

Jacob Mantooth

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RESEARCH EXPERIENCE

Understanding Reinforcement Learning Through Games August 2022 –

- Explore Three Reinforcement Learning cases: continuous, single-discrete, and multi-discrete.
- Compared four different Reinforcement methods on each case

Generalizing the Boltzmann Equations August 2022 –

- Studied what happens when two rarefied gases consisting of monotonic molecules collide
- Sought to derive the Boltzmann Equation by using the Edgeworth series in replacement of the Maxwellian

Comparing RL to OC Methods on the Continuous Mountain Car Problem June 2022 – July 2022

- Compared three methods in solving the continuous mountain car problem
- Investigated the trade-off between data-driven RL methods and model-driven optimal control methods on the continuous mountain car problem
- Used Hamilton-Jacobi-Bellman (HJB) equation to train an approximating neural network for the value function

Mathematics of Deep Learning, and SVD May 2021 – May 2022

- Examined the mathematics of deep learning
- Explored the PCA dimensional reduction and linear regression and how these work when interchanged
- Provided a proof for the interactions of PCA and linear regression
- Using Python, Jupyter notebooks, TensorFlow, NumPy, and Pandas, created deep learning models to examine the mathematical tools utilized

Temperatures Affect on Ultra Sonic Waves January 2021 – May 2021

- Sought to find the connection between temperature and ultrasonic waves
- Using a multitude of different types of oils showed that as the temperature of the oils increases, the velocity of sound decreases

Covid-19 and Travel July 2020 – December 2020

- Using google travel data showed different types of relationships between Covid-19 and travel
- Coded multiple interactive models showing the spread of Covid-19 and how it affected travel in the USA, all hosted online
- Sought to find a correlation between travel and Covid-19 to make more accurate predictions on outbreaks

Operation Research January 2020 – May 2020

- Assigned to a local oil trucking business named Cantrell Jackson to manage and evaluate data to improve their operations
- The primary goal was to optimize truck efficiency and evaluate each customer to determine their value to the company

EDUCATION

East Central University
B.S., Mathematics, Physics

August 2019 – May 2023
Ada, OK

Lindsay High School
High School Diploma

August 2015 – May 2019
Lindsay, OK

POSTER PRESENTATIONS

Understanding Reinforcement Learning Through Games

Oklahoma Research Day

March 2023

Comparing RL to OC Methods on the Mountain Car Problem (1st Place Winner)

2022 Computational Mathematics REU at Emory University

July 2022

Temperatures Affect on Ultra Sonic Waves

McNair Intern Poster Display

April 2022

Mathematics of Deep Learning, and SVD

Oklahoma Research Day at the Capital (Chosen to be my school only representative)

March 2022

Oklahoma Research Day

March 2022

Oklahoma Academy of Science

November 2021

Covid-19 and Travel

Oklahoma Research Day

March 2021

Oklahoma Academy of Science

November 2020

Cantrell Jackson

Oklahoma Research Day

March 2020

ORAL PRESENTATIONS

Understanding Reinforcement Learning Through Games (2nd Place Winner)

OK-AR MAA

March 2023

Mathematics of Deep Learning, and SVD

Oklahoma Academy of Science

November 2021

Covid-19 & Travel

Oklahoma Academy of Science

November 2020

CONFERENCE ATTENDED

30th Annual UMBC McNair Scholars Research Conference

October 2022

OK-LSAMP 28th Annual Research Symposium

October 2022

SKILLS

Languages : Python, HTML, Git, R, Linux, C , Excel

Skills : Computer skills, Leadership experience, Communication skills, Collaboration talent, People skills, Problem-solving abilities

PROFESSIONAL EXPERIENCE

ECU Tutor

2021-2022

Tutor

Ada, OK

- One-on-one tutoring in Mathematics, Biology, and Physics
- Adapted teaching style to the unique needs of students
- Prepared weekly lesson plans to help students prepare for their courses
- Recognize the primary role of helping students become more confident, more successful, self-directed learners

TH Rogers Lumber Co. Lindsay

2020-2021

Yard Foreman

Lindsay, OK

- Manages yard operations and works in yard to assist customers
- Managed dry wall deliveries to customer
- Maintained yard and warehouse upkeep and repairs
- Ensure safe and effective use of forklift machines
- load products, and deliver and transport materials to customer sites

Super C

2019-2020

Manager

Lindsay, OK

- Ensure that grocery shelves are maintained clean and organized
- Provide excellent customer services for sales growth
- Unload/load delivery trucks
- Ensure safe and effective use of forklift machines
- Manage daily operations of grocery store to meet store goals

RECOGNITION'S & SCHOLARSHIP'S

- 2nd Place Winner of the 2023 Research Presentation at OK-AR MAA
- 1st Place Winner of the 2022 Research Poster Competition in the Undergraduate Math/Computer Science Category at Emory REU
- Powerlifting 90kg collegiate state champ
- NASA Fellowship
- Ronald E. McNair Research Fellowship
- LSMAP Scholar
- McNair Scholar
- President honor roll(x3)
- Dean honor roll (x2)
- Lance Fenton Math Scholarship
- Higginbotham Family Scholarship
- Charles & Lila Acker Math Scholarship
- Oklahoma Teacher's Promise Scholarship