Mukesh Ghimire

mukeshghimire.com.np
ghimiremukesh1@gmail.com | 662.202.2139 | Tempe, AZ, USA

EDUCATION

ARIZONA STATE UNIVERSITY
PhD in Mechanical Engineering
Tempe, AZ
GPA: 4.0 / 4.0

UNIVERSITY OF MISSISSIPPI
BS in Mechanical Engineering
Minors: Computer Science, Math
May 2021 | Oxford, MS
GPA: 3.98 / 4.0

LINKS

Github:// **ghimiremukesh**
LinkedIn:// **mukesh-ghimire-np**

COURSEWORK

GRADUATE
Game Theory
Causal Inference
Stochastic Processes
Convex Optimization
Advanced Modern Control
Numerical Methods for PDEs
Reinforcement Learning (w/ Prof. Dimitri Bertsekas)

SKILLS

PROGRAMMING
Proficient:
Linux • OOP in Java • Shell • Python
Matlab • CUDA • PyTorch • LaTeX
Tensorflow • Scikit-Learn
Familiar:
C • C++ • Julia • Ray • RLLib • Spark
Hadoop • Git • CI/CD • AWS • R

AI AND ROBOTICS
Optimization
Optimal Control
Reinforcement Learning
Model Predictive Control
Human-Robot Interaction
Monte-Carlo Tree Search (MCTS)
Physics-Informed Machine Learning

INVITED TALKS

SPARKY'S CUP EDUCATION
Lightning Talk on Game-Changing AI Applications in Sport

EXPERIENCE

DESIGN INFORMATICS LAB | Graduate Research Associate
Jun 2021 - Present | Tempe, AZ

- Modeled vehicle interactions as general-sum complete-information differential games to generate safe equilibrial policies for autonomous vehicle agents.
- Extended the current state-of-the-art methods of approximating continuous values of zero-sum games to discontinuous values of general-sum games via physics-informed machine learning.
- Used PyTorch and CUDA extensively to construct physics-informed neural networks with Hamilton-Jacobi-Isaacs as the governing equation.

THYSSENKRUPP ELEVATOR | Product Development Intern
Aug 2019 – Aug 2020 | Middleton, TN

- Successfully reduced manufacturing costs of the elevator cab by 10% through process improvements.
- Developed over 100 Configure-To-Order (CTO) prints using Creo while adhering to the customer and regulatory requirements.
- Reduced data pre-processing time for sheet metal shearing jobs by more than 50% through implementing an automated process using Python.

RESEARCH PROJECTS

SOCIALLY ADEPT SELF-DRIVING
Jun 2021 – Jan 2022 | Tempe, AZ
Collaborated with researchers from the RISE Lab to further the research in socially adept self-driving vehicles. Designed and trained a reinforcement learning agent using Soft Actor-Critic-Discrete algorithm. The agent learned to trigger intent-inference whenever necessary instead of running the inference algorithm throughout the interaction saving the computational costs by 59%.

REINFORCEMENT LEARNING IN AUTONOMOUS RACING
Sep 2020 – Apr 2021 | Oxford, MS
Used Proximal Policy Optimization (PPO) algorithm to train a Deep Reinforcement Learning (DRL) agent for Amazon's DeepRacer car. The agent was trained offline using Gazebo as the physics engine. The trained model was deployed in the 1/18 scale model of the DeepRacer car which was able to complete the race track successfully.

AWARDS

2023 Experiential Learning Award ($1000)
2020 SMBHC Research Fund Award ($1,000)

PUBLICATIONS

[1] M. Ghimire, L. Zhang, Y. Ren, and Z. Xu. State constrained zero-sum differential games with one-sided information. *arXiv:2403.02741*, 2024.

[2] M. Ghimire, L. Zhang, W. Zhang, Z. Xu, and Y. Ren. Solving two-player general-sum games between swarms. In *2024 American Control Conferece (ACC)*, 2024.

[3] L. Zhang, M. Ghimire, W. Zhang, Z. Xu, and Y. Ren. Approximating discontinuous nash equilibrial values of two-player general-sum differential games. In *2023 IEEE International Conference on Robotics and Automation (ICRA)*, pages 3022–3028. IEEE, 2023.