

Macalester College, Saint Pual, MN *B.A. Expected May 2023*

Major GPA 4.0/4.0 *Mathematics, Computer Science*

- Charles J. Turck Presidential Honor Scholarship(Four-year scholarship)
- School Dean's List (2019 - PRESENT)
- **Relevant Coursework**: Real Analysis, Computational linear algebra, Complex Analysis, Algorithm Design and Analysis, Applied Multivariable Calculus, Linear algebra, Discrete Mathematics, Intro to Data Science, Intro to Statistics, Digital Ethics

Skills

Programming **R**(ggplot, ggmap, plotly, leaflet, gganimate, rvest, shinny), **Python**(numpy, pandas, easygui, matplotlib, xgboost, openAI, tensorflow, gym, baseline), **Java, MATLAB, SQL, HTML, CSS, Markdown, TEX, COMSOL**

Experience

Teaching Assistant *St. Paul, MN*

Mathematics, Statistics and Computer Science Department, Macalester College *Jan. 2020 - PRESENT*

- Teaching Assistant(Preceptor) in COMP 128 Data Structure at Macalester College in Fall 2020
- Help all 21 students in the class with implementations and applications of stack, queue, list, map, tree, and graph by *Java*.
- Teaching Assistant(Preceptor) in STAT/COMP 112 Intro to the Data Science at Macalester College in Spring 2020
- Help all 48 students in two class sessions with realize multivariate visualization, data wrangling, interactivity, Leaflet, scraping data, Shinny APP, SQL, and machine learning by *R*(RStudio)

Deep Reinforcement Learning Research Assistant *St. Paul, MN*

Professor Esra Kadioglu Urtis Lab, Macalester College *Jun. 2020 - Aug. 2020*

- 2020 Summer Research with professor Esra Kadioglu Urtis at Macalester College
- Implement the area coverage approach on unmanned aerial vehicles(UAVs)
- Develop and implement deep reinforcement learning based algorithms with simulations for UAVs coverage
- Implement a gym environment for coverage path planning for multiple drones using Actor Critic using Kronecker-Factored Trust Region (ACKTR) method provided by stable baseline in Python.

Conference Member *Beijing, China*

the First BRICS Mathematics Conference *Jul, 2017 - Aug. 2017*

- Was invited to attend and listen series of worldwide cutting-edge mathematical lectures from the conference at Chinese Academy of Sciences
- Consulted mathematicians from five BRICS(Brazil, Russia, India, China and South Africa) countries and made a manuscript

Projects

Kaggle: House Price Prediction

13^{th} placs(0.06%) out of 19506 teams *Jan. 2020 - Feb. 2020*

- Using Ridge, Lasso, LGBM, XGB, and Stacking CV Regressor, and series of data visualization and analytical techniques to reach 0.10643 root mean squared logarithmic error and 12449.19063 mean absolute error, got 13^{th} place, 0.06% out of 10506 teams(individual)

Mathematical Modeling for Drone Light Show

Honorable Mention out of 938 teams in Mathematical Contest in Modeling *Jan. 2018 - Feb. 2018*

- Using *MATLAB*, I built models to determine the required number of drones and every drone's initial location during the process.
- Any simple pictures or icons could be designed for the drone show by my *MATLAB* program.

Design and Optimization of Comb Drive Accelerator for High Frequency Oscillation

Published in Modern Mechanical Engineering Vol.8 No.1, February, 2018 *Apr. 2017 - Feb. 2018*

- This project is mentored by a doctor at UCLA and the final paper was published. In this work, using *COMSOL* and *MATLAB*, a finite element code was used for the design, optimization, and visualization of a comb drive accelerator.

Generalizations of Trajectory about Fixed Points and Lines Moving to Magnify and Shrink

Published in Mathematical Study and Research Vol 19, 2017 *Sep. 2016 - Feb. 2017*

- This Chinese geometrical paper is for mathematical Olympics competitions, generalized series of problems of locus by an elegant method and visualized by *Geometer Sketchpad*

Honors

Jan, 2020	**13th place(0.06%) out of 19506 teams,** Kaggle Data Science Competition	*U.S.A*
Dec, 2019	**Top 9,** The Mathematical Association of America-North Central Section(MAA-NCS) Team Contest	*U.S.A*
Feb, 2018	**Top 5%,** American Mathematics Competition(AMC12)	*U.S.A.*
Nov, 2017	**Honorable Mention,** Mathematical Contest in Modeling	*U.S.A*
Sep, 2017	**First Prize,** Chinese Mathematics League	*China*