Bibek Poudel

Computer Science Ph.D. Student

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Visa status: F1 visa

Education

- **University of Tennessee in Knoxville** 2023–Present
  Ph.D. in Computer Science
  Advisor: Prof. Weizi Li
  Research: Novel applications of Reinforcement Learning in Intelligent Transportation Systems.
- **University of Memphis** 2019–2023
  M.S. in Computer Science, GPA: 4.0/4.0
  Advisor: Prof. Weizi Li
  Research: Coordination and control of Reinforcement Learning agents in mixed-autonomy traffic, robustness evaluation of traffic state monitoring systems, and real-time control in micro-mobility systems.
- **Tribhuvan University** 2012–2017
  B.Eng. in Electronics and Communication

Professional Experience

- **Graduate Research Assistant**
  Department of Electrical Engineering and Computer Science, UTK 2023–Present
- **Graduate Teaching Assistant**
  Department of Computer Science, U of M 2019–2023

  Lectures: Delivered lectures to undergraduate and graduate courses on the following topics:
  1. "Introduction to Transformers", Machine Learning Spring 2023.
  2. "Optimization and Stochastic Gradient Descent", Artificial Intelligence Spring 2023, Machine Learning Spring 2023, Intro to Neurocomputing Fall 2020 and Fall 2021.
  3. "Introduction to Adversarial Machine Learning", Intro to Neurocomputing Fall 2021.

  Assignments: Developed and conducted coding assignments for graduate AI and ML courses, on topics including Convolutional Neural Networks, Reinforcement Learning algorithms, and finetuning of Transformers.

  Teaching Assistance: Courses covered include Software Engineering, Database Systems, Artificial Intelligence, Data Mining, Machine Learning, and Advanced Machine Learning.

Publications

- M. Villarreal, **B. Poudel**, W. Li, "Can ChatGPT Enable ITS? The Case of Mixed Traffic Control via Reinforcement Learning." *In Submission*
- M. Villarreal, **B. Poudel**, J. Pan, W. Li, "Hybrid Traffic Control and Coordination from Pixels." *In Submission*
- M. Villarreal, **B. Poudel**, R. Wickman, Y. Shen, W. Li, "AutoJoin: Efficient Adversarial Training for Robust Maneuvering via Denoising Autoencoder and Joint Learning." *In Submission*
- R. Wickman, **B. Poudel**, M. Villarreal, X. Zhang, W. Li, "Efficient Quality-Diversity Optimization through Diverse Quality Species." Proceedings of the Genetic and Evolutionary Computation Conference (GECCO) 2023. Preprint
- **B. Poudel**, T. Watson, W. Li, "Learning to Control DC Motor for Micromobility in Real Time with Reinforcement Learning." Proceedings of the IEEE International Conference on Intelligent Transportation Systems (ITSC) 2022. Paper
- **B. Poudel**, W. Li, "Black-box Adversarial Attacks on Network-wide Multi-step Traffic State Prediction Models." Proceedings of the IEEE International Conference on Intelligent Transportation Systems (ITSC) 2021. Paper

Projects

- **Robustness to Input Corruptions and Adversarial Examples in Steering Angle Prediction via Self-Supervision:** Examined the use of self-supervised learning in steering angle prediction task to enhance model robustness under conditions such as snow, fog, frost, pixelation, and blur. *Preprint.*

- **Latent Representation of Inputs: A Defense Against Adversarial Examples in Deep Q Networks:** Used feature squeezing to improve the performance of a Deep Reinforcement Learning algorithm, DQN trained to play Atari Pong, under adversarial attacks. *Preprint.*
- **Distributed Hyperparamter Tuning of Neural Networks:** Parallelized the hyperparameter search objectives in grid search and random search using Distributed Hash Table, such that, computational resources are shared across multiple nodes to accelerate the search.
- **BarterBaron, A Commerce App Based on Barter System:** Developed a ebay-like commerce platform using Ruby on Rails framework with features like chat, content search, and user authentication. *Demo.*
- **Delta Design 3D Printer:** Designed and developed a working prototype of a 3D printer using Arduino Mega (Senior year Engineering project). *Report.*

Awards & Honors

- Travel Grant, Department of Computer Science, University of Memphis, 2021
- "Best project in the class" award for BarterBaron, Software Engineering, University of Memphis
- Merit based scholarship (top 5% of the class), Tribhuvan University.

Skills & Certifications

- **Machine Learning:** Proficient in data exploration, analysis, ML model programming, GPU-accelerated training, and model validation. Experienced in generating adversarial examples and implementing reinforcement learning algorithms.
- **ML Tools:** Experienced with HuggingFace and Weights & Biases. Proficient with virtualization tools such as Conda and Venv. Capable of distributing and managing experiments across multiple systems.
- **Frameworks and Libraries:** Proficient with PyTorch, TensorFlow, Keras, AdverTorch, Seaborn, Pandas, Matplotlib, Scikit-learn, and NumPy.
- **Languages and OS:** Skilled in Python, C++, and LaTeX. Experienced with Linux (including shell scripting, software installations, package management), MacOS, and Windows OS.
- **Design and Hardware:** Proficient with Adobe Illustrator and Sketch app. Experienced with Arduino.
- **Certifications:**
  1. Neural Networks and Deep Learning, deeplearning.ai

Academic Service

- **Reviewer:**
  1. IEEE International Conference on Intelligent Robots and Systems (IROS) 2022, 2023
  2. Robotics: Science and Systems (RSS) 2023
  3. IEEE Robotics and Automation Letters (RA-L) 2022
  4. International Conference on Learning Representations (ICLR) Workshop on Generalizable Policy Learning in the Physical World 2022
  5. IEEE International Conference on Robotics and Automation (ICRA) 2021
- **Membership:**
  1. IEEE student member

Personal Interests

- **Hobbies:** Gardening, Cooking, Movies, and Swimming
- **Languages:** English, Nepali, and Hindi

References

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