Mukesh Ghimire

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EDUCATION

ARIZONA STATE UNIVERSITY
PhD in Mechanical Engineering
2021 - 2025 | Tempe, AZ
GPA: 4.0 / 4.0
Advisors: Yi Ren, Zhe Xu

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
Reinforcement Learning
Advanced Modern Control
Game Theory
Convex Optimization
Causal Inference
Numerical Methods for PDEs

SKILLS

PROGRAMMING
Proficient:
Java • Shell • Python • Matlab • CUDA
PyTorch • Tensorflow • LaTeX
Familiar:
C • C++ • Julia

AI AND ROBOTICS
Optimization
Optimal Control
Reinforcement Learning
Model Predictive Control
Human-Robot Interaction
Modeling, Perception and Planning
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

- Lead researcher in general-sum incomplete-information differential games.
- 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.
- Trained incoming engineering interns on the day-to-day responsibilities of an engineer.

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

2020	SMBHC Research Fund Award ($1,000)
2019-2020	Co-op Scholarship ($678 per semester)
2016-2021	Academic Excellence Award ($22,000 per semester)

PUBLICATIONS

[1] S. Amatya, M. Ghimire, Y. Ren, Z. Xu, and W. Zhang. When shall i estimate your intent? costs and benefits of intent inference in multi-agent interactions. In *2022 American Control Conference (ACC)*, pages 586–592, 2022.

[2] L. Zhang, M. Ghimire, W. Zhang, Z. Xu, and Y. Ren. Approximating discontinuous nash equilibrial values of two-player general-sum differential games, 2022.